

COST Action C17:
BUILT HERITAGE:
FIRE LOSS TO
HISTORIC
BUILDINGS

C | Conference
Proceedings

Part 4

TECHNICAL
CONSERVATION,
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EH9 1SH
Tel 0131 668 8638
Fax 0131 668 8669
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C | Conference Proceedings

COST Action C17:
Built Heritage: Fire Loss
to Historic Buildings:
Conference Proceedings
PART 4

Edited by
Ingval Maxwell OBE

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1-3 December 2006

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Giorgio Mazzini,
Head of National Fire Services Corps, Italy

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Steve Emery

3. Post-fire decisions; Norwegians examples:

Einar Karlsen

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COST Action C17: “BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS”: FINAL CONFERENCE: SUMMARY REPORT

Ingval Maxwell

The Final Conference of COST Action C17 was held in the Istituto Superiore Antecendi, Via del Commercio 13, Rome, Italy on 1-3 December 2006

Background

As the scene of one of the greatest historic city fires, it was perhaps fitting that the final meeting of COST Action C 17 should be held in Rome. During the night of 19 July AD 64 a fire started amongst the shopping stalls in the Circus Maximus. By 28 July, when it finally burnt out, two-thirds of the city of Rome had been destroyed, wiping out 10 of the Imperial city's 14 districts.



The final COST C17 meeting was hosted by the Ministero dell'Interno, Dipartimento dei Vigili del Soccorso Pubblico e della Difesa Civile, Istituto Superiore Antincendi, in the Magazzini Generali, Rome from 1-3 December 2006.

The Magazzini Generali were originally built between 1909 and 1912 at the river harbour on the left bank of the River Tiber. During their functioning period until the mid 1970's the general warehouses provided the central storage areas for the distribution and conservation of city's foodstuffs and the need to organise the capitals trading activities.

The redundant buildings were then purchased by the Italian Government for the Ministry of the Interior and, from the mid-1980's, work was started to convert them into a Higher Institute of National Corps of Fire Fighters.

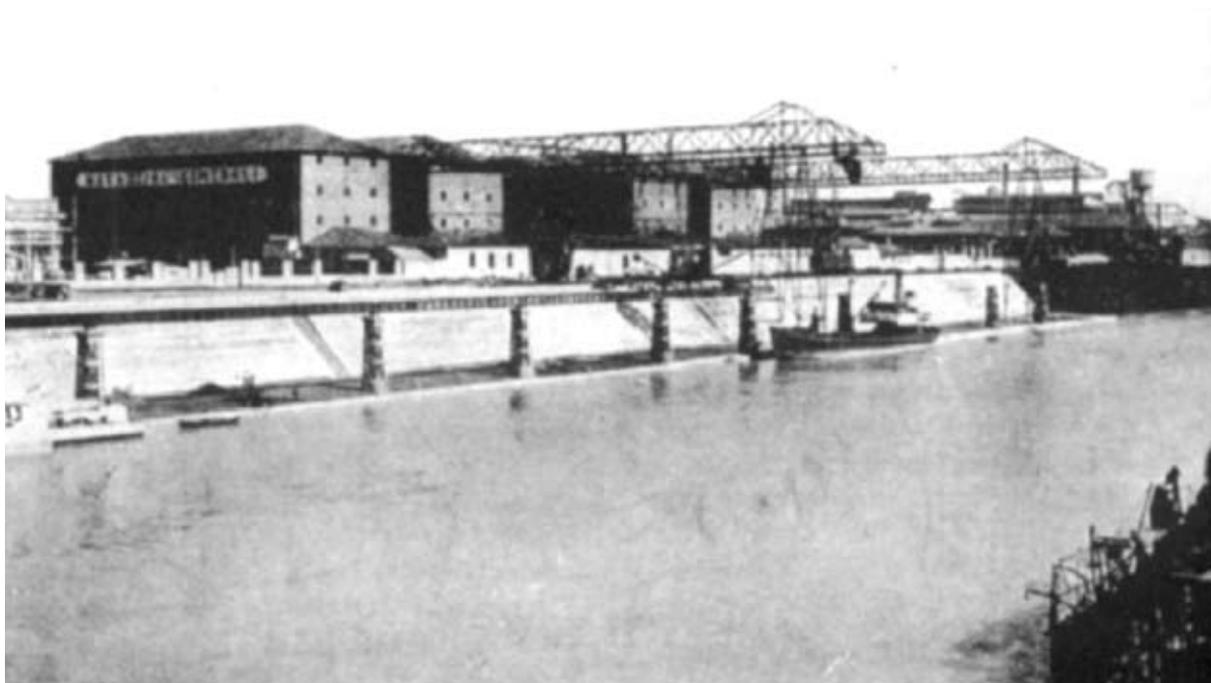
Quoting from Laura Barreca's 2002 publication *Magazzini Generali, Rome*, Guido Parisi, Director of the Istituto Superiore Antincendi, describes the background to the facility -

The National Corps of Fire Fighters new organisational programme (Law 398/2001) stresses the importance of staff training. The Central Training Direction within the Department of Fire Fighters for Public Relief and Civil Defence of the Ministry for the Interior, emphasises the Administration's commitment to the quality and quantity of staff training, a recognised means for change, to increase work safety conditions and to improve procedures and behaviours to the benefit of the service to society. The Fire Fighting Higher Institute occupies the premises in Via del Commercio and as the place where the National Corps of Fire Fighters has its organisation in the fields of safety, prevention and protection from accidents and relates to its staff and to other institutions.

In particular, the Institute is responsible for the training of the Fire Fighters National Corp's staff, its professional, technical and procedures updating. The Institute organises and manages displays, and congresses on safety. It organises for training of Professional Orders, such as Architects, Engineers and Land Surveyors on fire-fighting and safety. It organises studies and research at a national and international level; in collaboration with the Rome University "La Sapienza" it organises Master courses in the Faculty of Engineering and with the Civil Protection Department, on problems related to natural, industrial or civil disasters intervention techniques.

The headquarters premises are nearly finished, they are made up of four main buildings to be used as students' residences and teaching rooms. Two more buildings are under completion: one is going to house the historic and artistic museum and the other the diagnostic centre of the Firefighters National Corps' National Health Service, and other related services. The archaeological site discovered during the excavations for the building of the underground car-park has brought to light a Roman residence of about the first to second century AD, and layers of a necropolis dating 3rd century AD. Work on the area is now going to be completed and the area connected to other neighbouring archaeological sites.

The Fire Fighting Higher Institute complex covers a surface of over 23,000 square metres, for over 110,000 cubic metres of reconstructed buildings; it is in a strategic position in respect of the city of Rome and its urban links, it is within students' and staff's easy reach, and offers, after a day of teaching and learning activities, several proposals for relaxation and enjoyment in a city rich with a high quality historical and architectural heritage. The Institute has an ambitious programme for the future: it proposes to become an international reference centre and venue for debates and congresses on development and deeper awareness on safety culture, on prevention and intervention in accidents involving human beings in an evolving society.



Stefano Marsella offered words of welcome to COST Action C 17 members on behalf of Giorgio Mazzini, Head of National Fire Service Corps, Italy.





Ministero dell' Interno

**Dipartimento dei Vigili del Fuoco
del Soccorso Pubblico e della Difesa Civile**

DIREZIONE CENTRALE PER LA FORMAZIONE

ISTITUTO SUPERIORE ANTINCENDI





In providing an update from the COST Office Marcus Zisenis, Science Officer for COST Transport & COST Urban Civil Engineering informed members about -

- Dissemination of the Action results
- The submission of the evaluation report
- The new systems and Domain descriptions
- How to process a new call for an action
- The new grants system
- The updated number of COST countries

Friday 1 December 2006

Opening Session

Stefano Marsella offered words of welcome to COST Action C 17 members on behalf of Giorgio Mazzini, Head of National Fire Service Corps, Italy.

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Summary of Action MC + WG Activities

Ingval Maxwell, Chairman, noted that the Action was initiated on 13th December 2002 and was due to formally terminate on 12th December, 2006. However, due to uncertainties throughout most of 2003 the Action did not fully get under-way until its first meeting in Edinburgh in September 2003. Consequently, the emerging results were the work of members over the last 3 $\frac{1}{2}$ years. He then gave a summary of all the Action Management Committee and Working Group activities over that period. He specifically noted that a remarkable amount of work had been achieved as a result of the unstinting support which had been received from all members at the each meeting. He reiterated that the strategy which had driven the Actions activities throughout. This involved planning integrated Management Committee and Working Group activities along with a support Seminar or Conference at each meeting - thereby maximising on available time and resources. This formula had proved to be exceptionally effective and had contributed greatly to the success of the action.

Session 1: The Work of Working Group One: Data, Loss Statistics and Evaluating Risks

Session 1.1 The Scale of Fire Loss to Historic Buildings

Ingval Maxwell presented a paper on the scale of Fire Loss to Historic Buildings. This looked at the historic situation of major fires in cities and offered a list of significant fires in heritage buildings that had occurred in recent years. Working from available information from press clippings a list of fires which had occurred each year during the Action was also presented. Noting that significant data was unavailable and could not be found during the life of the Action a specific exercise had been carried out in the United Kingdom. This trawled a significant number of websites to obtain a national and regional data of fire losses to historic buildings. Whilst the full information from this exercise will be presented in the Action's Final Report an analysis was presented on the range of incidence which had been tracked down. This looked in detail at a number of factors including the building's age, its function and the causes of fire.

Session 1.2 Scottish Historic Buildings National Fire Database

Mike Coull presented an updated paper on the benefits and development of the Scottish Historic Buildings and National Fire database. This was now fully operational throughout Scotland although different systems adopted by the various Fire and Rescue Services currently prevented a uniform approach being used to maximise on the database's potential. None the less, the database had become a critical element of the integrated risk management assessment approach which each Fire and rescue Service now had to work to. In consequence, realistic feedback as to the real scale of fire loss to the built heritage was now being received.

Session 1.3 Spanish Fire Cases during COST Action C17 (2002-2006)

Mariana Llinares presented the information on the scale fire Loss experienced in Spain during the life of COST Action C 17. She noted that the scale and degree of loss was still presenting cause for concern. She also recognised the lack of any official statistics in trying to obtain a truer understanding of the real scale of loss.

A number of case study fire incidents that had occurred during the Action period were considered including the:

- 15 February 2002 fire at the early 20th C Palau de Mar, Barcelona:
- 8 March 2002 fire at the 16th C Buenavista Palace. Málaga
- 25 March 2003 fire at the 15th C Country House Unanue-Zar. San Sebastián
- 7 August 2003 fire at the 17th C San Cayetano Church. Madrid
- 14 April 2004 fire at 13th C Toledo Cathedral
- 12 February 2005 fire at the 20th C Windsor Building. Madrid
- 5 December 2005 fire in an ancient building. in Las Palmas de Gran Canaria
- 23 January 2006 fire at the 17th C Bishop See. Tenerife, and the
- 16 November 2006 fire at the 18th C Zalduondo Town Hall;

Session 1.4 Predicting Risk from Statistics

With reference to data collated by the National Trust, Nick Jordan presented a table and analysis of 881 different fire incidents that the Trust had experienced in England and Wales covering the period 1991 –2005.

Session 1.5 Assessment of fire safety of people with disabilities: problems and possible solutions

Stefano Marsella presented a paper which addressed legislative needs to accommodate disabled occupants of buildings. Noting that there were 2.5 million people in Italy with disabilities, he focused on giving an assessment of fire safety issues for people with disabilities and offered a range of possible solutions to the problem. The current codes D.M. 236 del 14/6/1989 e D.P.R. 503 del 24/7/1996 required that “Accessibility is intended as the possibility for everybody (even persons with impaired capabilities) of reaching a building and every space of it with the necessary safety and autonomy”. And that D.M. 236 del 14/6/1989 e D.P.R. 503 del 24/7/1996 called for “Every project that intends to consider accessibility has to present the distribution of rooms and spaces and specific features aimed at limiting the risk of fire to people with sensorial or motion disabilities. In order to reach the level of safety for people with disabilities, when possible should be preferred the division of the spaces into fire compartments more than choosing means of egress that use only stairs” .He also indicated that the Italian authorities had produced a related booklet “Rescuing People with Disabilities: Emergency Management Guidelines”. This promoted practical guidance and this was available from the web site - www.vigilfuoco.it

Session 1.6 Discussion

In the Session discussion period Wolfgang Kippes indicated that a new Austrian law had become effective from 1 January 2006. Whilst this required building owners to facility and support disabled people by every means, it was proving difficult to achieve in practice. It was noted that a useful publication and DVD on accommodating the disabled had been produced in Sweden.

Session 2: The Work of Working Group 2: Available and Developing Technology

Standing in and apologising for the absence of Stewart Kidd, Nick Jordan presented an overview of Working Group 2 activities during the Action. This involved:

- Behaviour of structures and materials in fires
- The balance between technological and management solutions to counter the effects of fire
- Availability of traditional skills which will be required in a post fire situation
- Causes of Fires
- Consider appropriateness of current codes and standards
- Assess the provision of means of escape, damage limitation and access for fire fighters
- State of the art solutions minimising intrusion of technology

Session 2.1 Norwegian Overview

Sjur Helseth offered a Norwegian Overview emphasising that fire protection was not about technology as the main issues involved:

- A holistic approach
- Concepts or solutions durable over time
- A never ending search for simple and basic solutions
- A strategy tailored to the object and to the local possibilities

He also emphasised that the technology should be about “fun”. He raised concern over the accidental discharge of fire suppression systems and the need for lateral thought when installing systems. As an example, he noted it was easier, and less damaging, to securing fixing blocks by a single nail to the structure of a wooden building so that a greater number of fixings could be made onto the fixing block, rather than the original structure. He also revealed new technology such as the water cannon which could fire out water-mist over a 20 metre range, and the use of a water cutting lance, which cut through the structure, to allow fire fighters to attack a fire from the relatively safe exterior around a wooden building, rather than try to penetrate the building and fight the fire from within. He also described self-contained water-tank and water-mist systems which included alarms and security devices, and the fire detection monitoring of cities through the use of remote thermal cameras set at variable temperatures. A network of such cameras could then be remotely monitored at the Fire and Rescue station. He further reflected on the need to recognise the simple fire bucket, fitted with a handle on the bottom to improve the throwing capability, could also be a relevant solution in many cases.

Session 2.2 Hypoxic Air - Update

Geir Jensen offered an Update on Hypoxic Air Systems, preferring to describe them as inert air systems. He reviewed the benefits of the technology of the system noting that there was substantial interest shown by the preservation community in the system with enticing benefits such as:

- Prevent fire in spaces that may be occupied in the short or long term
- No environmental issues – no secondary damages
- Involving small or reversible hardware in protected spaces
- Minimally invasive
- Simple with proven components.
- Reliable.
- No transportation tasks to refill

He suggested that the system redefined the understanding of air conditioning. A greater awareness of the system had also led to a number of actual project case studies. This had also generated new research needs, where it has now been shown that an installation can cover a range of rooms from an outlet in one room – if there is only a small amount of air leakage.

Session 2.3 Numerical Simulation of Fire Dynamics

In presenting Switzerland's contribution to the Action, Christian del Taglia aimed to show the effectiveness of the computer simulations for safety analysis in historic buildings and addressed risk assessment, fire safety certification and post-fire archaeology, noting that two simulation techniques were appropriate – zonal models and computational fluid dynamics. He made a plea for multi-disciplinary working for the benefit of the built heritage and concluded with the views that:

- Performance-based approach leads to effective and reliable solutions
- Innovative solutions can be found by simulations
- These solutions do not interfere with value of historic building
- CFD can model the complex historic-building architecture with high accuracy
- User expertise is necessary for simulations

Session 2.4 Skill registers

Vincenzo Nuzzolese presented the results of the Working Group 2 Survey Questionnaire with the intention of identifying professional skills and competence of contractors, craftsmen and generic manpower to intervene in historical buildings damaged by a fire in Europe. With information received from members in Austria, Bulgaria, Denmark, Finland Italy, Netherlands, Norway, Poland, Spain, Sweden, Switzerland and the UK, he offered a country-by-country breakdown of available skills to deal with the aftermath of fires in historic buildings in each of the Action's member countries. The analysis considered three main issues–

- the presence of subjects (public or private if any) having jurisdiction on historic buildings in general
- the presence of any kind of regulation (pre-requisites, special registers, associations, etc.) selecting subjects (contractors, craftsmen, etc.) that may intervene in a historic building in general (for maintenance and restoration works) or when damaged by a fire
- training activities, requisites due to be eligible to operate in a historic building and any further information on the subject

This comprehensive overview revealed considerable shortcomings, and he called for the Scottish Historic Buildings National Fire Database to be promoted as a model which could be adopted in each country in the future. He emphasised the need for any database information to be validated so that its usefulness could be quality controlled and guaranteed. One of the key aspects of the analysis was the recognition of the lack of consultation and co-ordination regarding the range of details and information across the European perspective. As a conclusion, he proposed the development of a new Action to pull this material together.

Saturday 2 December 2006

Session 3: The Work of Working Groups 3: Cultural and Financial Value

Session 3.1 Cultural Historic Value; International documents and definitions

With reference to a wide range of international charters and conventions, Sakari Mentu addressed the issues of cultural values. He noted that the main criteria of cultural historic value included:

- historic interest includes buildings which illustrate important aspects of social, economic, scientific, cultural (literature, theatre, film, art, architecture etc) or military history
- architectural interest; buildings of interest for their architectural design, decoration and craftsmanship
- technical interest; buildings of interest because of technical innovations. This dimension in many countries is included in architectural interest
- emotional interest; buildings which are associated with important people or events, or have great symbolic value
- group value; buildings which are important as elementary parts of an interesting or beautiful unity

He also explained that enhancing factors or added value can be:

- authenticity or genuineness
- representative-ness or rareness, if the building is very typical or very special
- clarity and educational potential, if the building is suitable for presenting or displaying its history and other values as education or for tourists
- the degree of importance; significance for a village, a town, a region; national or global importance

Aspects that also needed to take into account included:

- quality or state of maintenance
- usefulness/functionality

He noted that the definitions from the different countries in Europe seem to correspond very well, but different traditions give different emphasis on some aspects and slightly different expressions in their definitions. With reference to a variety of international conservation charters and conventions, he selected appropriate aspects of these that were relevant to the Action's intentions, and succinctly set out operational parameters that should be followed in the future.

Session 3.2 Consequences and probability of fire in historic buildings

Steve Emery considered three aspects in dealing with the consequences and probability of fire in historic buildings – the loss of building; the loss of trade; and the cost of rebuilding what was destroyed. He made reference to a number of case studies including the Cowgate, Edinburgh; Chester Rows; a thatched cottage and a lodge. He suggested that some changes in emphasis and approach should be made that starts to change the emphasis of the probability of to the assumption that a fire is probable to consider the probability of fire spread when a fire occurs. Consequently, there was a need to identify what the biggest threats were and consider how to reduce them.

Session 3.3 Post-fire decisions; Norwegians examples

Einar Karlson reviewed the case study of the reconstructed section of Bergen's Bryggen district following the fire in the 1950s. He traced the development of various proposals, and the dilemmas and solutions of the difference schemes which were played out throughout the 1960-70's to reveal the eventual answer. He also presented an analysis of the Archbishop's Palace fire in Trondheim in 1983 together and with its solutions, and the emerging scheme which has since been adopted for the Nordegate 2002 fire site in Trondheim.

Session 3.4 Recommendations for Insurance of Historic buildings

Based on many years of professional involvement, Ivar Clausen considered that the insurance aspect in the Action's Memorandum of Understanding was an important part of the Actions work. In an important presentation, he offered a range of recommendations for owners to consider under the legislation; standard insurance conditions; easy and clear insurance conditions to understand; competence by the insurance companies in assessing the issues; and objectivity.

Session 3.5 Importance of cultural value and economy

In providing a scene-setting overview of the cultural heritage sector and a broader or industry interests, Kerstin Westerlund Bjurstrom summarised the recommendations and findings of Working Group 3's activities. WG 3 Cultural and Financial Value to deal with:

- Cultural value
- Cultural value and economy
- Insurance of Historic buildings financial data
- Evaluation of Risks and special measures to take regards to historic buildings

- Loss Recovery from ethical point of view

She noted that the economic value consists of value for the:

- owner in terms of market value and emotional value
- tourist industry which consume historic property
- enterprise use of the value as symbols in marketing
- societies use of cultural heritage as an identity to attract people and enterprise

From WG3's point of view she suggested that the Action recommends to each State and the responsible authorities that:

- the responsibility to protect a building against fire and to insure it should be clarified in the regulations for listed buildings at least
- fire prevention measures for listed buildings should be paid from grants from the community in addition to some part of other preservation measures.
- responsible government bodies ought to study the possibility to give money back to the built heritage from the tourist industry
- research on the influence of historic buildings and their surroundings on the economy is initiated and supported by governments and responsible institutions

With regards to property owners the Action recommends:

- to be aware of the economic value for society of their historic buildings, and of the costs to reconstruct them, and that:
- that tenancy agreement should include information about the special value of the building, its vulnerability and what is forbidden because of that
- it has to be clearly motivated and formally decided if fire prevention measures cannot be undertaken because of economy or other reasons
- it has to be formally decided if the building is planned to be used by an enterprise that could cause danger to it

The Action recommends that all parties should encourage the media to pay attention to:

- how insurance companies and owners take their responsibility
- the lack of fire prevention of historic buildings
- under-insured amounts in relation to cultural value of buildings

Session 3.6 Discussion

In considering the value of the built heritage Jacques Akerboom noted that in 2005 some 4.5 million tourists visited the city of Amsterdam, and spent some € billion. The point was made and that if this element of value of the built heritage could be aggregated across Europe the importance and significance of retaining Europe's historic buildings in an intact, original, state could not be underestimated. The discussion recognised the critical need of disseminating information such as this, which had been accumulated as a result of the work of the Action.

Session 4: The Work of Working Group 4: Property Management Strategies

The Work of Working Group 4

In opening the session, Wolfgang Kippes emphasised that the result of Working Group 4 was still dependent upon the results emanating from the other Working Group activities and listed the following as a range of possible contents for that section of the final report.

- Documentation of premises, collections, know how and organisation (including regulations and control) possible recommendations could include the need for:
- Fire Safety Handbook
- Control of hot building works
- Fire Safety Log Book
- Address location of records/archives to ensure business continuity
- Management Plans:
- Emergency Planning: Information – and Alarm–logistics, opening/closing procedures of the premises, evacuation plan for visitors and staff, artefact evacuation / damage limitation plans, public relations, post alarm reaction plan, key control. Coordination and integration of emergency services response: Best practice results for liaison with emergency rescue services. Building upgrading planning: Publish access to risk analysis in business annual accounts balance sheets and offer advice on how to analyse and release information.
- Training needs
- Evaluation / Audits:
- Risk Assessment on a regular basis
- External audit
- Evaluating the experience
- Decision making tools: Use of statistical data and lessons learnt for managerial needs.
- Loss recovery: Ethics, aspect of value, etc (cf. WG 3) management of loss recovery: priorities, funding, documentation, etc.

Session 4.1 Scottish Historic Buildings Fire Liaison Group

In offering a possible model for other member countries to follow, Ingvál Maxwell described the historic background, terms of reference, and modus operandi of the Scottish Historic Buildings Fire Liaison Group. Established in 1996 the SHBFLG is a Scottish-wide, pan-interest body which provides a platform to discuss issues related to the fire protection of historic buildings in Scotland, to share good practise and to develop technical guidance to develop strategies for the fire protection, prevention and response to fire incidents in historic properties. Its Aims and Objectives are to:

- assist in the production and review of technical publications
- exchange information and relevant experiences
- maintain a watching brief over the Scottish Historic Buildings National Fire Database Project
- ensure that outputs maintain a workable balance between the need to minimise any intervention into the fabric of an historic building and the need to improve the level of fire protection of the buildings.

He explained how important it was for the Group to be involved in the drafting of various technical publications dealing with fire loss matters. This involvement helped determine that the acceptance of the recommendations by building owners, and other interested parties, was assured at the point of publication. He also noted that at the Fire Liaison Group had been involved in reviewing the Technical Advice Note which had been published by Historic Scotland in support of COST Action C 17.

Session 4.2 Joint training Fire services - Board of Heritage

Luca Nassi presented a paper on the Italian joint training fire services initiative. In Italy he noted that the responsibility of built heritage conservation was under the Ministry for Cultural heritage and responsibility of built heritage fire protection is under the Ministry of Internal Affairs - National Fire Services Department. According to different laws, owners of listed buildings have to preserve and protect against the fire them but, as a result of the different responsibilities can work on the buildings only after the approval of the works by the superintendent and has to apply fire safety features that, in some cases have to be approved by the local fire services command.

A joint training program of fire officers and fire services officers was started in 2005 in order to give a brief information (1 week) concerning the main aspects of fire protection (to heritage people) and the main aspects of heritage conservation (to fire safety people) The goal of the program is to give to superintendents offices the minimum knowledge about fire safety in order to understand if invasive safety provisions can be avoided and to give Fire Officers a minimum idea of the heritage conservation issue and some basic knowledge about performance based approach. The students are mainly engineers and architects of the Fire Services Department, mostly working in the provincial Commands and technical employees working in local Superintendent offices and in national archives.

The first part of the program is divided into aspects of fire safety to heritage conservation and aspects of conservation legislation to fire safety people, with both parts involving lectures and visits. The second and third part of the training is joint and deals with the principle of the performance based approach to fire safety and the application of the approach to the specific problem of built heritage. The fourth part of the training involves the application of the performance based approach to two case studies. So far three courses have been completed and 36 participants have been involved, but experience has shown that some further development work is required.

Session 4.3 Risk assessment loss recovery in practice

In reviewing the August 2006 fire consequences at Trinity Cathedral St Petersburg, Russia, Per Rohlen noted that the authorities appeared to have acted in a similar unprepared manner as those concerned with the Anna Amalia library fire in Weimar, Germany, in 2004. The initial reaction of the local population was to collect money to effect the rebuilding of the fire-damaged dome. Press photographs released at the time illustrated a complete lack of preparedness for the disaster. Pictures and contents been removed from the cathedral to be simply laid down in the open on the streets. There seemed to have been little or no disaster planning in place. He reported that in 2002 the Swedish legislation was amended to make fire safety a responsibility of the building owner. This had a significant impact on bodies which had previously relied upon the fire authorities to provide them with cover. This had required those bodies to develop a new expertise but this has taken time and a considerable commitment to resolve. As a result, however, there has been a better degree of day-to-day management emerging in many places, with a beneficial reduction in the risks, and their likely frequency, arising. This has emerged primarily because, once the owner had become aware of the risks, follow up remedial activities were essential. With the adopted system taking into account cultural value and restorability of the property, this has allowed prioritising of the approach which, in turn, has assisted the Fire and Rescue Services improve on their operational activities should be an incident occur.

Session 4.4 Implementation of Risk assessment

In a follow up to the presentation by Per Rohlen, Nick Jordan considered the differences in legislation and approach in the implementation of risk assessment. He offered five steps that need to be considered:

- Identify the Hazards/Sources of Fire
- Identify who/what is at Risk
- Assess the Risk
- Develop Control Measures
- Monitor and Review

In implementation he noted the need to develop policies and strategies for:

- Means of Escape
- Structural Protection and controlling the Spread of Fire
- Detecting Fire and Raising the Alarm
- Action to take in an Emergency

Session 4.5 Training Staff

Wolfgang Kippes discussed the salvage and recovery exercises involving the fire brigade's at Schonbrunn Palace. In considering the support needs for property managers the following needed to be addressed:

- Devise appropriate management regimes, learning from others in Europe, through studying best practice in policy, regulations, planning, organisation, checklists, training, monitoring, hot work permission etc.
- As support for property managers, provide models for risk analysis of a building, training of the staff, handling of contents in case of fire
- Establish a balance between technical and management contributions to combat the effects of fire
- Consider the management measures that will contribute to the prevention of fire ignition Consider how the complexity of the building may initially dictate search and rescue, and then fire fighting

The training topics that required to be addressed included:

- Risk Awareness
- Management Plans
- Handling of fire fighting units
- Damage Limitation Training
- Refresher Training
- Joint Exercises (internal staff, emergency services, external partners)
- Evacuation Tests and Training
- Special Training units for decision makers

On the Schloss Schönbrunn Model training involved:

- Emergency evacuation plan is trained three times a year (without visitors). The goal of training is to evacuate all people within 3 minutes
- Risk awareness programme – every member of the staff in contact with visitors has to pass basic awareness training module before starting to work
- Risk awareness programme – every member of the staff dealing with facility management has to attend yearly upgrading modules
- Every staff member has to operate first fire fighting units once per year.

He noted that two years after undertaking their training, 95 per cent of the experience was lost to the staff involved. It was therefore essential to maintain a programme of ongoing training. Joint exercises with the Fire and Rescue Services were an essential part of the process. There was a clear need to promote education on this matter to all Heads of Units and to making them responsible to promote training across all their staff interests.

Session 5: Short Term Scientific Mission Reports and Poster Session

Session 5.1 STSM Burnt stone

Miguel Gomez Heraz reviewed the findings of his STSM and revealed the new development work that had occurred in the area since it was completed. He described oven-based simulation techniques, real fire tests and other IR laser techniques. He concluded that fire generates both physical and chemical changes in the stone as a consequence of fire. He noted the most noticeable short term effect was the discolouration and sooting up of stone, and that tough and compact stones were more sensitive to physical disruption and increase in porosity, whilst granular stones were more prone to mineral changes. He recommended that it would be advisable to make a survey of the most predominant stone types in the built heritage to help predict behaviour in fire situations. He noted that early extinction of fire, using no or little amounts of chemicals, was important to help avoid thermal shock and the risk of contaminants penetrating the stone's structure. The findings also revealed that in the later stages of fire the wetting of stone can transport contaminants into the stone that will lead to long-term decay processes.

Session 5.2 STSM Fire Brigade liaison

Mike Coull reviewed the findings of his STSM and revealed the new development work that had occurred in the area since it was completed. He noted that the Schonbrunn Palace Damage Limitation Team was well integrated into the overall management of the Palace, with the intention of working with, and alongside, the Fire and Rescue Services. He noted a lack of training of fire fighters to increase their awareness of the value of historic properties across Europe, and that the STSM guidelines were also needed to be promoted to owners. In reflecting that in the United Kingdom the term “salvage” was still being used, his aim was to develop this approach into “damage limitation and proactive responses” by creating procedures through a pre-incident awareness approach. In the immediate future there was an intention to develop the work carried out under the STSM into a Short Guide for Building Owners. This would offer practical guidance and information on how to liaise with the fire services. In a related activity, he was also aiming to devise a development programme for fire fighters on how to deal with an incident in a historic building. A draft document had been prepared and a final version of it was due to be published in 2007.

Session 5.3 STSM Management Plans

Jan Holmberg offered a comprehensive set of PDF documents in support of his STSM on Management Plans carried out at Maihaugen Open Air museum, Lillehammer, Norway.

Session 5.4 Flame – retardant Textile Materials Limiting Fire Hazards in Historic Buildings

Jolanta Muskalska indicated that her Institute had carried out a project on fireproofing textiles in support of COST Action C 17. The aims of the project were to:

- Assess the extent of fire hazards in historical objects resulting from the use of flammable textiles
- determine fire safety requirements for textile equipped interiors in historical objects and other situations such as hotels, restaurants and administrative rooms
- determine guidelines and technical features required for flame – retardant textiles
- devise and pilot the production of representative textiles for historical objects to meet assumed requirements
- develop systems to furnishing historic objects with textiles possessing features that satisfy the fire safety requirements and are reconstructed with respect to colour, design, weave and utilitarian properties

She referred to a number of palaces in Poland where the results of this work were beneficial and described the flame test work to analyse the burning behaviour and parameters of a variety of textiles. The new fabrics were predominantly flame resistant polyester, with one example of flame resistant cotton having been produced. She concluded that:

- All designed and produced fabrics meet the fire safety requirements and can be used in model historic objects.
- All designed fabrics meet requirements of the range of performance properties (i.e. colour fastness to artificial light, domestic and commercial laundering and dry cleaning) [and safety of use (i.e. emission of volatile organic compounds, content of extractable heavy metals, presence of arylamines that are not allowed to be split off from colorants under reductive conditions and pentachlorophenol) the results of which were not offered in the presentation].
- Currently, fabrics were being installed in the Cinematography Museum.
- During renovation of historical objects it is important to replace furnishings such as net curtains, drapery, carpets etc. made from flammable textile raw materials with flame-retardant fabrics having all the necessary performance and aesthetic features.

Session 6: Invited Papers

Session 6.1 The Colosseo Fire, Rome: 3rdC AD

Professor Catapati described an analysis of the historic and physical evidence of the fire which occurred in the Coliseum, Rome, in 217 AD. The study was part of a broad research program entrusted by the “Soprintendenza Archeologica di Roma” where the aim was to evaluate what contribution and damage level to the masonry structure could be attributed to the fire, compared to earthquakes and foundation settlement that followed shortly afterwards. Historically the sequence of event included:

- The fire of 217 AD (23 August?): The day of the “Vulcanalia” a lightning strike started the fire in the upper gallery (wooden structure).
- An Earthquake in September (?) 217 AD: a strong earthquake of c 5.0 level on the Richter scale.
- Various earthquakes in 223 AD: 9, 17 September, 19 October 223.
- Restoration works began in 218 AD and were carried on during the Alexander Severus period from 222 to 235 AD.
- Foundation settlements affected the structure from the 2^o century AD

He explained that in the 217 AD incident, fire-flow was driven by a wind from the South West. As a result one side of the Coliseum was more affected by thermal damage than the other. He explained the General Theory of the effects of temperature variations on the different materials that the Coliseum was constructed from, and offered a detailed analysis of how this had affected the structure. Mathematical model had been undertaken on three stages of the study. This considered:

- The fire as an “action” on the structure, modelled by means of a spatial distribution of temperature vs. time and the effects of the hot gases from the fire.
- The thermic fields created inside the structures, to determine how the external surface were heated.
- A mechanical model of the structure to assess the distribution of stresses and resulting deformations.

Through the results of this computer modelling and simulation he illustrated the distribution of stresses in the structure, and the levels of expansion in the masonry. This was due to the thermal properties of the fire and its transmission into the stone work. With project work still in progress, the aim was to continue work to establish the historic development and influences of the range of disasters which had occurred.

Session 6.2 High Pressure Water Mist Fire Suppression Systems for the Protection of Church Cupolas: fire Tests for System Definition

Luciano Nigro, Marioff Ltd, offered a presentation on water mist suppression systems for church domes. Using the fire incident at Trinity Cathedral St Petersburg for reference, he described how water mist systems could be appropriate, but these needed to be specifically designed and developed to accommodate the specific construction of the domes and their timber substructures. Recognising that the Russian authorities had to employ the use of a helicopter to “dump” water on top of the burning dome to help extinguish the fire, it was clear that it was impossible to carry out any human fire-fighting intervention whilst the fire was active. Consequently, the case revealed that a fixed extinguishing system was revealed as the only realistic approach to control a fire in such circumstances. From subsequent fire tests, cupolas were shown to consist of hybrid structures.

As it was designed to do, the external weatherproof dome protects the underlying dome in such away as to prevent any external fire-fighting water from penetrating into the intervening space. In effect it creates a vertical wall over the underlying dome. But, as the wall is also curved, a complex fires spread situation emerges. As a result, he noted that the main problem to be solve is the fire behavior in the limit condition of a vertical wooden wall with beams running vertically and horizontally as the actual configuration is quite important to assist in defining the system. He described the adopted test scenarios and the emerging results, concluding that:

- a design specification for dome system could be defined
- they show the kind of system the site conditions required.

- Can offer design parameters for an installation, including:
- the kind of sprinkler nozzles
- their spacing along the wall
- their spacing in height (different levels)
- their operating pressure

Session 6.3 Summary of Action Presentations

In moving to conclude the Action, and to stimulate views during the General discussion period, Ingvál Maxwell reminded members of the wide range of other presentations that had been offered at the various Seminars and Conferences arranged in support of the Action during the previous 3_ years. In listing the Action outcomes to date he noted the following publications has resulted as a direct result of C 17 activities:

- COST C17 International Workshop Conference Proceedings, 9-11 September 2004 Varna, Bulgaria
- Heritage Protection Conference Abstracts and CD ROM, 23-25 May 2006: Ljubljana, Slovenia

He also outlined the emerging arrangements being created under the European Construction Technology Platform (ECTP) Focus Area Cultural Heritage (FACH) with specific reference to the Horizontal Issue (HI 5) “Disaster prevention and Risk assessment”. He intimated that this could well prove the vehicle for furthering the Action’s activities.

Session 7: Open Forum - General Discussion on WG’s + STSM Reports + Poster Session

Steve Emery reported that the UK government was interested in creating a Virtual Fire Academy which should be freely accessible through the internet. He proposed that all of the Action’s material should be eventually put into the Academy for ease of reference by others.

Wolfgang Kippes encouraged members to react to the current C 17 web-based home page, hosted by Schloss Schonbrunn. He also encouraged members to offer links to their individual institutes’ home pages and to create a chat room facility. He reiterated his original offer to continue to host the C 17 website for one year after the Action had concluded. This required all members to confirm that they were content that their material and reports were properly located on the site. After the host year was up at the end of 2007, the option was open to transfer the site to another location.

Christian del Taglia inquired what needed to be done after the Action was completed to inform the authorities about the results, and how this should be affected. Ingvál Maxwell reflected on the presentation he had given on the creation, terms of reference and working methodology of the Scottish Historic Buildings fire Liaison Group and suggested that this model could be used to assist in the development of similar groups in each of the member countries. If this were possible, then it should be a relatively simple matter to use the group to promote the Actions findings and to develop the future needs of each member’s country. Kirsten Westerlund Bjurström noted that a Swedish group had already been established during the work of the Action, and this was being used to considerable advantage.

Ivar Clausen emphasised the necessity to interface with the insurance world, and suggested the need to promote the Actions findings on insurance matters to each country’s heritage board so as to stress the importance of the issues which had been addressed. Jacques Akerboom intimated that the European Heads of Cultural Heritage departments were meeting in Prague during the spring of 2007 and attempts should be made to use that platform to promote the Action’s findings and results.

Vincenzo Nuzzolese endorsed the view that each country should form its own interest group, and that these groups should be encouraged to work to progress all the issues dealt with by the Action.

General discussion followed on the need to ensure that the Action’s work was printed and made available for members’ for their future use. It was agreed that each member should receive a minimum of 10 copies of the Final Report but, if circumstances permitted, 25 copies would be better so that the results could be promoted more effectively. There was also case made for a Summary Brochure of the Actions findings to be prepared. Suggestions were offered that this brochure should be between 2 and 20 pages in length and that each country should arrange to

have it translated into their own language. Marcus Zenis, Scientific Secretary, suggested that the COST Office would also require between 5 and 10 copies and that there were three possible options of obtaining some COST Office funding to help satisfy the members' requirements-

- Produce conference proceedings of the final Rome conference
- Produce a Final Scientific Report (this was mandatory)
- Produce a Summary Leaflet or Brochure of the Action's key findings

He emphasised the need to negotiate with the publishers the intention of putting a PDF copy on the Actions home page using the standard template produced by the COST Office.

Sunday 3 December 2006

Session 8: Planning Ahead and Next Steps

Session 8.1 COST Action C 26

Frantisek Wald was invited to address the Action. In doing so he outlined the background and results of COST Action C 26 - Urban Habitat Constructions under Catastrophic Events - which was initiated on 26 June 2006. There were four working groups:

- WG1 – Fire resistance (F. Wald)
- WG2 – Earthquake resistance (D. Dubina)
- WG3 – Impact and explosion resistance (M. Byfield)
- WG4 – Resistance to infrequent actions (M. Faber)

Of interest to Action C17, WG 1 would address:

- Structural Integrity Robustness of elements and joints
- Subjects
- Fire model
- Connection modelling
- Member behaviour
- Material simulation
- Fire after earthquake
- Global analyse

The fire testing programme has already commenced and the work programme was due to last four years. He invited members to check the website for their interest at <www.civ.uth.gr/cost-c26>

Session 8.2 Proposed Action on the Consequences of Using Chemical Extinguishing Materials

Professor Jiří Zelinger, Chairman of the Ministry of Culture of the Czech Republic "Technology of fire protection of cultural heritage" project, was invited to address the Action. The goal of this project is to develop fire protection strategy for cultural heritage in the Czech Republic, and the intention to write a methodical notebook similar to Historic Scotland's Technical Advice Notes. It is also intended to establish a Consulting Centrum for Fire Protection of Cultural Heritage in the frame of Methodical Centrum for Conservation, which is attached to the Technical Museum in Brno. The Consulting Centrum for Fire Protection of Cultural Heritage would be able to advice to management, conservators and other persons involved how to solve problems of fire protection at the institution in their responsibility.

As a chemist, he explained the problems of the influence of extinguishing materials and their degradation products on works of art. He indicated that he was convinced there was a problem regarding the use of chemical fire extinguishing materials, and indicated that his concern focused on thermal degradation as a result of by-products produced by the chemical systems and extinguishing powders used for fire-fighting and how these could significantly damage the objects. Given the nature of some of the chemicals it was inevitable that post-fire decay processes would result from their use (assuming they were also effective in controlling the fire). From the archivists point of view it is important to understand the influence of degradation products of halon alternatives on iron gallotannate inks and, for conservators of musical instruments, the influence of degradation products on the metallic parts of these instruments. He also noted that over heated water steam (as a result of water based fire-fighting techniques) can influence the protective varnish on the easel paintings and canvases.

In recognising that COST Action C 17 was concerned mainly with the structural aspect of buildings he argued that the contents of buildings were inevitably related to that problem. In noting that there were numerous papers on the damaging effect of fire on objects of art and books, the fundamental point was to try to make appropriate decisions before an incident occurred. He therefore invited members of the Action to consider the development of a proposal on how the use of chemical technology in fire-fighting can influence the future well-being of art objects.

Session 8.3 Self Evaluation Responses by Members on COST Action C17 Analysis by Ulla Priha

Ingal Maxwell presented a report on the Self Evaluation Responses by members on COST Action C17. This was an analysis of views submitted from 18 members (out of a possible 60 returns) by Ulla Priha, Helsinki on 1 November 2006. Responses had been received from Belgium, Bulgaria, Finland, Italy, Netherlands, Norway, Poland, Spain, Sweden, Switzerland and the UK.

Using a score of 1-5 (1-5: Bad, Poor, Fairly good, Good, Excellent) the key findings were:

1. Results versus objectives

Do you think that COST Action C 17 achieved the general goal of COST, namely increasing European co-operation and interaction and improve European synergy in the field?

Results versus general objectives:	4.4
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Do you think that COST Action C 17 achieved its main MoU objectives to date

Results versus specific objectives:	3.9
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2. Outcome and achievements

Could you please describe the main outcome and the main achievements of the COST Action C 17 and the significance of these?

Outcome and achievements:	4.1
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3. Impact of COST Action C 17

Could you please describe the importance and benefits of COST Action C 17 for research and technology in your own country?

Impact of COST Action C17:	3.8
External "visibility":	3.7

4. European added-value

Could you please describe how the scientific research in the domain of COST Action C 17 in your institution has been improved by the COST co-operation?

Could you please identify what synergies and added value came out of the COST framework?

National projects set up or running:	3.3
International projects set up or running:	3.2
Other added-value aspects:	3.9

5. Coordination and management

Could you please describe the effectiveness of coordination and management of COST Action C 17?

Overall management of Action:	4.6
Organisation of meetings:	4.0
Distribution of documents:	4.4
Usefulness of the COST homepage:	3.5
Internal self assessment of progress:	3.8

6. Dissemination and results

Could you please describe briefly the effectiveness of dissemination?

Publications from meetings:	4.0
Accessibility of documents:	3.7
National + International publicity and marketing:	3.3

7. Organisation

Do you think within COST C17 there should/could have been made more:

Research	Case studies	Common projects	Seminars Conferences	Working Group Meetings
10	8	7	6	8

Do you think your workload was generally:

Far too heavy	Too heavy	OK	Small
0	2	16	0

Do you find it beneficial the meetings being held in partner's (or other) cities?

Very much	Fairly	Not so much	Better in Bruxelles
16	2	0	0

Do you think that the interactions among the 4 working groups was:

Excellent	Good	Sufficient	Not enough
3	11	3	4

8. Participation

Could you please describe briefly the effectiveness of the participation of your Institution to the Action?

- European wide: 3.8
- Nationally / regionally: 3.8
- Within your organization: 4.0
- Short-term scientific missions: 3.6

9. Economic aspects

(Based on 12 returns out of a possible 60 responses from members)

Could you roughly estimate the total manpower in person-days dedicated by yourself and by your Institution's personnel to the activities of the action each year and for the entire duration of the COST Action C 17, including attendance of meetings?

- (150 days average) 1,800 person days total

Could you estimate the total financial resources mobilised by your Institution each year and for the entire duration of the Action for the scientific research co-ordinated by the COST C 17 Action, excluding the cost of above mentioned person days?

- (31,294 average) 375,528 total
- Cost (time and money spent) of Action in relation to participation and added value: 4.3

10. Overall Comments and Recommendations

- Overall, excellent and remained true to the intent of the Memorandum of Understanding
- Limited production of scientific documents could have been better organized
- Lack of a useful website hampered efficient progress
- Exchange, and benefit of, information at conferences, meetings etc has been very good
- The chairman, management and various hosts has been excellent
- Working Group Convenors were sometimes less prepared at meetings

Recommendations: The Action should progress in three ways:

1: The final report should be used in each country to encourage the formation of National Working / Consultation Groups to continue the :

- work of the Action
- collection and collation of data relating to fire loss
- development of fire protection strategies and protocols for comparison across the EU

2: These National groups should continue to meet to carry on the process of collaboration and exchange of information.

3: Specific outcomes of the Action should be carried forward to further develop the level of knowledge and co-operation in the protection of built heritage

- Consider a new Action concerning problems related to the safety and security of the built heritage against natural and man-made disasters
- The next programme should cover a smaller field so it's possible to come closer to the issues and just not list what's already done
- There is still a lot of work to do regarding the fire safety of monuments, to spread the message and to follow what is new in the field

Summary of Self Evaluation Opinions

With an average score of 3.86 the returned opinions of 18 members considered the work of the Action to be verging on being Good overall (Score range 1-5: Bad, Poor, Fairly good, Good, Excellent).

With 12 members considering that they spent, on average, 150 days working on Action activities an extrapolation of that statistic would suggest that some 9000 working person days had been aggregated over the Action period.

Similarly, with an average additional financial resource of €1,294 being committed for each of the 12 responding members during the Action period, a total additional financial resource of €1.87 million can be suggested. This sum is in addition to the financial support received from the COST Office over the 4-year period.

Session 8.4 European Construction Technology Platform: Focus Area Cultural Heritage (ECTP FACH): Disaster Planning and Risk Management: Horizontal Issue 5

Ingval Maxwell reporting on meetings held in Prague, Czech Republic, in June and Cavtat, Croatia, in October 2006, and in concluding the work of COST Action C17, reflected on developments which could emerging under the European Construction Technology Platform (ECTP), Focus Area Cultural Heritage (FACH). He had undertaken a preliminary assessment of where the future aspirations of COST Action C 17 could fit into each of the six Working Group activities operating under the Focus Area. In looking specifically at the strategic objectives of the Groups he noted the following FACH intentions that could be relevant:

WG 1: Assessment, Monitoring & Diagnosis: Priorities

Priority 1:

- Damage free renovation of the existing building stock preserving authentic materials and structures with emphasis on environmental influences.

Priority 2:

- Prediction of physical, chemical and mechanical aging and damaging processes of Cultural Heritage buildings based on experience and innovative technology considering databases and past and future environmental influences as well as natural hazards (pollution, earthquake, flood, landslide, traffic, climatic changes etc.).

Priority 6:

- Development of models for evaluating and predicting the behaviour of historic materials and structures considering material properties and environmental influences for disaster prevention, risk management and for understanding of mechanisms of degradation and deterioration.

Priority 7:

- Setting up databases, standard protocols and criteria for an integral structural assessment of Cultural heritage, including seismically-active and flood plane areas. Integration of this database into an efficient management and maintenance system for Cultural Heritage building.

WG 2: Materials: General Strategy

- 2010: Development of enhanced diagnosis systems, development of standards and guidelines
- 2020: Regular application of diagnosis and monitoring systems, application to new materials, development of management systems, safety of buildings
- 2030: Integration of building diagnosis in management systems, operation, impact on quality of life in the cities

WG 3: Intervention Techniques: Priorities

Priority 1

- To develop databases of different structural elements and structural typologies defined at different geographical level, and a validated catalogue of intervention techniques with respect to their effectiveness, their compatibility – removability – retreatability.

Priority 2

- To develop effective and reliable traditional and innovative “smooth” interventions techniques that alter at the minimum level the historic structure’s character. To optimise the single or combined techniques for application and propose integrated intervention systems.

Priority 3

- To improve analytical tools for structural assessment and simulation of interventions.

Priority 4

- To identify “strategies” for the design of the interventions, by defining “target” structural behaviour of single components and of the overall structure which are compatible with available and “admissible” intervention techniques.
- He encouraged members to check the ECTP web site and to take advantage of the opportunities which FACH might present to them to further their interests in partnership with others.

Priority 5

- To select enhanced and intelligent systems, such as smart systems for monitoring the intervention and real time modification of the working conditions (“early warning systems”) , and select a number of pilot sites for case studies application and validation of the system; after the validation, on the long term, larger scale application of integrated interventions making use of smart technologies, with enhancement of durability and removability

Priority 7

- Optimisation of all obtained results from financial and efficiency points of view (reduction of cost and duration of interventions); development of structural protocols, development and update guidelines; standardization of techniques and procedures

Priority 8

- Setting up of cultural and technological programmes for disseminating and exporting technologies and knowledge to third and in particular developing countries

WG 4: Energy and Environment: Priorities

Priority 1

- To develop our understanding of the nature of movable and immovable CH environments through the... development of risk management methodologies, models and tools.

Priority 2

- To study the micro-environments and the interface between environment and surfaces that create stresses on movable and immovable CH. Development of understanding of physical changes in CH and citizens' through advanced and non-destructive techniques for damage diagnosis

Priority 3

- To identify the optimum management and use of old and new buildings also in terms of energy saving to avoid damage to movable and immovable CH To identify sustainable solutions in terms of conservation of the movable and immovable CH, use of non-renewable energy sources and cost-effectiveness in the design, ... and maintenance of museum...etc.

Priority 6

- To apply new and satellite technologies (including SAR microwave and radar monitor) and multi-spectral scanners to assess damage to movable and immovable cultural heritage (structural, bio-deterioration, blackening, etc) due to the action of the environment...

WG 5: Management, Exploitation + Maintenance: Strategy

Maintenance

- Development of methodologies and establishment of appropriate criteria to elaborate sustainable and reliable maintenance plans of monuments and historical districts, traditional architecture (2010)
- Development of methodologies and tools and establishment of appropriate criteria to elaborate sustainable and reliable predictive maintenance strategies (2020)
- Development of tools and systems to prevent service life of ancient and new materials and structures (2030)

WG 6: City + Territorial Aspects: Strategy

- Research, development and implementation of standardised modular tools, technologies and systems for survey, documentation, evaluation, sustainable management, public participation, communication and networking of units with cultural and natural heritage territorial values.
- Monitoring and early warning systems for critical deterioration of historic environment.
- Safeguarding and consolidation of cultural heritage values in risk in territories should be improved by 40% between 2010 and 2030

Termination of COST Action C17

Following an expression of thanks and appreciation to all participating members of COST Action C17, and a particular thanks to all involved in setting up the Final conference, as there was no further business COST Action C 17 terminated, as planned, at midday on Sunday 3 December 2006.

FINAL CONFERENCE OF COST Action C17 COST OFFICE UPDATE

Marcus Zisenis

cost

Final conference of COST Action C17:

“Built Heritage: Fire Loss to Historic Buildings”

1

COST Action C15 finalization

- **dissemination of the final (scientific) report**
 - publication: as a book and PDF file on the COST Action C17 homepage
- **final evaluation report (six months after termination)**
 - rapporteur: Prof. František WALD from the Czech Republic
 - external expert: Mr. Dennis DAVIS from the UK

European COOperation in the field of Scientific and Technical Research **cost**

2

COST Action Domains and Committees

1. Biomedicine and Molecular Biosciences
2. Food and Agriculture
3. Forests, their Products and Services
4. Materials, Physical and Nanosciences
5. Chemistry and Molecular Sciences and Technologies
6. Earth System Science and Environmental Management
7. Information and Communication Technologies
8. Transport and Urban Development
9. Individuals, Society, Culture and Health

European COOperation in the field of Scientific and Technical Research **cost**

3

COST Open Call of new Actions

- continuous and thematically open COST Open Call
- preliminary and full proposals' evaluation procedure
- next collection date on 30 March 2007 (normally twice per year)

European COOperation in the field of Scientific and Technical Research **cost**

4

COST countries

- ◆ 25 EU Member States
- ◆ EU Accession countries
 - 4 Bulgaria
 - 4 Romania
- ◆ EU Candidate countries
 - 4 Croatia*
 - 4 Former Yugoslav Republic of Macedonia (FYROM)*
 - 4 Turkey
- ◆ three EFTA Member States
 - 4 Iceland
 - 4 Norway
 - 4 Switzerland
- ◆ other European Countries
 - 4 Republic of Serbia*
- ◆ COST Cooperating States
 - 4 Israel

* not associated to the ECJ/EFPA

European COOperation in the field of Scientific and Technical Research **cost**

5

New COST Actions' grant system

- expected average financial support of some € 90,000 p.a. for up to 4 years
- grant holder institution (normally that of the Chair or Vice-Chair of the MC)
- starting for all new COST Actions of the Open Call, and for ongoing Actions by April 2008 at the latest
- Up to 15% overhead fee for administrative costs

European COOperation in the field of Scientific and Technical Research **cost**

6

Selection of COST Actions' funding

- travel expenses and daily allowances for delegates to Management Committee and Working Group meetings
- workshops/conferences
- Short Term Scientific Missions (STSMs) inter-laboratory exchanges
- training schools
- Action grants
- publications and dissemination (including a website grant)
- high level research conferences (jointly with the European Science Foundation (ESF))
- special provision for researchers from "near neighbours" countries

European Cooperation in the field of Scientific and Technical Research



7



COST Office contact points

Transport and Urban Development Domain (TUD)

Carmencita MALIMBAN
Administrative Officer
Office: +32 (0)2 533 38 41
E-mail: cmalimban@cost.esf.org

COST Office
145 avenue Louise, 1050 Brussels, Belgium
Home page: <http://www.costesf.org>
Fax: +32 (0)2 533 38 90



European Cooperation in the field of Scientific and Technical Research

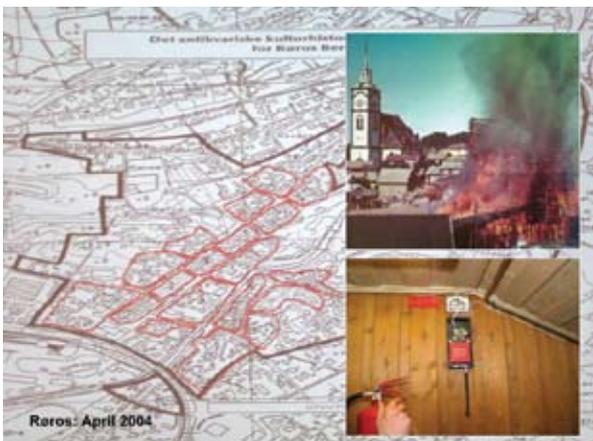


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SUMMARY OF Action C17 ACTIVITIES: MANAGEMENT COMMITTEE AND WORKING GROUP ACTIVITIES

Ingval Maxwell







15

Stockholm, Sweden: WG 3 June 2004



Schloss Schonbrunn, Vienna (WG 1): July 2004

16



17



Varna Free University, Bulgaria: September 2004

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Hotel de Ville, Paris: WG 3 October 2004



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Hotel de Ville, Paris: October 2004



23



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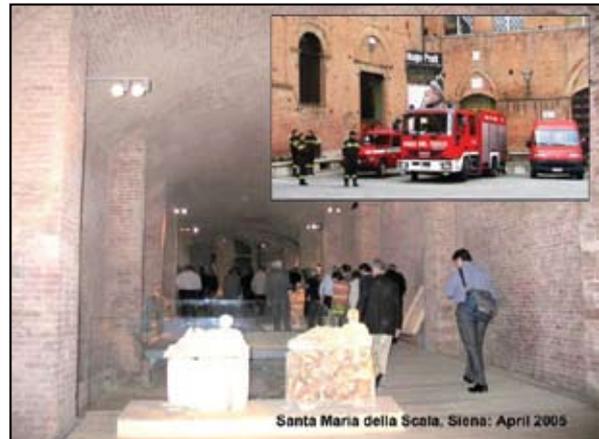
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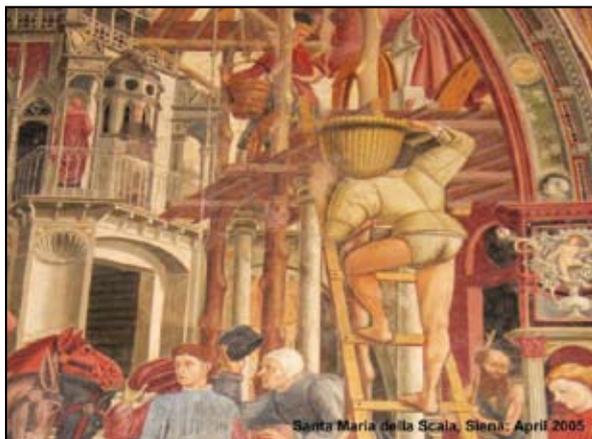
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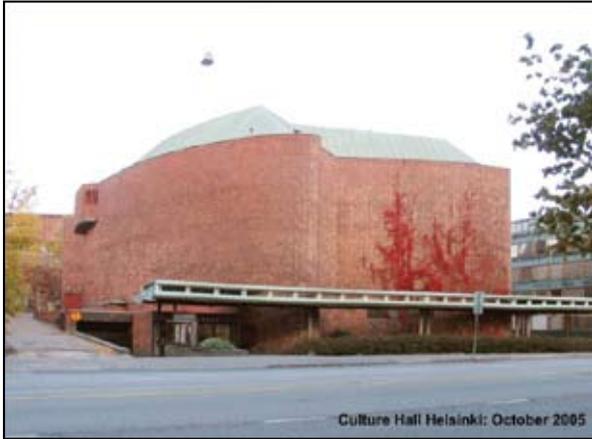
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Culture Hall Helsinki: October 2005



32

Marrioff HQ Helsinki: October 2005



33

Marrioff HQ Helsinki: October 2005



34

Fuzine Castle, Ljubljana : May 2006



35

Ljubljana Castle: May 2006



36



37

In Memory: Chris Hood, UK

Michel Schall, France



38

THE SCALE OF FIRE LOSS TO HISTORIC BUILDINGS

Ingval Maxwell



The Scale of Fire Loss to Historic Buildings

COST C17 Final Conference
Istituto Superiore Anticendi, Rome
1-3 December 2006
Ingval Maxwell
 OBE DADun RIBA FRIAS AABC FSAScot
 Chairman COST Action C17

1

Major Fires in Historic Cities

London, England	1212	Alesund, Norway	1904
London, England	1666	Chelsea, USA	1908
Uppsala, Sweden	1702	Salem, USA	1914
Copenhagen, Denmark	1795	Thessaloniki, Greece	1917
Edinburgh, Scotland	1824	Tokyo, Japan	1923
Chicago, USA	1871	Chiado, Lisbon, Portugal	1988
Boston, USA	1872	Edinburgh, Scotland	2002
Jacksonville, USA	1901	Trondheim, Norway	2002
Baltimore, USA	1904		



2

Major Fires in Historic Building

York Minster, England	July 1984
Hampton Court Palace, England	March 1986
Uppark House, England	August 1989
Proveantgarden, Copenhagen, Denmark	February 1992
Odd Fellow Palace, Copenhagen, Denmark	April 1992
Christianborg Palace Church, Copenhagen	June 1992
Windsor Castle, England	November 1992
Redoutensal, Hofburg, Vienna, Austria	November 1992
Pont de la Chapelle, Lucerne, Switzerland	August 1993



3

International perspective: 1980-1994

USA: 1980 - 1993
 30,000 heritage related fires occurred. With a loss of c\$40 million in value: only one-third of properties had detection apparatus: >10 per cent were fitted with sprinkler protection.

Canada: 1982 - 1993
 316 museums, art galleries and library fires occurred (average of 30/annum): estimated loss over \$17 million. June 1994 St George's Church, Halifax. Nova Scotia arson loss cost \$3 million

Norway: 1992 - 1994
 40 Stave Kirks destroyed by arson attacks. Prior to 1992 the loss rate ran at 1/annum.

New Zealand: 1993
 15 heritage related fires estimated to occur/annum: 93 per cent of the buildings lack any fire detection systems.

4

Major historic building international fire incidents occurring during the course of Action C17: 2003-2006

Press clipping records of the scale of significant international fire losses -

- 25 in 2003
- 16 in 2004
- 36 in 2005
- 23 in 2006 (to October)



5

2003 International Fire incidents

- The entire Research School of Astronomy and Astrophysics Mount Stromlo Observatory, Canberra, Australia (bush fire)
- Hermitage and Dzerzhinsky Naval College, St Petersburg
- Baroque Luneville Chateau NE France
- 17th century Glienicke Jagdschloss Hunting lodge, nr. Berlin
- Pratapur Temple, Swyambhunath Buddhist shrine, Kathmandu, Nepal
- 2 wooden bridges and 1 house, Madison County, USA



6

2004 International Fire incidents

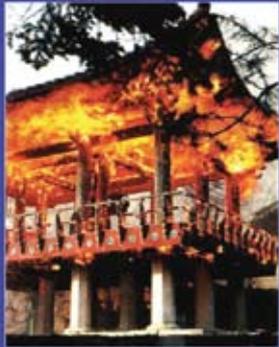
- Several city block buildings, Spring Street, Jefferson, USA, (including recently renovated 1880's buildings at a cost of \$1 million)
- 16 medieval Orthodox Serb monasteries and churches over 3-day period of civil unrest in March 2004. (also estimated >150 Serb churches and monasteries destroyed in Kosovo since 1999)
- Central Manezh Exhibition Halls, Red Square, Moscow
- Anna Amalia Library, Weimar, Germany
- Restored dome of 1921 Harbin New Synagogue, China
- 1884 Laurel Grove Church, Fairfax, USA



7

2005 International Fire incidents

- N tower St Johannis Church, Gottingen, Germany (recently renovated €7.3 million)
- 1,300 year-old Naksan-sa Buddhist Temple, Yangyang, S Korea
- 1897 Rand Club, Johannesburg, South Africa
- 1916 Schloss Hotel Kruen, Bavaria
- 200 year-old Gasthofs Lowen, Oberrohrdorf, Switzerland
- 19th C Peterhof Summer Palace, St Petersburg, Russia



8

2006 International Fire incidents

- 1891 Pilgrim Baptist Church, Chicago USA
- 400 year-old Reinertentisch of farm, Schonwald, Germany
- 17th C residence Bishop of Tenerife, La Laguna, Tenerife
- 18th C Vosshaus, Luboch, Germany
- 1930's Pravda newspaper offices, Moscow
- 13th C Provoce Cathedral roof, Finland
- 1835 Trinity Cathedral, St Petersburg, Russia
- 14 buildings in Flies old town, Graubunden, F Switzerland (estimated loss €10 million)



9

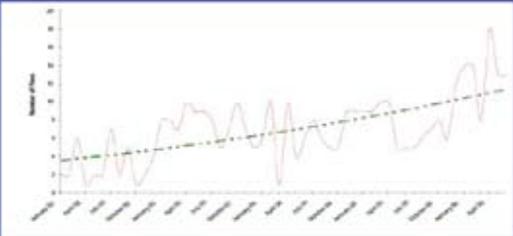
The Scale of Fire Loss to Historic Buildings: UK Fire Loss 2002–2006: Information Sources

- Scottish Fire Loss statistics compiled by Ingval Maxwell, HS
- English Fire Loss statistics compiled by Steve Emery, EH
- English Heritage's Listed Building image archive
- Community websites (particularly useful in rural areas)
- Personal web pages on specialist subjects, (e.g. old cinemas or historic barns)
- Press releases and other information published online by UK fire and rescue services
- Google News (useful for recent events given the large number of publications linked to it)

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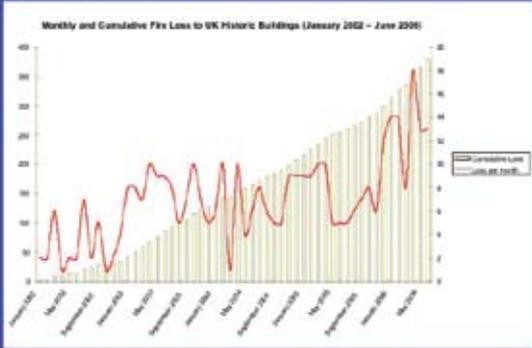
UK Fire Loss: January 2002– June 2006 Summary results:

- c400 separate incidents
- Average of 7 UK heritage buildings lost or damaged/month
- Average of 10 over the period mid 2005 – mid 2006
- 13 over the first six months of 2006



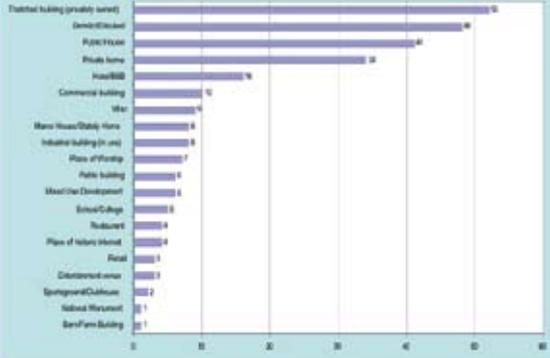
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UK Fire Loss: January 2002– June 2006 Summary results:



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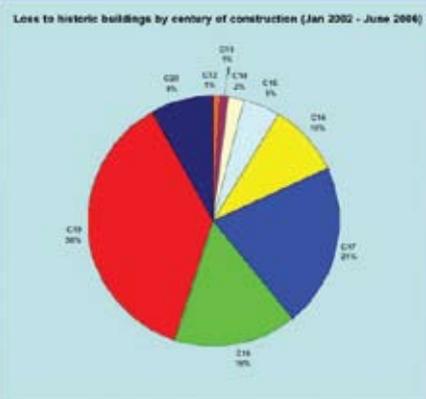
Accidental Fire Loss to Historic Buildings, Classified by Use (Jan 2002– June 2006)



Building Use	Number of Incidents
Theatrical building (usually listed)	52
General/Residential	48
Public House	42
Private home	38
Household	28
Commercial building	18
Work	16
Mass House/Club House	14
Industrial building (in use)	12
Place of Worship	10
Public building	8
Wood Use/Development	6
School/College	5
Restaurant	4
Place of Public Interest	3
Public	2
Entertainment venue	2
Sportground/Clubhouse	2
Historic Monument	1
Sea-Farm Building	1

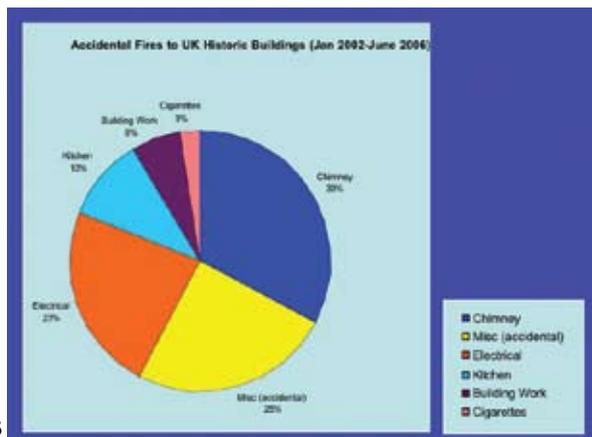
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Loss to historic buildings by century of construction (Jan 2002 - June 2006)

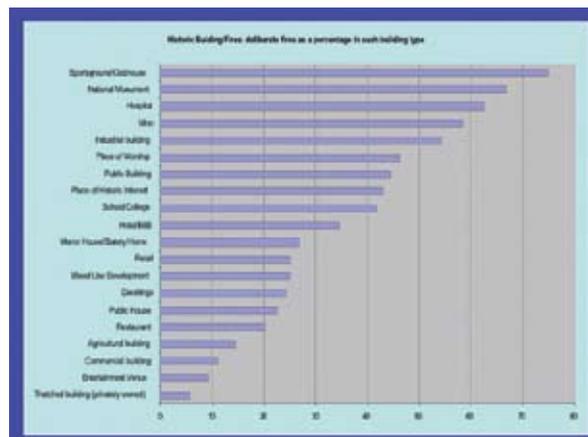


Century	Percentage
C19	30%
C18	20%
C17	20%
C16	15%
C15	10%
C14	5%
C13	5%
C12	5%
C11	5%
C10	5%

14



15



16

F+R Service	A-Total	B-Total	C/S-Total	Total	I-Notes
Central	-	-	-	-	Awaiting confirmation of reporting procedures
D&G	1	15	5	21	To end of March 2006
Fire	-	-	-	-	Awaiting confirmation of reporting procedures
Grampian	9	19	13	41	To end of March 2006
H & I	0	5	3	8	To end of March 2006
E & B	36	90	31	157	To end of March 2006
Strathclyde	-	-	-	-	Awaiting confirmation of reporting procedures
Fayode	-	-	-	-	Awaiting confirmation of reporting procedures
Totals	46	129	52	227	

SHBNFD: Preliminary Reporting of Fire Incidents in Scottish Historic Properties: 2005/06 (To end March 2006)

17

SHBNFD: Preliminary Reporting of Fire Incidents in Scottish Historic Properties 2005/06:

Established Causes of Incidents (to end March 2006):

Electrical appliances / Installation	80
Cooking	63
Wilful	26
Smoking materials	20
Candles	8
Heating appliance	9
External source	9
Unknown	7
Blow Torch	4
Chemical Reaction	1

18

Recommendations 1

While far from comprehensive, from an analysis of the collected press reporting data on UK fire incidents it is possible to formulate a number of recommendations.

Sustained efforts to keep homeowners informed of the need for basic fire precautions (maintenance of building structure and electrics; smoke alarms; the use of kitchen equipment etc.) should be upheld. There remains considerable work to be done to persuade homeowners of their role in fire prevention.

Awareness-raising should be held in conjunction with practical measures.

Local authorities should work with landlords, developers, architects and heritage groups to reduce the security risk of abandoned buildings.

19

Recommendations 2

While far from comprehensive, from an analysis of the collected press reporting data on UK fire incidents it is possible to formulate a number of recommendations.

Renovation and development work should take into account the historic nature buildings and work should be undertaken in accordance with the most stringent possible safety standards.

Workers should be given appropriate training on risks and dangers, particularly in advance of hot work, or when working with combustible materials.

When designing fire prevention strategies for the built heritage initiatives aimed at owners and residents of listed buildings should predominate.

20

Recommendations 3

While far from comprehensive, from an analysis of the collected press reporting data on UK fire incidents it is possible to formulate a number of recommendations.

Building owners, whether private, state or municipal, need to be aware of the particular risk to fire of leaving buildings unoccupied.

Local authorities should be afforded greater powers to direct building owners to carry out renovation work to ensure empty buildings are returned to the market. These powers might be supported with grants or other financial incentives.

21

Recommendations 4

While far from comprehensive, from an analysis of the collected press reporting data on UK fire incidents it is possible to formulate a number of recommendations.

European Member States should consider implement national paperless reporting systems that is capable of recording information on a building's age, listing status and heritage value.

As an interim measure prior to each Member State implementing the above recommendation, each Member State should create and maintain a database record in order to monitor the most important heritage losses through the effects of fire.

22

SCOTTISH HISTORIC BUILDINGS NATIONAL FIRE DATABASE PROJECT

Mike Coull

Scottish Historic Buildings National Fire Database Project

Mike Coull
Grampian Fire & Rescue Service



1

Project History

Scottish Historic Buildings Fire Liaison Group meeting - November 1999

- Demonstration by Strathclyde Fire Brigade, East Command, of pioneering fire risk cards drawn up for all category A-listed properties in their area.
- Demonstration by Historic Scotland of a CD-ROM with information on 45,000 listed properties in Scotland.



2

Aims and Objectives

- To improve effectiveness of fire-fighting operations at historic buildings
- To improve reporting and gathering of statistics on fires
- Encourage on-going partnership between three public bodies - Historic Scotland, Scottish Fire Services and Royal Commission on Ancient and Historic Monuments



3

Vehicle Mounted Data System

Back Home Print Original Target

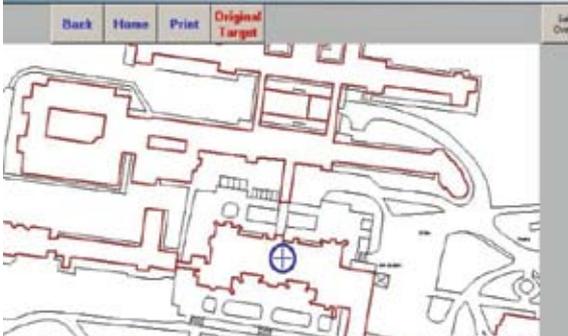


100m 200m 250m 500m 800m 1.5km 2.5km 5.1km 9km 13.6km 25km 40km

4

Vehicle Mounted Data System

Back Home Print Original Target



100m 200m 250m 500m 800m 1.5km 2.5km 5.1km 9km 13.6km 25km 40km

5

Vehicle Mounted Data System



6

Vehicle Mounted Data System

Back Home Print Risk Information Page Menu 3x/08

Risk Information - Historic Building

100016-01 Erskine House

HB No	10909	NMRS No	N5473E 1.00	Category	A
-------	-------	---------	-------------	----------	---

Architectural Description
 1826-28 Large stone mansion house of two stories and basement. Timber floors and boarded and slated roof. Main entrance via porch, second entrance to front leading to stair to first floor. Second stone stair to all levels with front.

Architectural Summary

Significance Statement
 This is a Category 'A' listed building of national importance so the preservation of the entire fabric is highly desirable.

Owned/Occupier
 Mar Holdings (Oct 2008)

7

Vehicle Mounted Data System

Cultural Significance	Fire Vulnerability	Procedures Vulnerability
High	High	High
Location	Element	Description
Interior	Drawing Room	Painted to half height, Gilded plaster vaulted ceiling (see photo)
Cultural Significance	Fire Vulnerability	Procedures Vulnerability
High	High	High
Location	Element	Description
Interior	Library	Timber panelling on walls, Ornate ceiling (see photo)
Cultural Significance	Fire Vulnerability	Procedures Vulnerability
High	High	High
Location	Element	Description
Interior	North entrance hall (front)	Rib vaulted ceiling (see photo)

8



9

Research Progress

F & R Service	Number	Progress
Strathclyde	504	Completed - VMDS
Grampian	387	Completed - Paper
Lothian and Borders	421	Completed - VMDS
Fife	204	Completed - VMDS

10

Research Progress

Central	125	Completed
Dumfries and Galloway	224	Completed - VMDS
Tayside	344	Completed - VMDS
Highlands and Islands	248	In Progress

11

- ### Heritage Co-ordinator Role
- Research project for Edinburgh and Glasgow
 - Research project for B-listed properties
 - Ensure appropriate reporting of fire incidents
 - Develop guidelines on prevention and intervention strategies

12

Research: Edinburgh and Glasgow

City of Edinburgh	902	HBR completed approx 60% Fire Service Researcher completed 40%
City of Glasgow	278	HBR completed all properties Fire Service Researcher commences on 8 January 2007

13

- ### B-Listed Properties
- Review of existing methodology
 - Integrated Risk Management Planning
 - Research an integral part of IRMP
 - Five Year Project Research project

14

Research: Reporting of Incidents

Service	A-Listed	B-Listed	C(S)-Listed	Total	Notes
Central	-	-	-	-	Not Reporting
D & G	2	17	5	24	End Aug 2006
File	2	16	7	25	End Sept 2006
Grampian	11	33	24	68	End Sept 2006
H & I	1	7	8	16	End Sept 2006
L & B	48	135	51	234	End Sept 2006
Strathclyde	-	-	-	-	Not Reporting
Tayside	1	5	1	7	End March 2006
Totals	65	213	96	374	(15 month period)

15

Benefits of the Project

- Integrated Risk Management Plans
- Improved Reporting Systems
- Providing Information to Crews
- Improved Partnership Working

16

SPANISH FIRE CASES DURING COST Action C17 (2002-2006)

Mariana Llinares-Cervera



1

15th February 2002
Palau de Mar. Barcelona

Built:
1910

Location: port area
(Museum of History of Catalonia)

Fire origin:
Short circuit in the archives area

Damages: two floors partially burned





2

8th March 2002
Buenavista Palace. Málaga

Built: XVIth century

Location: historical town centre
(Picasso Museum)

Fire origin: restoration works?

Damages: wooden ceilings from XVIth and XVIIIth centuries burned





3

3

25th March 2003
Country House Unanue-Zar. San Sebastián

Built: XVth century

Location: countryside (6km far from town centre)

Fire origin: fireplace

Damages: completely destroyed




4

4

7th August 2003
San Cayetano Church. Madrid

Built: XVIIth century

Location: historical town centre

Fire origin: church belfry

Damages: no damages



5

5

14th April 2004
Toledo Cathedral

Built: started in XIIIth century

Location: historical town centre

Fire origin: heating facilities

Damages: no damages



6

6

12th February 2005
Windsor Building. Madrid

Built:
 XXth century (during 70's)

Location:
 business centre

Fire origin: unknown

Damages: completely destroyed



7

12th February 2005
Windsor Building. Madrid



8

5th December 2005
Ancient building. Las Palmas de Gran Canaria

Built: ???

Location:
 historical town centre

Fire origin:
 electrical failure

Damages:
 completely destroyed



9

23rd January 2006
Bishop See. Tenerife

Built: XVIIth century

Location:
 historical town centre

Fire origin: electrical failure in the library of the Bishop's residence

Damages: two floors of the diocesan library burnt and adjacent University building affected



10

23rd January 2006
Bishop See. Tenerife



11

16th November 2006
Zalduondo Town Hall

Built: XIVth (XVIIIth?) century

Location:
 historical town centre

Fire origin:
 electrical origin?

Damages: roof and interior destroyed



12

CONCLUSIONS

Information

- Statistical data: causes, consequences
- Technical expertise
- Passive and active technical countermeasures
- Risk assessment methodologies
- Etc

13



14

SPANISH FIRE CASES DURING COST Action C17 (2002-2006): STILL A CURRENT HAZARD

Mariana Llinares-Cervera

In Spain there are no fire statistics about historical buildings and, by the moment, no work is being made on it. The following presentation is based on information about several fire cases collected from newspapers. That means that probably many more “less important” or “less media” fires might have taken place, but that information haven’t been recorded in any Historic Buildings Fire Database.

To give an idea of the scale of fire loss in historic buildings in Spain, I wanted to bring here some fire cases occurred during the life of COST Action C17. Fires that have either just threatened or which have already reduced Spanish Historical Heritage.

15th February 2002. Palau de Mar. Barcelona

On February 2002 a fire took place in Palau de Mar in Barcelona. It is the only preserved building of the old industrial port of Barcelona, which was built during the first decade of the XXth century. Nowadays it houses the Museum of History of Catalonia and the Department of Social Wellbeing. The fire affected part of the third and fourth storeys of the building. Police sources suggested that the cause of the fire, might be a short circuit, but it was difficult to obtain more information because of the virulence of the fire.

It started in the archives placed in the last floor. A visual alarm system was installed since some employees had auditory problems, but there were no sprinklers for it was not necessary according to the current regulations.

8th March 2002. Buenavista Palace. Málaga

On March 2002 there was a fire in Buenavista Palace. A building from the XVIth century which was declared National Monument in 1939. At present it lodges the Picasso Museum in Málaga.

Some of the panelled ceilings from the XVIth century as well as roofs from the XVIIIth century were burned. Nevertheless, damages were not only due to fire but also to the intervention of firemen. Water used during extinction works also affected wood.

Apparently, one of the suggested reasons of the origin of fire was the restoration works, but it was not confirmed.

25th March 2003. Country House Unanue-Zar. San Sebastián

On March 2003 the country house Unanue-Zar, the most ancient in San Sebastian, with nearly 800 years of history, was devastated by the flames after the firemen ran out of water when they had almost controlled it. The fire started in a wooden fireplace of the building.

Its principal historical value was its original Gothic oak timber structure which remained “in perfect state” before the fire.

The firemen admitted that their intervention was interrupted during half an hour because of “problems of water supply”, although it “was not determinant” in the result of the disaster.

An expert states that “San Sebastian loses an average of 7_5 old country houses a year”. At the beginning of the XXth century, in Guipúzcoa 700 country houses were recorded, and only “a hundred” of them remain at present.

7th August 2003. San Cayetano Church. Madrid

On August 2003 a small fire took place inside the belfry of San Cayetano Church, a building that dates back from the XVIIth century.

A few planks began to burn at midnight, which provoked a small fire that needed the intervention of firemen but hopefully neither victims nor material damages were caused.

14th April 2004. Toledo Cathedral

On April 2004 a fire declared in a plant room adjacent to Toledo Cathedral was suffocated by firemen without personal or heritage damages. The bad state of the boilers set into fire the fuel oil they contained. This plant room, placed underground, remained completely destroyed, but hopefully it didn’t reach the cathedral.

12nd February 2005. Windsor building

On February 2005 a fire destroyed Windsor tower, which was part of our modern heritage. It was an emblematic building because it was one of the first skyscrapers of the city, a building which tried to communicate values of modernity and progress.

It was built during the seventies according to the current standards, so only smoke detection and fire hoses systems were installed. The building was being refurbished at the time when the fire occurred. Active measures in this building were limited to automatic detection and alarm, fire hoses and a dry riser system.

The fire started in the 21st floor at eleven p.m. Firemen tried to extinguish it from the interior. But the fire spread very quickly, so at midnight they ordered to leave the building, fighting only from outside. Unexpectedly, fire spread downwards to the lower section of the building through services penetrations and through slab edge openings, with a subsequent interior horizontal spread.

Fire was extinguished after eighteen hours of fire fighting and the result was a completely destroyed building.

5th December 2005. Old building in historic city centre. Las Palmas de Gran Canaria

Maybe this was not a listed building, but it was one of the most ancient buildings of Las Palmas historical centre. It had been abandoned during a long time, and finally fire destroyed it on December 2005. Apparently the fire took place due to an electrical spark as soon as the Christmas lights were lit.

The garbage accumulated inside the building and the carelessness of homeless spending the night there were also suggested reasons of the catastrophe.

23rd January 2006. Bishop See in Tenerife

Another fire took place on January of this year (2006) in the Bishop See in Tenerife. The building, dated back from the XVIIth century and it was one of the most emblematic ones in all Canary Islands as well as an essential part of the town's old centre. It was declared part of the World Heritage by UNESCO in December, 1999.

The prime minister of the Canary Islands Government declared that the most probable hypothesis to explain the origin of the fire was that of a short circuit. The fire was detected at about midday and the building was immediately evacuated.

Firemen from several towns and two helicopters took part in the extinction works. They managed to control the flames in the building after five hours. Nevertheless, by that time the fire had spread to the contiguous Diocesan bookstore, and two of its three floors had already burnt.

The fire went out of control and the wooden roofs complicated the extinction works and adjacent houses had to be evacuated. The historical files of the building, despite the virulence of the fire, were not in danger for they were kept in a fireproof bunker.

16th November 2006. Zalduondo Town Hall

Just fifteen days ago there was another fire in the town hall of a small village of the Basque Country.

The first flames appeared in the higher part of the building and quickly expanded to the rest of it. The structure, except the four exterior walls, was made of timber. After the fire only the stone masonry walls remained.

The principal hypothesis was that an electrical spark from cables moved by the strong wind started the fire.

Paradoxically, the most ancient thing from its interior was saved: the historical files, dated between XIVth and XIXth centuries. These documents were kept into the old stone walls to preserve them from possible catastrophes. Only some documents got wet because of the water used for extinction. Instead, modern files were lost.

Conclusions

Despite the concern for Historical Heritage loss increases every day, funds dedicated to its preservation are scarce. In Spain mainly emblematic buildings have an adequate protection, whilst many small buildings are even abandoned.

Information like this should help building owners, property managers, conservation professionals and regulators to take decisions on how to protect historical buildings against fire. Some of these events have already caused political reactions that changed fire regulations, but for new buildings. After Windsor fire it is compulsory installing sprinklers for buildings higher than 80 meters.

Most of these fires we have seen, took place during refurbishment works, in places without presence of people or in abandoned buildings.

Spanish regulations don't take measures aimed at protecting buildings during refurbishment works and, in common with most European codes, more emphasis is placed on passive control measures than on active measures.

Besides, it is too difficult to give alternative approaches to those stated in the Building Code because there isn't an official method to assess the risk level of different solutions. This makes very difficult for historic buildings to accomplish regulations.

Analysed statistical data, state of the art technical expertise, available countermeasures, risk assessment methodologies, ... are part of the essential information to deal with this problem in historic premises.

Let's hope the results of this Action C17 work will be a useful guide to protect our built heritage from fire.

There is a general lack of statistical information, and a common lack of understanding and appreciation of what measures are available and required, to counter the effects of fire. Good guidance is urgently called for on how to sensitively retrofit modern day equipment into historic fabric. There is also a need to develop related management expertise in the dealing with this problem in historic premises.

- The compilation of appropriate statistical information including an analysis of expert opinion on the rate of loss of historic buildings to fire. _
- A common state-of-the-art understanding, and appreciation, of available appropriate countermeasures should include concerted action to influence future developments in technology.
- A relevant understanding in the financial protection of historic properties
- Guidance on the sensitive integration and retrofitting of countermeasures.
- Compiling statistical data on the extent of Heritage at risk.
- Promoting statistical research into the consequences and causes of fires, both major fires and
- more minor incidences, (e.g. small fires to which the fire brigade are not called or false alarms) and their impact. Using this risk mapping data gathered as a basis for discussion, establish a dialogue with insurance bodies to seek the development of insurance products more closely tailored to historic buildings.
- Establishing a well-documented survey of state of the art technical expertise to assist in influencing future developments in fire protection technology for use in historic buildings.
- Defining an appropriate range of passive and active technical equipment countermeasures.
- Considering alternative approaches to assist in stemming current loss levels
- Organising a series of conferences and/or workshops to develop thinking for effective Risk
- Assessment techniques and risk mapping using insurance company and other data.
- Promoting findings and benefits of relevant risk assessment methodologies and property
- Management support.
- Effecting know-how dissemination through publishing proceedings and recommendations.
- In particular the results of the COST Action shall be targeted to building owners, property managers and conservation professionals to increase awareness and understanding.

PREDICTING RISK FROM STATISTICS USING NATIONAL TRUST FIGURES: PERIOD 1991-2005

Nick Jordan

Cause	Year															Total per Category
	91	92	93	94	95	96	97	98	99	0	1	2	3	4	5	
Cause not Specified	6	1	3	0	1	3	0	1	0	0	0	0	0	0	0	15
Deliberate	3	8	10	8	7	8	11	1	0	5	3	2	8	4	3	81
Other	0	4	2	1	2	6	1	3	2	3	4	3	2	2	1	36
Electrical Hard Wiring	6	9	26	7	5	8	6	4	5	8	12	6	8	4	3	117
Electrical Flex/Cable/Equipment	3	7	21	14	11	9	3	9	13	8	13	8	5	7	5	136
Kitchen/Restaurant/Equipment	2	12	7	6	8	6	6	3	10	6	6	7	4	5	2	90
Hot Work	1	1	1	4	2	0	1	0	1	0	2	2	1	0	0	16
Open Fires/Chimneys	10	18	17	19	15	18	15	13	16	9	6	7	8	15	7	193
Contractors	0	1	6	0	0	0	0	0	0	2	0	0	0	1	0	10
Smoking Materials	0	2	0	0	2	0	1	0	2	2	1	0	1	0	0	11
Controlled Burning - Out of Control	0	3	1	2	1	1	2	0	2	1	0	0	0	0	0	13
Lightning Strike	1	0	5	7	9	1	2	1	9	5	2	3	5	6	2	58
Unknown	3	8	5	6	5	2	2	0	0	2	4	1	2	0	1	41
Hot Ashes in Bin	2	0	1	1	2	0	2	0	1	0	0	0	0	0	1	10
Candles/Naked Light	1	1	6	1	1	0	0	0	1	0	0	0	0	3	0	14
Boiler/Boiler room	1	2	2	0	0	0	2	2	0	3	1	2	1	0	2	18
Gas/Gas Leak	0	1	1	1	0	0	0	0	0	0	1	0	1	0	0	5
LPG	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Open Fire Ignited	0	0	0	1	1	1	0	0	0	1	0	0	0	0	1	5
Vehicle	0	0	0	0	3	2	1	0	0	2	1	2	2	0	2	15
Fireworks	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2
Total per Year	39	78	115	78	75	65	55	38	62	57	56	44	48	47	30	887

15

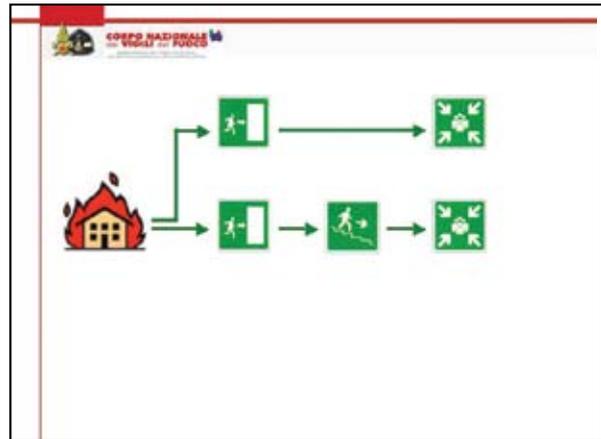
**COSEP NAZIONALE
DEL VIGILANTE
DEL FUOCO**

D.M. 236 del 14/6/1989 e D.P.R. 503 del 24/7/1996

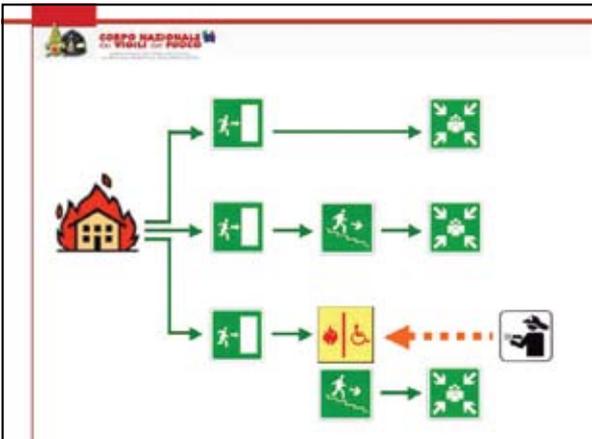
Every project that intends to consider accessibility has to present the distribution of rooms and spaces and specific features aimed at limiting the risk of fire to people with sensorial or motion disabilities.

In order to reach the level of safety for people with disabilities, when possible should be preferred the division of the spaces into fire compartments more than choosing means of egress that use only stairs.

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17



18



19



20

**COSEP NAZIONALE
DEL VIGILANTE
DEL FUOCO**

**RESCUING PEOPLE WITH DISABILITIES:
EMERGENCY MANAGEMENT GUIDELINES**

21

**COSEP NAZIONALE
DEL VIGILANTE
DEL FUOCO**

FIRE SAFETY CHECK-LIST

- ✗ Perception of the alarm
- ✗ Orientation during the evacuation
- ✗ Mobility in inner spaces
- ✗ Mobility in outer spaces

A. Alarm perception	
QUESTION	ANSWER
1) How many people in the building are able to hear the alarm?	
2) How many people in the building are able to see the alarm?	
3) How many people in the building are able to feel the alarm?	
4) How many people in the building are able to smell the alarm?	
5) How many people in the building are able to taste the alarm?	
6) How many people in the building are able to understand the alarm?	
7) How many people in the building are able to recognize the alarm?	
8) How many people in the building are able to respond to the alarm?	
9) How many people in the building are able to evacuate the building?	
10) How many people in the building are able to reach the safe area?	
11) How many people in the building are able to use the stairs?	
12) How many people in the building are able to use the elevator?	
13) How many people in the building are able to use the wheelchair?	
14) How many people in the building are able to use the hearing aid?	
15) How many people in the building are able to use the visual aid?	
16) How many people in the building are able to use the tactile aid?	
17) How many people in the building are able to use the olfactory aid?	
18) How many people in the building are able to use the gustatory aid?	
19) How many people in the building are able to use the cognitive aid?	
20) How many people in the building are able to use the emotional aid?	

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**COSEP NAZIONALE
DEL VIGILANTE
DEL FUOCO**

COST Action C17 - Final Conference
Roma - ISSUE Superiore Anticosti
1-3 dicembre 2016

**THANK YOU FOR YOUR
ATTENTION!**

Stefano Marsella
stefano.marsella@vigilfuoco.it

Stefano Zanut
stefano.zanut@vigilfuoco.it

Ministry of Interior, Department for Fire and Rescue Services and Civil Defence - Italy

COST Action C 17 - BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS FINAL CONFERENCE SESSION 1: SUMMARY REPORT

Ingval Maxwell

The Work of Working Group One: Data, Loss Statistics and Evaluating Risks

Session 1.1 The Scale of Fire Loss to Historic Buildings: Ingval Maxwell



Ingval Maxwell presented a paper on the scale of Fire Loss to Historic Buildings. This looked at the historic situation of major fires in cities and offered a list of significant fires in heritage buildings that had occurred in recent years. Working from available information from press clippings a list of fires which had occurred each year during the Action was also presented. Noting that significant data was unavailable and could not be found during the life of the Action a specific exercise had been carried out in the United Kingdom. This trawled a significant number of websites to obtain a national and regional data of fire losses to historic buildings.

Whilst the full information from this exercise will be presented in the Action's Final Report an analysis was presented on the range of incidence which had been tracked down. This looked in detail at a number of factors including the building's age, its function and the causes of fire.

Session 1.2 Scottish Historic Buildings National Fire Database: Mike Coull



Mike Coull presented an updated paper on the benefits and development of the Scottish Historic Buildings and National Fire database. This was now fully operational throughout Scotland although different systems adopted by the various Fire and Rescue Services currently prevented a uniform approach being used to maximise on the database's potential. None the less, the database had become a critical element of the integrated risk management assessment approach which each Fire and rescue Service now had to work to. In consequence, realistic feedback as to the real scale of fire loss to the built heritage was now being received.

Session 1.3 Spanish Fire Cases during COST Action C17 (2002-2006): Mariana Llinares

Mariana Llinares presented the information on the scale fire Loss experienced in Spain during the life of COST Action C 17. She noted that the scale and degree of loss was still presenting cause for concern. She also recognised the lack of any official statistics in trying to obtain a truer understanding of the real scale of loss.

A number of case study fire incidents that had occurred during the Action period were considered including the:

- 15 February 2002 fire at the early 20th C Palau de Mar, Barcelona:
- 8 March 2002 fire at the 16th C Buenavista Palace. Málaga
- 25 March 2003 fire at the 15th C Country House Unanue-Zar. San Sebastián
- 7 August 2003 fire at the 17th C San Cayetano Church. Madrid
- 14 April 2004 fire at 13th C Toledo Cathedral
- 12 February 2005 fire at the 20th C Windsor Building. Madrid
- 5 December 2005 fire in an ancient building. in Las Palmas de Gran Canaria
- 23 January 2006 fire at the 17th C Bishop See. Tenerife
- 16 November 2006 fire at the 18th C Zaluondo Town Hall

Session 1.4 Predicting Risk from Statistics: Nick Jordan



With reference to data collated by the National Trust, Nick Jordan presented a table and analysis of 881 different fire incidents that the Trust had experienced in England and Wales covering the period 1991 -2005.

Session 1.5 Assessment of fire safety of people with disabilities: problems and possible solutions: Stefano Marsella



Stefano Marsella presented a paper which addressed legislative needs to accommodate disabled occupants of buildings. Noting that there were 2.5 million people in Italy with disabilities, he focused on giving an assessment of fire safety issues for people with disabilities and offered a range of possible solutions to the problem.

The current codes D.M. 236 del 14/6/1989 e D.P.R. 503 del 24/7/1996 required that “Accessibility is intended as the possibility for everybody (even persons with impaired capabilities) of reaching a building and every space of it with the necessary safety and autonomy”.

And that D.M. 236 del 14/6/1989 e D.P.R. 503 del 24/7/1996 called for “Every project that intends to consider accessibility has to present the distribution of rooms and spaces and specific features aimed at limiting the risk of fire to people with sensorial or motion disabilities. In order to reach the level of safety for people with disabilities, when possible should be preferred the division of the spaces into fire compartments more than choosing means of egress that use only stairs”. He also indicated that the Italian authorities had produced a related booklet “Rescuing People with Disabilities: Emergency Management Guidelines”. This promoted practical guidance and this was available from the web site - www.vigilfuoco.it Wolfgang Kippes indicated that a new Austrian law had become effective from 1 January 2006. Whilst this required building owners to facility and support disabled people by every means, it was proving difficult to achieve in practice. It was noted that a useful publication and DVD on accommodating the disabled had been produced in Sweden.

COST Action C17: WORKING GROUP 2, REPORT TO FINAL MEETING

Stewart Kidd

1	<p style="text-align: center;">COST Action C17: Built Heritage "Fire Loss to Historic Buildings"</p> <hr style="width: 30%; margin: auto;"/> <p style="text-align: center;">WG2 Report to Final Meeting Stewart Kidd</p>	2
2	<p style="text-align: center;">COST Action C17: Built Heritage "Fire Loss to Historic Buildings"</p> <p style="text-align: center;">The main objective of the Action is the definition at European level of the degree of loss to the Built Heritage to the effects of fire and for the proposal of remedial actions and recommendations to combat such loss, using minimal invasive techniques.</p> <p style="text-align: right; font-size: small;">(Inaugurated: 13 December 2002)</p>	2
3	<p style="text-align: center;">COST Action C17: Built Heritage "Fire Loss to Historic Buildings"</p> <ol style="list-style-type: none"> 1. Behaviour of structures and materials in fires 2. The balance between technological and management solutions to counter the effects of fire 3. Availability of traditional skills which will be required in a post fire situation 4. Causes of Fires 5. Consider appropriateness of current codes and standards 6. Assess the provision of means of escape, damage limitation and access for fire fighters 7. State of the art solutions Minimimising intrusion of technology 	4
4	<p style="text-align: center;">COST Action C17 Working Group 2 Available and Developing Technology</p> <p style="text-align: center;">Overview of Work Undertaken</p> <ul style="list-style-type: none"> • Norwegian Overview <i>Sjur Helseth</i> • Numerical Simulation of Fire Dynamics - <i>Christian del Taglia</i> • Hypoxic Air - Update: <i>Geir Jensen</i> • Skill registers: <i>Vincenzo Nuzzolese</i> 	4
5	<p style="text-align: center;">WG2 Available and Developing Technology (1)</p> <ul style="list-style-type: none"> • Behaviour of structures and materials in fires <ul style="list-style-type: none"> – Predictive: based on experimental work – Real fire experience <ul style="list-style-type: none"> • Building materials including stone, brick, slate, tile • Concrete, steel, wrought iron, cast iron • Textiles – Structural damage and stabilisation 	6
6	<p style="text-align: center;">WG2 Available and Developing Technology (2)</p> <ul style="list-style-type: none"> • The balance between technological and management solutions to counter the effects of fire <ul style="list-style-type: none"> – Containment – Risk alternatives – Protection – Risk minimisation – Risk transfer – Risk avoidance 	6

WG2 Available and Developing Technology (3)

- Availability of traditional skills which will be required in a post fire situation
 - Databases of craftsmen
 - Training courses
 - Registers

7

WG2 Available and Developing Technology (4)

- Causes of Fires
 - Analysis of records of heritage fires
 - Categorisation of causes
 - Where data does not exist extrapolation from other fire records (eg: it is likely that the uses to which the building is put is as important as its status – causes of fires in historic hotels will be similar to causes of fires in modern hotels.

8

WG2 Available and Developing Technology (5)

- Consider appropriateness of current codes and standards
 - Performance based vs. prescriptive codes
 - Value of risk assessment as a pointer
 - Fire engineering approaches

9

WG2 Available and Developing Technology (6)

Assess the provision of means of escape, damage limitation and access for fire fighters

- Review of national legal requirements (especially where a change of use for a historic building will involve compliance with current building regulations)
- Review of national approaches to damage limitation (Salvage)

10

WG2 Available and Developing Technology (7)

- State of the art solutions
 - Detection
 - Minimising false alarms
 - Combined sensors ("double knock")
 - Suppression
 - Potential value of water mist
 - Sprinklers
 - Gas Inerting
 - Hypoxic air systems
- Minimising intrusion of technology
 - Appropriate use of materials
 - Sympathetic installation
 - Working in Partnership with others

11

COST Action C17 - WORKING GROUP 2 AVAILABLE AND DEVELOPING TECHNOLOGY NORWEGIAN OVERVIEW

Sjur Helseth

1



**Cost C 17 – Working Group 2
Available and Developing
Technology**

Norwegian Overview

Sjur Helseth
Director of Conservation Department
Norwegian Directorate for Cultural Heritage

2



**Fire Protection is NOT about
Technology!**

The main issues are:

- An holistic approach
- Concepts or solutions durable over time
- A never ending search for simple and basic solutions
- A strategy tailored to the object and to the local possibilities

3



**Fire Protection is NOT about
Technology!**

- Still, Technology is very fun!



4



**Available and Developing
Technology – automatic
suppression systems**



5



**Available and Developing
Technology – automatic
suppression systems**



6



**Available and Developing
Technology – manual fire fighting**



 Available and Developing Technology – manual fire fighting



7

 Available and Developing Technology – fire detection



8

 Available and Developing Technology – fire detection cities



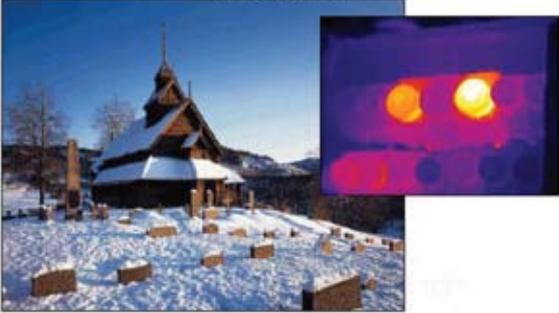
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 Available and Developing Technology – fire preventive measures



10

 Available and Developing Technology – fire preventive measures



11

 But there are also simple solutions!



12

UPDATE: INERT (HYPOXIC) AIR VENTING

Geir Jensen

COST Action C 17 Roma December 2006
Update on Inert Air Venting for Protection of Heritage

Update:

**Inert (Hypoxic) Air Venting
for Protection of Heritage**

Geir Jensen
COWI AS
Norway

1 | COWI presentation | 2006



COST Action C 17 Roma December 2006
Update on Inert Air Venting for Protection of Heritage

Action C17 2004:
Initiative within the Action to investigate inert air venting

Action C17 2006:
Report prepared, published, distributed to members
(Sponsored by Historic Scotland, Riksantikvaren the Directorate for Cultural Heritage Norway and COWI)



2 | COWI presentation | 2006



COST Action C 17 Roma December 2006
Update on Inert Air Venting for Protection of Heritage

SUBSTANTIAL INTEREST BY THE PRESERVATION COMMUNITY - ENTICING BENEFITS:

- Prevent fire, spaces may be short or long term occupied
- No environmental issues - no secondary damages
- None, small or reversible hardware in protected spaces = minimum invasive
- Simple and proven components. Reliable. No transportation tasks to refill

COST C17 REPORT INVESTIGATION:

- Benefits holds true
- Generally one drawback – limit number of applications, not performance. Systems less useful with high air exchange rates – energy penalty

3 | COWI presentation | 2006



COST Action C 17 Roma December 2006
Update on Inert Air Venting for Protection of Heritage

AIR CONDITIONING REDEFINED:

Was: Temperature, humidity

Now: Temperature, humidity and fire safety



4 | COWI presentation | 2006



COST Action C 17 Roma December 2006
Update on Inert Air Venting for Protection of Heritage

Installations ordered/planned/being specified - 2006

Museum of Cultural History Oslo		Storage rooms, various artefacts
Schloss Schonbrunn Vienna		Computer room
British Library London		Large, new premises for archives
Dora Bunker Trondheim		Huge storage bunker for various museums and archives
Smithsonian National Museum of American History, Washington DC		Preservation of first Star-Spangled Banner Flag (1813)

5 | COWI presentation | 2006



COST Action C 17 Roma December 2006
Update on Inert Air Venting for Protection of Heritage

Feasibility Evaluations, Application Research Projects - 2006

Schloss Schonbrunn Vienna		Feasibility study on hypoxic air venting for various storage and computer rooms
British Library London		Preparations for oxygen-reduced atmosphere in archives, through several years
National Library Norway		Investigations in view of future extensions and of improving present preservation+fire climate
Dora Bunker Norway		Research being considered. May join non-heritage inert air research projects in Norway
HSH College University Norway		Student exercise related to special artefact materials (small scale, realistic testing)

6 | COWI presentation | 2006



COST Action C 17 Roma December 2006
Update on Inert Air Venting for Protection of Heritage

Activities in the US and in other parts of the World - 2006

On return from the Ljubljana joint conference of COST, NFPA and SZPV in May, americans organized an event in Washington, prompting these present activities:

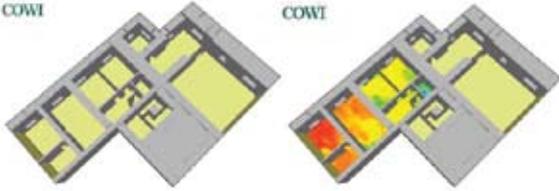
Smithsonian National Museum of American History, Washington DC	Preservation of first Star-Spangled Banner Flag (1813)	
Library of Congress Washington	Research on accelerated ageing of artefact materials in hypoxic air being considered	
Schloss Schonbrunn Vienna	Feasibility study made: Hypoxic air venting for various storage and computer rooms	
National Library (foreign country) Norway	US delegation consider hypoxic air venting Activities: See former slide	

8 COWI presentation 2007 **COWI**

7

COST Action C 17 Roma December 2006
Update on Inert Air Venting for Protection of Heritage

Unlike extinguishing systems: Inert air may be injected from one of several rooms – no installation required in the other protected rooms



8 COWI presentation 2007 **COWI**

8

NUMERICAL SIMULATION OF FIRE DYNAMICS: SWITZERLAND'S CONTRIBUTION TO THE COST C17 FINAL REPORT

Christian Del Taglia
Alfred Moser

AFC Air Flow Consulting

COST C17, December 1 – 3, 2006, Rome, Italy

Numerical Simulation of Fire Dynamics

Switzerland's contribution to the COST C17 Final Report

Dr. Christian Del Taglia, Alois Schölin, AFC Air Flow Consulting AG
Dr. Alfred Moser, Daniel Rusch, ETH Zurich

AFC Air Flow Consulting AG
Helmstr. 10
CH-4058 Zollikon

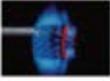
Tel: +41 79 25 89 11
Fax: +41 79 25 89 11

www.afc.ch
info@afc.ch

1

AFC Air Flow Consulting

Business areas

- _ Fire safety engineering 
- _ Energy, comfort and environment 
- _ Contaminant control and industrial ventilation 
- _ Product engineering 

COST C17, December 1 – 3, 2006, Rome, Italy

2

AFC Air Flow Consulting

Introduction

**Swiss contribution to the COST C17 Final Report:
Overview of Numerical Fire Dynamics Simulation**

Purpose of talk:
To show the effectiveness of the computer simulations for safety analysis in historic buildings

COST C17, December 1 – 3, 2006, Rome, Italy

3

AFC Air Flow Consulting

Types of analysis

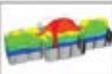
- Risk assessment
 - Simulations for analyzing fire risk
 - Fire protection concepts
 - Data for fire insurances and evacuation simulations
- Fire safety certification
 - Alternative concepts to fire safety prescriptions
 - Performance-based approach for fire safety certification
- Post-fire analysis
 - Possible causes of fire
 - Identifying liabilities
 - Information for insurances and court authorities.

COST C17, December 1 – 3, 2006, Rome, Italy

4

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Simulation techniques - Description

- Zonal Models 
 - Mass and energy balances applied to large volumes
 - 2 Zones: Upper smoke layer and a lower smoke-free layer
 - typically, less than 20 volumes in total
- Computational Fluid Dynamics, CFD 
 - many thousands of control volumes for one room
 - exact physical equations are applied to each control volume
 - Fire simulations around 1 million volumes (2006)

COST C17, December 1 – 3, 2006, Rome, Italy

5

AFC Air Flow Consulting

Simulation techniques - Limitations

Geometry	Multiple reactions	Simulation technique	Computational resources
Simple	Needed	Zone model	Low
Complex	Not needed	CFD with additional scalar	Medium
Complex	Needed	CFD with multiple reactions	High

COST C17, December 1 – 3, 2006, Rome, Italy

6

Computed fire related quantities

- **Fire spread**
- **Temperatures**
 - Air and surface
 - Heat radiation intensity
 - Material damage
- **Smoke**
 - Concentration and visibility
 - Smoke deposition
- **Moisture concentration**
- **Efficiency of**
 - Fire suppression measures
 - Smoke extraction ventilation

COST C17, December 1–3, 2006, Rome, Italy

7

Summary table

Fire related quantity	Damage	Type of analysis			Simulation technique	
		Risk assessment	Fire safety verification	Post fire analysis	CFD	Local Models
Fire spread	Material	X	-	X	X	X
Air temperatures	People	X	X	X	X	X
Surface temperatures	People Material	X	X	X	X	X
Heat radiation intensity	People Material	X	X	X	X	X
Smoke concentration	People	X	X	X	X	X
Smoke deposition	People	-	X	-	X	-
Material damage	Material	X	-	X	X	-
Smoke deposition	Material	-	X	X	X	-
Moisture concentration	Material	-	X	-	X	X
Efficiency of fire suppression measures	Material	-	X	X	X	X
Efficiency of smoke extraction ventilation	People Material	-	X	X	X	X

COST C17, December 1–3, 2006, Rome, Italy

8

Checklist for simulation techniques

- **User expertise (experience, relevant projects,..)**
- **Simulation code (validation,..)**
- **Computational domain (3-D, relevant geometry,..)**
- **CFD Computational grid (fine enough)**
- **Time dependent simulation**
- **Fire model (realistic plume behaviour)**
- **Visibility (line-of-sight integration approaches)**

COST C17, December 1–3, 2006, Rome, Italy

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Conclusions

- **Performance-based approach leads to effective and reliable solutions**
- **Innovative solutions can be found by simulations**
- **These solutions do not interfere with value of historic building**
- **CFD can model the complex historic-building architecture with high accuracy**
- **User expertise is necessary for simulations**

COST C17, December 1–3, 2006, Rome, Italy

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AFC Air Flow Consulting

COST C17, December 1–3, 2006, Rome, Italy

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Let's work together to conserve built heritage in the future!

Dr. Christian Del Taglia, Albie Schöllin, AFC Air Flow Consulting AG
Dr. Alfred Moser, Daniel Rusch, ETH Zurich

N/C Air Flow Consulting AG
Friedhofstrasse 7,
CH-8008 Zurich

T +41 (0) 20 20 98
F +41 (0) 20 20 98

www.afc.ch
Ruschi@afc.ch

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COST Action C17 WORKING GROUP 2: PROFESSIONAL SKILLS AND COMPETENCE OF CONTRACTORS, CRAFTSMEN AND GENERIC MANPOWER TO INTERVENE IN HISTORICAL BUILDINGS DAMAGED BY A FIRE IN EUROPE

Vincenzo Nuzzolese
Mirella Bindo

European Cooperation in the field of Scientific and Technical Research
COST Action C17 - Built Heritage: Fire Loss to Historic Buildings - WORKING GROUP 2

**COST Action C17
BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS**

WORKING GROUP 2

Professional skills and competence of contractors, craftsmen and generic manpower to intervene in historical buildings damaged by a fire in Europe

prof. Vincenzo Nuzzolese
Dipartimento di Architettura e Urbanistica
Politecnico di Bari
via E. Ortoleva 4 - 70125 Bari - Italy
v.nuzzolese@poliba.it

ing. Mirella Bindo
Studio di Progettazione "BANDO & NUZZOLESE"
via De Dominicis 106 - 79013 Bari - Italy
mirella@bnd.it

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**WITHIN THE ACTIVITIES
OF WORKING GROUP 2**

IT HAS BEEN DECIDED TO ANALYSE
THE EUROPEAN SCENARIO WITH
REFERENCE TO THE SUBJECTS
THAT:

- TAKE CARE OF BUILT HERITAGE (have Jurisdiction)
- CAN INTERVENE TO MAINTAIN HISTORIC BUILDINGS (having necessary skill and competence)
- INTERVENE BEFORE OR DURING A FIRE TO PREVENT/REDUCE DAMAGES

2

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**TO COLLECT
NECESSARY
INFORMATION ON THE
DIFFERENT SOLUTIONS
ADOPTED IN THE
VARIOUS COUNTRIES IT
WAS DECIDED TO SEND
A
QUESTIONNAIRE**

TO ALL COST C17 MEMBERS
BELONGING TO THE
PARTICIPATING
COUNTRIES

**AUSTRIA - BELGIUM - BULGARIA - DENMARK - FINLAND -
FRANCE - HUNGARY - ISRAEL - ITALY - MACEDONIA -
NETHERLANDS - NORWAY - POLAND - SLOVENIA -
SPAIN - SWEDEN - SWITZERLAND - UNITED KINGDOM -
TURKEY**

(> ANSWER RECEIVED) (> NO ANSWER RECEIVED)

3

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QUESTIONNAIRE

- In your Country, somebody stated which contractors can operate in a historical building?
- Does it exist in your Country, a special register or other recognized list for contractors, craftsmen and/or generic manpower appropriately skilled to operate in a historical building?
- Does it exist in your Country, a special register or other recognized list for people appropriately skilled to operate in a historical building damaged by a fire?
- Does it exist in your Country, a special register or other recognized list for people appropriately skilled to operate in a generic building damaged by a fire?
- Do exist in your Country, lists of contractors dealing with restoration and fire protection in heritage buildings?
- Does it exist in your Country, a defined training that contractors or involved people must have followed to be eligible to operate in a historical building in general or in a historical building damaged by a fire?
- Can you suggest any Web sites where is available useful information on the subject (contractors, professional skills, craftsmen, etc. to intervene in a historical building or in a historical building damaged by a fire)?
- Which are in your Country the Organizations (public or private ones) taking care and having jurisdiction of historic buildings, on historical buildings damaged by a fire and on fire prevention in historical buildings?
- Any useful information on specialist contractors working on rehabilitation or restoration of historical buildings in your Country.
- Any information on organizations such as trade associations or groups or any database which might be available on the subject.
- Any other useful news on the subject.

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**FROM THE CONTRIBUTION RECEIVED
IT HAS BEEN DERIVED A REPORT
FOCUSING ON 3 MAIN SUBJECTS OF
INTEREST:**

- 1. the presence of subjects (public or private if any) having jurisdiction on historic buildings in general
- 2. the presence of any kind of regulation (pre-requisites, special registers, associations, etc.) selecting subjects (contractors, craftsmen, etc.) that may intervene in a historic building in general (for maintenance and restoration works) or when damaged by a fire
- 3. training activities, requisites due to be eligible to operate in a historic building and any further information on the subject

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**THIS REPORT IS INTENDED TO BECOME
PART OF THE
COST Action C17 FINAL DOCUMENT
AND WILL CONTAIN THE COLLECTED DETAILS
WITH REFERENCE TO ALL THE PARTICIPATING
COUNTRIES**

THE RESULTS WILL BE HERE SUMMARIZED GIVING
EVIDENCE ONLY TO THE MAIN ASPECTS RELIEVED

FOLLOWING SLIDES WILL COVER THE THEME
NECESSARILY NEITHER EXHAUSTIVELY NOR
REPORTING ALL THE INFORMATION RECEIVED FROM
THE
VARIOUS COUNTRIES

IT WILL BE POSSIBLE TO READ ALL FURTHER
DETAILS
IN THE COST Action C17 FINAL DOCUMENT

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1
SUBJECTS HAVING JURISDICTION

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1- subjects having jurisdiction

While it is a constant, all over the involved European Countries, the presence of a central "public office" devoted to historic heritage, quite different appears the organized structure of "subjects having jurisdiction" set up for the purpose

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1- subjects having jurisdiction

A few Countries (as, mainly, Bulgaria and Poland) seem to have a more structured and capillary presence of various offices, all over the territory, organized in a strictly hierarchical order

In the remaining Countries (i.e.: Austria, Denmark, Finland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and United Kingdom) competence appears, mainly, of a central specific Office with its, eventually, peripheral centres or in collaboration with local Authorities (Counties, Cantons, Districts, Regional governments, etc.)

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1- subjects having jurisdiction

BULGARIA

- **Ministry of Culture**
formulates, administrates, coordinates and exercises control over the implementation of the government policy in the sphere of protection and promotion of the cultural-historical heritage
- **National Council for the Protection of the Monuments of Culture**
assists the Minister of Culture in his activities and includes the representatives of unions of artists and technicians, concerned agencies and organizations, as well as individual scholars, artists and experts
- **National Institute for the Monuments of Culture (NIMC)**
is a body within the Ministry of Culture, established in 1957 for assisting the Ministry in the implementation of the state policy for the protection of the immovable monuments of culture
- **District Governors**
enforce the state policy for preservation of the cultural-historical heritage on the territory of the respective district
- **Regional historical museums**
execute the implementation of the state policy for preservation of regional level
- **Municipal Councils**
mayors of municipalities and mayors of regions and municipalities take part in the preservation of the immovable cultural-historical heritage within their territory
- **Reserve Directorates**
special management units have been established with some municipalities (depending on the situation) for the management, supervision and control of the preservation of reserves and the activities carried out in them
- **Voluntary and non-governmental organizations**
involve the sphere of cultural heritage and more if it is not developed widely enough in Bulgarian society, are manifested in joint participation in projects and programs for protection of the immovable monuments of culture and in the implementation by hotels of access activities, organized by them

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1- subjects having jurisdiction

POLAND

- **Minister of Culture appoints the General Conservator of Historic Monuments** who is responsible for these Centres established for the purpose of protecting historic monuments and public collections:
 - the Centre for Protection of Public Collections
 - the National Centre for Historic Monuments Examination and Documentation
 - the Centre for Protection of Architectural Heritage
- The Centres work closely with the:
 - District Historic Monuments Protection Offices administered by the
 - District Conservation Officers

The scope of activities of the District Historic Monuments Protection Office includes:

- carrying out tasks which result from the national programme for protection and preservation of historic monuments,
- supervising correctness of conservation and architectural examinations, conservation and restoration work, construction work and other activities being carried out on historic monuments as well as of archaeological investigations,
- establishing and maintaining control of historic monuments protection and preservation

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1- subjects having jurisdiction

SPAIN

- **Ministry of Culture (Ministerio de Cultura)** takes care of historic buildings owned by the State through:
 - the General Department of Fine Arts and Cultural Property (Dirección General de Bellas Artes y Bienes Culturales)
 - the General Subdepartment of the Institute of Spanish Historical Heritage (Subdirección General del Instituto del Patrimonio Histórico Español)
 - the Department of the Council of Historical Heritage (Secretaría del Consejo del Patrimonio Histórico)
- Ministry of Culture creates national regulations with reference to historic buildings owned by private entities
- Regional governments have their own regulations added to the national ones

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1- subjects having jurisdiction

AUSTRIA

- **AHJ is the national heritage authority (BDA - Bundesdenkmalamt)**
- with regional organisations in every of the 9 countries (Länder)
- They have no special jurisdiction on buildings damaged by fire else but the undamaged building
- Fire prevention is matter to the fire brigades (serving with expertise) and primarily to the building owner

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1- subjects having jurisdiction

DENMARK

- the **National Cultural Heritage Agency (KULTURARVSSTYRELSEN)** has jurisdiction on all listed buildings
- **Municipal Fire Brigades** are responsible for fire prevention measures
- The **owner** of a listed building would have to submit any application for repairs following any fire to the National Cultural Heritage Agency

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1- subjects having jurisdiction **FINLAND**

- the **National Board of Antiquities (Museovirasto)** has jurisdiction on and takes care of historical buildings
- Provincial Museums** are also involved in this activity
- Local Fire Officers** are responsible for fire prevention measures.

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1- subjects having jurisdiction **NORWAY**

- the **Directorate for Cultural Heritage (Riksantikvaren)** is responsible for the jurisdiction on a national level
- The **counties** (a total of 20) are responsible for the jurisdiction of historical buildings on a local level
- The **owners** are responsible both for the maintenance and fire protection of historical buildings

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1- subjects having jurisdiction **SWEDEN**

- the **National Property Board (NBH)**
- the **National Heritage Board** and
- the **21 County Boards** take care and have jurisdiction on Historic Buildings

NBH has the jurisdiction over **government owned** protected buildings and the **County Boards** have the jurisdiction over the **other protected buildings** (incl. churches)

NBH has also supervision over the **County Boards**

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2
QUALIFICATION AND REGISTERS

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2 - qualification and registers **EUROPE scenario**

From the received answers emerges a European scenario in which,

with reference to **general interventions** on historical buildings, professional skills of manpower and qualification of contractors seem to be quite present all over Europe even if not organized in the form of public compulsory registers

It emerges too a need to better define specialized manpower qualification and to enlarge, over passing national frontiers, the potential work market

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2 - qualification and registers - define formation **NORWAY**

It was recently set up in Norway, promoted by the **Norwegian Teknologisk Institutt** of Oslo, the research program named **AHAC "Architectural Heritage and Crafts. A conservation programme for craftsmen"** funded by the **European Commission, Directorate-General for Education and Culture**, developed in the years 1996 - 1999 and led to the definition of the **"Vocational and Pedagogical Guidelines"** for the correct formation of manpower in the architectural restoration sector

In this program have participated the following institutions spread all over Europe: the Academy of Cultural Heritage, the Høgskolen i Østfold, the Lam Secondary School, the National Training Centre for Traditional Building Techniques, the Norwegian Heritage, the Innreka Secondary School, and the Federation of Norwegian Craft Enterprises (all in Norway); the Centre for Research and Education Development Centre, the Green Torsky School, and the Robert Griener University Museum Conservation Research Group, all in the **United Kingdom**; the EPICENTRE Training Education Centre and the ZRUS European Economic Interest Group (Greece); the European Centre for Conservation Restoration and Renovation ECORR (**Belgium**); the European Environmental Research Centres (**Spain**); the German Centre for Craft and the Preservation of Historical Monuments ZHD and the Institute for Monumental Engineering (IFM) (**Germany**); the IMAEL National Workshop's Institute (**Poland**); the Associazione Giovanni Segno Scuola (**Italy**); the AEL Centre for Technical Training and the Oulu Institute of Craft and Design OIKTO (**Finland**); the Valere Rehabilitation Project (**Italy**)

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2 - qualification and registers - enlarge market **ITALY**

- the project **"Europa restauro"** (set up by the **Tuscany Region** and sustained by trade associations) can be cited among initiatives aiming to qualify contractors and different specialist craftsmen to promote work opportunities all over Europe for local workers

This project lead to the formation of the **"Repertorio dei Restauratori Toscani"** (Tuscan restorers inventory - available, in Italian, English, French and Spanish) that contains, at present, 162 operators related to restoration works on historic buildings or on ancient handmade and art articles

www.euoparestauro.it/progetto/progetto.htm - clicking on this link

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2 - qualification and registers **EUROPE scenario**

- In **Italy** it is present a compulsory certifying system that compels contractors to specify their competence, and so acquire the right to participate to public tenders, through a pre-defined and onerous accrediting procedure
- In **Poland** a specific recent Regulation (2004) defines procedures to be applied and prerequisites of subjects that can be involved with reference to building restoration works
- In other Countries (as **Austria, Finland, Netherlands, Spain, Sweden, Switzerland and United Kingdom**) specific Associations counterbalance the absence of a public register grouping subjects professing interest and qualification to operate on historical buildings

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2 - qualification and registers **ITALY**

- Starting from February 2000 it has been defined in Italy a new qualifying system based on the so called **SOA (Società Organismi di Attestazione - i.e. Certifying Societies/Organisms)** who has been demanded the task to certify, through a complex and onerous process, eligibility of a contractor in one of the different work categories defined
- It were established two category types: "general works" ("OG", i.e. Opere Generali - a total of 13) and "specialized works" ("OS", i.e.: Opere Specialistiche - a total of 34)

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2 - qualification and registers **ITALY**

- As "general works" have to be intended works comprehensive of various working activities/specializations
- A new building construction is an OG category (OG1). Category OG2 concerns restoration and maintenance works in historic buildings under safeguard by the law concerning the heritage patrimony
- As "specialized works" have to be intended single working types
- Intervention on wooden structures constitutes an OS category (OS32)
- Interventions on decorative elements constitutes OS2 category
- The aim of the new certifying system is to define, progressively, a public classification of contractors ISO quality certified

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2 - qualification and registers **ITALY**

- As a result only the contractors that succeed the procedure defined to be inscribed in the OG2 category and with reference to the maximum amount to which they have been classified as eligible
- It has been defined a total of 8 amount classes: from not more than Euro 258.228 (class I) to Euro 15.493.707 or more (class VIII)
- A complete list of the categories can be found on the web site: www.appalti pubblici.it/help/idee/scrizioni.htm
- Complete lists of contractors subdivided by categories and/or belonging region can be obtained accessing the Public Work Authority web site: www.autoritalavoripubblici.it - clicking on the link "casellario informatico"
- At present a total of 40184 contractors certified, with reference to the different categories stated, can be found in this site among which 3853 result to be certified to operate on historical buildings (OG2 category)

578 belong to OS2 (decorative elements) category

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2 - qualification and registers - FIRE **EUROPE scenario**

With respect to competence to intervene on historical buildings in case of fire and/or when damaged by a fire the situation seems to be somewhat more critical considering that, quite generally, all training activities appear devoted to the building characteristics, to technologies of the past involved, materials, finishing, and so on with still scarce relevance given either to fire prevention themes (and specific, as far as possible reversible and less intrusive technologies to be adopted), either to intervention modalities to be adopted to avoid further damages not due to the fire

Exceptions and examples to be followed are the experiences developed, during the last years, in the United Kingdom, specifically in Scotland, in Switzerland and in the Netherlands

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2 - qualification and registers - FIRE **UK- SCOTLAND**

- In the **United Kingdom** and specifically in **SCOTLAND**, through the collaboration set up between the **Scottish Fire Services** and **Historic Scotland**

"It has been created a database containing details of the most important buildings in the country to give fire fighters crucial information about historic properties and highlighting areas of importance that should be given priority in the event of a fire to limit the extent of the damage as much as possible"

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2 - qualification and registers - FIRE **SWITZERLAND**

- In **SWITZERLAND** it has been defined, on a national level, in collaboration with the local fire brigades and under responsibility of **Cantons**

"procedures and instruments to react quickly and correctly in case of fire involving a cultural heritage object through the presence of selected specialists involved already at the stage of the documentation and data acquisition on the building"

These specialists participate too in fire drills giving their contribution in defining procedures and measures to be adopted and have to reach the fire site within 20 minutes after alarm

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2 - qualification and registers - FIRE **NETHERLANDS**

- In the **NETHERLANDS** it has been set up, on initiative of insurance companies, the organization named **Salvage** that

"while the fire service is still extinguishing the fire, arrives at the site and lists what can be done during and after the fire in order to prevent damage"

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2 - qualification and registers - FIRE **EUROPE scenario**

- WHEN IT IS NOT PRESENT A PUBLIC REGISTER A SOMEWHAT EQUIVALENT ROLE IS OFTEN PLAYED BY SPECIFIC NATIONAL GROUPING

(ON A VOLUNTARY BASE OR THROUGH SOME KIND OF "SELECTION")

CONTRACTORS "QUALIFIED" TO OPERATE ON HISTORIC BUILDINGS

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2 - qualification and registers - associations **SPAIN**

- In **SPAIN** a list of contractors specialized to intervene in historic buildings can be found at the

ARESPA (Asociación Española de Empresas de Restauración del Patrimonio Histórico)
 (Spanish Association of Heritage Restoration companies- web site: www.arespaph.com)

The aim of the Association is to take interest in the Historic Patrimony conservation in general and to safeguard interests of Companies mainly involved in conservation and restoration works inherent such a Patrimony

On February 2003 this Association has approved a Deontological Code thought to assure service quality, loyalty, respect and collaboration among members, responsibility towards society for the Cultural Heritage Conservation, professional competence and best practice application developing restoration works

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2 - qualification and registers - associations **SWEDEN**

- In **SWEDEN** in 2001 it has been formed a non-governmental organization (NGO) named

FIBOR (www.fibor.org)
 with severe member admission conditions, that organise contractors and consultants with good skill for the tasks that they have declared

Some FIBOR member companies are skilled to operate in buildings damaged by a fire, but this is not specially mentioned in their "CV"

This organization intends to cover the whole Nation and it should have replaced all those seldom updated lists in the drawers of most of the civil servants

FIBOR is not under any control except from itself, and the companies within the organisation are not authorised, though they have discussed that possibility with the National Heritage Board.

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2 - qualification and registers - associations **UK - ENGLAND**

- In the **UK - ENGLAND** useful information on contractors, professional skills, craftsmen, etc. to intervene in a historical building can be found through the

SPAB (Society for the Protection of Ancient Buildings)
 (www.spab.org.uk)
 or the

Building Conservation Directory
 (www.Buildingconservation.com)

Both of them do not relate specifically to fire damage.

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2 - qualification and registers - associations **UK - SCOTLAND**

- Historic Scotland, TCRE Group,** operate the **Building Conservation Register for Scotland**

This covers all aspects of building conservation, care and aintenance, and also supply of materials

To be entered on the HS database, the contractor / supplier / consultant organisation is required to have worked on one of HS properties, or have worked on a project which was grant aided by HS. This means that one of HS architects has noted the job was completed to their satisfaction

HS database is used to provide information and contacts to around 130 people per month seeking advice or information in this respect

Some of the specialisms are related to fire, most are generic in relation to historic buildings

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3 TRAINING ACTIVITIES

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3 - training activities **EUROPE scenario**

- The overview conducted has revealed as quite relevant the number of institutions and/or Organisations developing, in the various Countries, training courses on themes related to historic buildings conservation

- A few Countries as **FINLAND, ITALY and UK-SCOTLAND** have been evidenced, through the collected information, to be more active in this field.

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3 - training activities **FINLAND**

- In **FINLAND** there is not a pre-defined training process to be followed to operate in a historical building but numerous are the local or regional centres developing various activities for the built heritage. Among these, the following:

- Rakennuskulttuuritalo Teivo (House for Built Heritage "Teivo") www.pori.fi/ymparisto
- Vanhin Rauman korjausrakentamiskeskus Tammela (Restore Centre of Old Rauma "Tammela" - Old Rauma is a World Heritage Site) www.rauma.fi/ymparisto/raumanvanha3.htm
- Cuoreto Turunmaan korjausrakentamiskeskus r.y. (Restore Centre in Turku "Cuoreto") www.cuoreto.fi
- Lastu-taludenmaan korjausrakentamiskeskus Rubrica (Restore Centre "Rubrica") www.kulttuurinorjaus.fi
- Rakennuskulttuurikeskus Lastu (Cultural Centre for Built heritage "Lastu") www.aesola.fi/lastu2
- Etelä-Pohjanmaan rakennuskulttuurikeskus Herralta (Cultural Centre for Built Heritage "Herralta") www.rakennuskulttuurikeskus.herralta.fi
- Oy Rakennusapteekki Ab (Pharmacy for Built Heritage Co) www.rakennusapteekki.fi
- Stundarsin museo - ja kulttuurikeskus (Museum and Cultural Centre of Stundars) www.stundars.fi
- Pohjois-Pohjanmaan korjausrakentamiskeskus Pora (Restore-Centre

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3 - training activities **ITALY**

- In **ITAY** operate the Building Schools managed by Formedit and organized on a regional and provincial level.

Formedit (www.formedit.it) is a national board financed by trade associations and unions through a percentage of building sector workers salaries

A few schools devote more attention to building restoration themes (essentially in Toscana, Emilia Romagna and Veneto regions)

A group of these schools (**Scuola Edile di Ferrara, Scuola Edile di Reggio Emilia and Scuola Edile di Firenze**) (together with other European and Italian partners as Compagnons du Tour de France, Institut Gaudi - Barcelona, Faculties of Architecture of Barcellona, Florence and Limoges) have recently set up a research program aimed to develop a professional profile and a common certification method for manpower in the architectural restoration sector

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 GROUP 2

3 - training activities **UK-SCOTLAND**

• The **Historic Scotland TCRE Group (Technical Conservation, Research and Education)** develops its safeguard activity on built heritage through:

the **Historic Scotland Conservation Bureau (HSCB)** and the **Historic Scotland Conservation Centre (HSCC)**

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 GROUP 2

3 - training activities **UK-SCOTLAND**

• The **Historic Scotland Conservation Bureau (HSCB)** promotes and supports through an integrated research and education programme, the development of specialist, professional, technical and craft skills. The Bureau address also the availability of traditional building material supplies. Professional advice is available from the Bureau on a wide range of specialist and technical matters relating to the built environment

The Bureau Enquiry Service provides a central contact point for information on technical publications, research activities, specialist, professional and technical conservation matters. Details of contractors, suppliers and consultants are held in the **Building Conservation Register for Scotland** (www.historic-scotland.gov.uk/conservationbureau)

The Bureau maintains, and is developing, a conservation support Resource Centre. This facility contains related books, periodicals, supplier information and audiovisual material

(www.historic-scotland.gov.uk/conservationbureau)

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3 - training activities **UK-SCOTLAND**

• The **Historic Scotland Conservation Centre** leads the field in all aspects of practical and preventive conservation for the built environment in Scotland

Conservators specialise in stone, easel paintings, wall paintings, environmental monitoring and the analysis of historic decorative schemes

The Centre primarily provides specialist conservation advice to other groups in Historic Scotland, and carries out practical work on Properties in Care in the Agency's own estate

(www.historic-scotland.gov.uk/index/conservation.htm)

During the last two years, at HS, in collaboration with the Scottish Fire Services, has been created the mentioned database containing details of the most important buildings in the country.

(www.historic-scotland.gov.uk/sign/historic/news-full-article.htm?articleid=18785)

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European Cooperation in the field of Scientific and Technical Research
 COST Action C17 - Built Heritage: Fire Loss to Historic Buildings - BOP/FRAG
 GROUP 2

Conclusions **EUROPE scenario**

- All the collected information define a European scenario rich of initiatives and different solutions given to various problems
- It can be noted a lack of coordination and/or collaboration among all the subjects involved mainly with reference to a European dimension overpassing Country limits
- To increase information exchange and to open activities to a wide European dimension, Internet can play, as in other fields, a significant role
- Consulting the various web sites, cited in the report, it can be obtained an up to date information on programmed activities and on the pursued purposes, in the most general sense, all over Europe
- A difficulty can be constituted by the language: not always the various web sites are provided with multilingual versions
- To permit a wider exchange of information and experiences an effort should be developed to overpass such a limitation
- This could easily lead to the creation of a permanent and effective European network on Heritage themes with consequent enhancement of initiatives, spread of information and increase of over national collaborations

do we need a new COST C17 ACTION ?

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COST Action C17 BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS FINAL CONFERENCE SESSION 2: THE WORK OF WORKING GROUP 2: SUMMARY REPORT

Ingval Maxwell



The Work of Working Group 2: Nick Jordan

Standing in and apologising for the absence of Stewart Kidd, Nick Jordan presented an overview of Working Group 2 activities during the Action.

This involved:

- Behaviour of structures and materials in fires
- The balance between technological and management solutions to counter the effects of fire
- Availability of traditional skills which will be required in a post fire situation
- Causes of Fires
- Consider appropriateness of current codes and standards
- Assess the provision of means of escape, damage limitation and access for fire fighters
- State of the art solutions minimising intrusion of technology

Session 2.1 Norwegian Overview: Sjur Helseth

Sjur Helseth offered a Norwegian Overview emphasising that fire protection was not about technology as the main issues involved:



- A holistic approach
- Concepts or solutions durable over time
- A never ending search for simple and basic solutions
- A strategy tailored to the object and to the local possibilities

He also emphasised that the technology should be about “fun”. He raised concern over the accidental discharge of fire suppression systems and the need for lateral thought when installing systems.

As an example, he noted it was easier, and less damaging, to securing fixing blocks by a single nail to the structure of a wooden building so that a greater number of fixings could be made onto the fixing block, rather than the original structure. He also revealed new technology such as the water cannon which could fire out water-mist over a 20 metre range, and the use of a water cutting lance, which cut through the structure, to allow fire fighters to attack a fire from the relatively safe exterior

around a wooden building, rather than try to penetrate the building and fight the fire from within. He also described self-contained water-tank and water-mist systems which included alarms and security devices, and the fire detection monitoring of cities through the use of remote thermal cameras set at variable temperatures. A network of such cameras could then be remotely monitored at the Fire and Rescue station. He further reflected on the need to recognise the simple fire bucket, fitted with a handle on the bottom to improve the throwing capability, could also be a relevant solution in many cases.

Session 2.2 Hypoxic Air – Update: Geir Jensen



Geir Jensen offered an Update on Hypoxic Air Systems, preferring to describe them as inert air systems. He reviewed the benefits of the technology of the system noting that there was substantial interest shown by the preservation community in the system with enticing benefits such as:

- Prevent fire in spaces that may be occupied in the short or long term
- No environmental issues – no secondary damages
- Involving small or reversible hardware in protected spaces
- Minimally invasive
- Simple with proven components.
- Reliable.
- No transportation tasks to refill

He suggested that the system redefined the understanding of air conditioning. A greater awareness of the system had also led to a number of actual project case studies. This had also generated new research needs, where it has now been shown that an installation can cover a range of rooms from an outlet in one room – if there is only a small amount of air leakage.

Session 2.3 Numerical Simulation of Fire Dynamics: Christian del Taglia



In presenting Switzerland's contribution to the Action, Christian del Taglia aimed to show the effectiveness of the computer simulations for safety analysis in historic buildings and addressed risk assessment, fire safety certification and post-fire archaeology, noting that two simulation techniques were appropriate - zonal models and computational fluid dynamics.

He made a plea for multi-disciplinary working for the benefit of the built heritage

He concluded with the views that:

- Performance-based approach leads to effective and reliable solutions
- Innovative solutions can be found by simulations
- These solutions do not interfere with value of historic building
- CFD can model the complex historic-building architecture with high accuracy
- User expertise is necessary for simulations

Session 2.4 Skill registers: Vincenzo Nuzzolese



Vincenzo Nuzzolese presented the results of the Working Group 2 Survey Questionnaire with the intention of identifying professional skills and competence of contractors, craftsmen and generic manpower to intervene in historical buildings damaged by a fire in Europe. With information received from members in Austria, Bulgaria, Denmark, Finland Italy, Netherlands, Norway, Poland, Spain, Sweden, Switzerland and the UK, he offered a country-by-country breakdown of available skills to deal with the aftermath of fires in historic buildings in each of the Action's member countries.

The analysis considered three main issues-

- the presence of subjects (public or private if any) having jurisdiction on historic buildings in general
- the presence of any kind of regulation (pre-requisites, special registers, associations, etc.) selecting subjects (contractors, craftsmen, etc.) that may intervene in a historic building in general (for maintenance and restoration works) or when damaged by a fire
- training activities, requisites due to be eligible to operate in a historic building and any further information on the subject

This comprehensive overview revealed considerable shortcomings, and he called for the Scottish Historic Buildings National Fire Database to be promoted as a model which could be adopted in each country in the future. He emphasised the need for any database information to be validated so that its usefulness could be quality controlled and guaranteed. One of the key aspects of the analysis was the recognition of the lack of consultation and co-ordination regarding the range of details and information across the European perspective. As a conclusion, he proposed the development of a new Action to pull this material together.

COST C17 WORKING GROUP 2

PROFESSIONAL SKILLS AND COMPETENCE OF CONTRACTORS, CRAFTSMEN AND GENERIC MANPOWER TO INTERVENE IN HISTORICAL BUILDINGS DAMAGED BY A FIRE IN EUROPE.

Vincenzo Nuzzolese & Mirella Bindo

The “questionnaire”: Summary Report

The following questionnaire was sent to all COST C17 members (Management Committee and Working Groups)

QUESTIONNAIRE

- Is in your Country someway stated which contractors can operate in a historical building ?
- Does it exist, in your Country, a special register or other recognized list for contractors, craftsmen and/or generic manpower appropriately skilled to operate in a historical building ?
- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a historical building damaged by a fire ?
- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a generic building damaged by a fire ?
- Do exist, in your Country, lists of contractors dealing with restoration and fire protection in heritage buildings?
- Does it exist in your Country a defined training that contractors or involved people must have followed to be eligible to operate in a historical building in general or in a historical building damaged by a fire?
- Can you suggest any Web sites where is available useful information on the subject (contractors, professional skills, craftsmen, etc. to intervene in a historical building or in a historical building damaged by a fire) ?
- Which are in your Country the Organizations (public or private ones) taking care and having jurisdiction on historical buildings, on historical buildings damaged by a fire and on fire prevention in historical buildings ?
- Any useful information on specialist contractors working on rehabilitation or restoration of historical buildings in your Country.
- Any information on organisations such as trade associations or groups or any database which might be available on the subject.
- Any other useful news on the subject.

Answers were received from representatives of:

- Austria
- Bulgaria
- Denmark
- England
- Finland
- Italy

- Netherlands
- Norway
- Poland
- Scotland
- Spain
- Sweden
- Switzerland

No answers were received from the following member Countries representatives:

- Belgium
- France
- Hungary
- Israel
- Macedonia
- Slovenia
- Turkey

For a few Countries (i.e.: England, Norway, Spain, Sweden and Switzerland) there were received more than one answer. Some members limited the contribution strictly to the different questions in the questionnaire, others sent wider and more articulated documents on the subject.

It has been tried a synthesis of the contributions received focusing, more than on single answers to the 11 questions contained in the Questionnaire, on the 3 main subjects involved:

1. the presence of subjects (public or private if any) having jurisdiction on historical buildings in general;
2. the presence of any kind of regulation (pre-requisites, special register, etc.) selecting subjects (contractors, craftsmen, etc.) that can intervene in a historical building damaged by a fire or in general;
3. training activities, requisites due to be eligible to operate in a historical building and any further information on the subject;

including in these points the web sites links and any other kind of further information given.

The results are reported hereafter in the form of a brief general overview and a short text for each Country in which have been simply reported or summarized (to balance the various contributions) the received answers.

General overview

While it is a constant, all over the involved European Countries, the presence of a central “public office” devoted to historic heritage, quite different appears the organized structure of “subjects having jurisdiction” set up for the purpose. According to the answers received, a few Countries (as, mainly, Bulgaria, Poland and Spain) seem to have a more structured and capillary presence all over the territory organized in a strictly hierarchical order. In the remaining Countries (i.e.: Austria, Denmark, Finland, Italy, Netherlands, Norway, Sweden, Switzerland and United Kingdom) competence appears, mainly, of a central specific Office with its, eventually, peripheral centres or in collaboration with local Authorities (Counties, Cantons, Districts, etc.).

From the received answers emerges a European scenario in which, with reference to interventions on historical buildings, professional skills of manpower and qualification of contractors seem to be quite present all over Europe even if not organized in the form of public compulsory registers. It emerges too a need (cf.: Norway – point 3 – AHAC program --- Italy – point 2 – Europa Restauro) to better define specialized manpower qualification and to enlarge, over passing national frontiers, the potential work market.

It seems that, at the moment, only in Italy it is present a compulsory certifying system that compels contractors to specify their competence, and so acquire the right to participate to public tenders, through a pre-defined and onerous accrediting procedure. In Poland a specific recent Regulation (2004) defines procedures to be applied and prerequisites of subjects that can be involved with reference to building restoration works. In other Countries (as Austria, Finland, Netherlands, Spain, Sweden, Switzerland and United Kingdom) specific Associations counterbalance the absence of a public register grouping subjects professing interest and qualification to operate on historical buildings.

With respect to competence to intervene on historical buildings in case of fire and/or when damaged by a fire the situation seems to be somewhat more critical considering that, quite generally, all training activities appear devoted to the building characteristics, to technologies of the past involved, materials, finishing, and so on with still scarce relevance given either to fire prevention themes (and specific as much as possible reversible and less intrusive technologies to be adopted), either to intervention modalities to be adopted to avoid further damages not due to the fire.

In this last respect exceptions and examples to be followed are the experiences developed, during the last years, in the United Kingdom, specifically in Scotland, in Switzerland and in Netherlands. In the United Kingdom, through the collaboration set up between the Scottish Fire Services and Historic Scotland “it has been created a database containing details of the most important buildings in the country to give fire fighters crucial information about historic properties and highlighting areas of importance that should be given priority in the event of a fire to limit the extent of the damage as much as possible” (cf. Scotland – point 3). In Switzerland it has been defined, on a national level, in collaboration with the local fire brigades and under responsibility of Cantons, “procedures and instruments to react quickly and correctly in case of fire involving a cultural heritage object through the presence of selected specialists involved already at the stage of the documentation and data acquisition on the building”. These specialists participate too in fire drills giving their contribution in defining procedures and measures to be adopted and have to reach the fire site within 20 minutes after alarm (cf. Switzerland – point 1). In Netherlands it has been set up, on initiative of insurance companies, the organization named Salvage that “while the fire service is still extinguishing the fire, arrives at the site and lists what can be done during and after the fire in order to prevent damage” (cf. Netherlands – point 2).

The overview conducted has revealed as quite relevant the number of Institutions and/or Organisations developing, in the various Countries, training courses on themes related to historical buildings conservation. A few Countries as Finland, Italy, Netherlands, Norway and Scotland, have been evidenced, through the collected information, to be more active in this field.

To increase information exchange and to open activities to a wide European dimension, Internet can play, as in other fields, a significant role. Consulting the various web sites, cited in the report, it can be obtained an up to date information on programmed activities and on the pursued purposes, in the most general sense, all over Europe. A lack can be constituted by the language: not always the various web sites are provided with multilingual versions. To permit a wider exchange of information and experiences an effort should be developed to overpass such a limitation. This could easily lead to the creation of a permanent and effective European network on Heritage themes with consequent enhancement of initiatives, spread of information and increase of over national collaborations.

Austria

1. AHJ is the national heritage authority (Bundesdenkmalamt - <http://www.bda.at/> - only in German), with regional organisations in every of the 9 countries (Länder). They have no special jurisdiction on buildings damaged by fire else but the undamaged building.

Fire prevention is matter to the fire brigades (serving with expertise) and primarily to the building owner.

2. In Austria it is not officially stated which contractors can operate in a historical building. There are no special registers for contractors, craftsmen or generic manpower selected as appropriately skilled to operate in a historical building in general or in case of fire, but there is a list of restorers, as they are organized in a special association. These restorers usually have to have academic qualifications (exemption is very rare). In case a building owner is willing to cooperate with national heritage authorities, these would provide a list of qualified contractors/restorers according to the single needs.

3. The heritage authorities provide training courses in various handicrafts focusing on traditional handcraft skills and on a modern understanding of the Charta of Venice. These training courses can serve as selection criteria when running an open tender. These considerations especially are appropriate when dealing with restoration programs which need highest qualifications. Those mostly academic restorers who want to be promoted by the heritage authorities have to attend special trainings within the central heritage workshops.

Bulgaria

1. In Bulgaria the Ministry of Culture formulates, administrates, coordinates and exercises control over the implementation of the government policy in the sphere of protection and promotion of the cultural-historical heritage.

The National Council for the Protection of the Monuments of Culture assists the Minister of Culture in his activities relating to the preservation of the immovable monuments of culture. The Council includes the representatives of unions of artists and intellectuals, concerned agencies and organizations, as well as individual authors, artists and experts.

The National Institute for the Monuments of culture (NIMC) is a body within the Ministry of Culture, established in 1957 for assisting the Ministry in the implementation of the state policy for the protection of the immovable monuments of culture.

The District Governors enforce the state policy for preservation of the cultural-historical heritage on the territory of the respective district.

The regional historical museums facilitate the implementation of the state policy for preservation at regional level.

The Municipal Councils, mayors of municipalities and mayors of regions and mayoralities take part in the preservation of the immovable cultural-historical heritage within their territory

Reserve Directorates – special management units have been established with some municipalities (depending on the situation) for the management, supervision and control of the preservation of reserves and the activities carried out in them.

The activities of the voluntary and non-governmental organizations in Bulgaria involve the sphere of cultural heritage and even if it is not developed widely enough in Bulgarian society, are manifested in joint participation in projects and programs for protection of the immovable monuments of culture and in the implementation by NGOs of various activities, assigned to them by the authorities under a contract and against remuneration.

2. The companies operating in the field of conservation and restoration of monuments of culture are specialized in different exploration, research, design and implementation activities – such as architecture and civil and construction, arts, technical and technological, and other activities. They have on their staff highly qualified experts with long-term experience acquired in most cases at the NIMC during the period when (prior to the reform conducted in the Institute in 1990) it used to perform the whole cycle of all preservation activities, including design and implementation of conservation and restoration activities. This holds true for the two state-owned companies established after the respective structural units were detached from the NIMC and registered as independent legal bodies, as well as for the numerous private companies with different profiles and capacity, which were established later on.

The assignees of conservation and restoration work on monuments of culture, which are public property, obtain the assignment through conducted bidding procedures, one of the requirements being that the bidders are specialists and are proven to have professional experience in this field.

The assignees of design work for such monuments are also required to be specialists with professional experience, priority being given to subjects (people or organizations), who are registered pursuant to the Commercial Law with a subject of activity “conservation and restoration of immovable monuments of culture”.

The owners of immovable monuments of culture may, themselves, hire designers and assignees for the conservation and restoration work, provided that the former provide the financing for the latter completely by themselves, however the lack of an information system and of advertising of the companies specialized in this field causes serious problems to the private developers.

The selection of contractors (assignees) is provided for by the Public Procurement Act (PPA) and the Ordinance for Assignment of Public Procurement Orders Larger than the Thresholds as specified in Article 7, paragraph 1 of the PPA.

The municipalities are obliged to announce the procedures depending on the amount of the allocated funds and the type of the conservation-restoration work.

The bidding documentation is coordinated with the National Institute for the Monuments of Culture (NIMC). Representatives of the Ministry of Culture and the NIMC take part in the bidding procedures.

After the completion of the conservation-restoration work, by an order issued by the mayor of the respective municipality a commission for acceptance of the completed work is appointed. A representative of the Ministry of Culture or the NIMC is involved in this Commission.

3. The training of specialists in cultural-historical heritage preservation is conducted at high school level, university level, post-graduate level and doctorate level. Alongside which, professional skills in restoration and conservation can be acquired in the National Crafts Chamber. The Chief Architects at the municipalities and practicing architects, who are willing to work in the field of monuments of culture preservation, may acquire the required additional training in the Specialized Training Centre with the NIMC. In this Centre graduates in architecture attend a two-year postgraduate course in preservation of immovable monuments of culture.

Arts high schools for applied arts, which have established traditions relating to the heritage, exist in: Tryavna (wood plastic art), Sliven (iconography) in Sofia (painting and plastic art), in Troyan (ceramics).

Denmark

1. In Denmark the National Cultural Heritage Agency has jurisdiction on all listed buildings – www.kuas.dk (only in Danish) while municipal Fire Brigades are responsible for fire prevention measures. The owner of a listed building would have to submit any application for repairs following any fire to the National Cultural Heritage Agency.

2. As there are no compulsory demands to people or contractors operating in historical buildings, no such register exists, and likewise there is not a special list of contractors or people appropriately skilled to operate in listed buildings. Insurance companies may have their own lists of people appropriately skilled to operate in buildings damaged by fire, but the National Cultural Heritage Agency would wish to agree on appropriately qualified contractors, especially concerning any reconstruction works of a listed building destroyed by fire. The National Museum of Denmark, www.natmus.dk (partly in English) has a wide range of specialists in restoring buildings, building details and interior design.

3. There is no pre-defined training that contractors or involved people must have followed to be eligible to operate in a historical building, although there are several historic building courses. Activity on the subject is carried on at the building heritage organisation Bygningkultur DK (Building Culture DK), www.bygningkultur.dk (only in Danish). The organisation is keeping a list of craftsmen and suppliers of traditional building materials for historical buildings and carries out some courses on restoration. The private enterprise, Center for Bygningbevaring (Centre for Building Conservation), www.bygningbevaring.dk (only in Danish) maintains a list of craftsmen and contractors specially trained and skilled for restoration and continuously runs courses on restoration. There are training courses at all levels of restoration and repair, from carpenter to architect, both full time and part time for those who are already employed at building companies.

Finland

1. In Finland the National Board of Antiquities (in Finnish “Museovirasto” – www.nba.fi – in Finnish and in English – and www.nba.fi/fi/rakennusperinto – only Finnish), has jurisdiction on and takes care of historical buildings. Provincial Museums are also involved in this activity while Local Fire Officers are responsible for fire prevention measures.

2. In Finland there are no lists for contractors nor craftsmen nor architects dealing with restoration and fire prevention in historical buildings. But there is a society of conservators where you can seek appropriate worker for restoration purposes (konservaattorit@oulu.fi) while various small contractor companies, having developed experience in historical buildings, are known to the National Board of Antiquities. There is also Finnish Union of Architects www.safa.fi (in Finnish, Swedish and English), which is keeping a list of their members, but there is no classification nor special restoration architects. Besides, there are a lot of architects who are not members of this union. There is also a web site of restorers working on different topics www.restaurointi.net (in Finnish, German, English and Swedish), which seems to be the best and only site available.

3. There is not a pre-defined training process to be followed to operate in a historical building but numerous are the local or regional centres developing various activities for the built heritage. Among these, the following (mainly only in Finnish):

- Rakennuskulttuuritalo Toivo (House for Built Heritage “Toivo”) www.pori.fi/smu/toivo
- Vanhan Rauman korjausrakentamiskeskus Tammela (Restore Centre of Old Rauma “Tammela” – Old Rauma is a World Heritage Site) www.rauma.fi/ymparisto/html/tammela3.htm
- Curatio Turunmaan korjausrakentamiskeskus r.y (Restore Centre in Turku “Curatio”) www.curatio.parnet.fi

- Länsi-Uudenmaan korjausrakentamiskeskus Rubrica (Restore Centre “Rubrica”) www.kulturfonden.fi
- Rakennuskulttuurikeskus Lastu (Cultural Centre for Built heritage “Lastu”) www.saunalahti.fi/lastu2
- Etelä-Pohjanmaan rakennuskulttuurikeskus Herrala (Cultural Centre for Built Heritage “Herrala”) www.rakennuskulttuurikeskusherrala.fi
- Oy Rakennusapteekki Ab (Pharmacy for Built Heritage Co) www.rakennusapteekki.fi
- Stundarsin museo- ja kulttuurikeskus (Museum and Cultural Centre of Stundars) www.stundars.fi (in Finnish and English)
- Pohjois-Pohjanmaan korjausrakentamiskeskus Pora (Restore Centre “Pora”) www.ouka.fi/pora

Italy

1. In Italy the Ministry for the Arts and the Environment has jurisdiction on the Heritage Patrimony and develops its activity of safeguard through its Regional and Provincial Departments named “Soprintendenze dei Beni e Attività Culturali”.

These peripheral offices, through their administrative and technical staff, take care of historical buildings that are present in the competence zone (the region or the province) analysing them, monitoring their conditions, developing documentation, developing restoration plans and work programs through architects belonging to their staff. These offices exercise too a control and supervision activity on intervention plans developed by external technicians as all works related to an historical building have to be previously approved by these peripheral offices.

2. At the end of 1999 it was suppressed in Italy the so called “Albo Nazionale dei Costruttori” (National Register of Contractors) an official register in which it were listed, by demand and according to specified rules, all contractors willing to participate to biddings related to public works.

This “register” was divided in categories depending on the type of works (i.e.: building restoration, industrial buildings, plants, etc.) and the maximum amount of the expenditure.

Starting from February 2000 it has been defined a new qualifying system based on the so called SOA (Società Organismi di Attestazione - i.e.: Certifying Societies Organisms) who has been demanded the task to certify, through a complex and onerous process, eligibility of a contractor in one of the different work categories that have been established. It were defined two category types: “general works” (“OG”, i.e. Opere Generali – a total of 13) and “specialized works” (“OS”, i.e.: Opere Specialistiche – a total of 34). As “general works” have to be intended works comprehensive of various working activities/specializations. A new building construction is an OG category (OG1), category OG2 concerns restoration and maintenance works in historic buildings under safeguard by the law concerning the heritage patrimony. As “specialized works” have to be intended single working types. Intervention on wooden structures constitutes an OS category (OS32), interventions on decorative elements constitutes OS2 category. The aim of this new certifying system is to define, progressively, a public classification of contractors ISO quality certified, with reference to their production process, and characterized by competence in the various field of interest.

As a result only the contractors that succeed the procedure defined to be inscribed in the OG2 category can participate to biddings inherent historic buildings and with reference to the maximum amount to which they have been classified as eligible (a total of 8 amount classes: from not more then Euro 258.228 – class I – to Euro 15.493.707 or more – class VIII). A complete list of the categories can be found on the following web site: www.appalti pubblici.it/help/descrizioni.htm (only in Italian). Complete lists of contractors subdivided by categories and/or belonging region can be obtained accessing the Public Work Authority web site (www.autoritalavoripubblici.it - clicking on the link “casellario informatico” - only in Italian). At present a total of 40184 contractors certified, with reference to the different categories stated, can be found in this site among which 3853 result to be certified to operate on historical buildings (OG2 category), 578 belong to OS2 (decorative elements) category and 95 to OS32 category (wooden structures).

Besides this official listing and classification, various private initiatives (usually referencing to associations and service societies) can be cited aiming to define special list of contractors and specialists (craftsmen, restorers, etc.) related to different operating fields. A list of restorers (paintings, wooden parts, gilded elements, gypsum decorations, etc.) as well contractors with experience on historic buildings restoration can be found accessing the web site: www.artsystem.it and clicking on the link “operatori” (only in Italian). Another site that can be cited belongs to an artisan consortium named “Civida” and grouping specialist in maintenance and restoration works on ancient buildings (www.civida.it – only in Italian).

Among initiatives aiming to qualify contractors and different specialist craftsmen has to be cited the project “Europa restauro” set up by the Tuscany Region, sustained by trade associations, to promote work opportunities all over Europe for local workers. This project led to the formation of the “Repertorio dei Restauratori Toscani” (Tuscan restorers inventory – available, in a reduced version, in Italian, English, French and Spanish) that, even if not exhaustive, contains, at present 162 operators related to restoration works on historic buildings or on ancient handmade and art articles. (www.euoparestauro.it/progetto/progetto.htm – clicking on the link “repertorio”)

3. In Italy operate the Building Schools managed by Formedil and organized on a regional and provincial level. (www.formedil.it – in Italian, English, French and German). Formedil is a national board financed by trade associations and unions through a percentage of building sector workers salaries. Even if the various schools, spread all over the Italian territory, develop coordinate teaching programs, a few schools (essentially in Toscana, Emilia Romagna and Veneto regions) devote more attention to building restoration themes. A group of these schools (Scuola Edile di Ferrara, Scuola Edile di Reggio Emilia and Scuola Edile di Firenze) have recently (together with other European and Italian partners as Compagnons du Tour de France, Institut Gaudì – Barcelona, Faculties of Architecture of Barcellona, Florence and Limoges) a research program aimed to develop a professional profile and a common certification method for manpower in the architectural restoration sector. First results have been presented during a Conference held in Ferrara in 2005 during the annual International Restoration and Conservation Fair (www.salonedelrestauro.com – in Italian and English).

Netherlands

1. In the Netherlands subjects taking care and having jurisdiction on historical buildings are, first of all, the owners of the buildings together with the Rijksdienst voor de Monumentenzorg (Netherlands Department of Conservation – www.monumentenzorg.nl – only home page in English, all others in Dutch), the insurance companies and the local fire departments.

2. In general, contractors in the Netherlands must be qualified to carry out building work. Minor maintenance work requires a less stringent qualification than is required for major construction work. No special qualification is needed to conduct work on historic buildings. The Netherlands does not have an official government register of contractors or professionals that are trained specifically for working with historic buildings.

However, there are voluntary registers. For example, the major restoration contractors in the Netherlands have joined forces in the Vakgroep Restauratie (restoration union). This is a joint venture in which they consult with the various organisations and governmental services on all aspects of monument restoration. An example of this is the consultation with the Rijksdienst voor de Monumentenzorg (Netherlands Department of Conservation) which involves discussion on the size of the hourly wages that restorers may charge for restorations.

In addition, all kinds of craftsmen, e.g. leaded glass companies, ornamental iron smiths, roofers, mill builders and restoration architects have formed associations. The Netherlands does not have a register for companies or people who are authorised to repair fire damage. However, the insurance company sector has created an organisation named Salvage that is used when limiting fire damage to items including objects of cultural value. While the fire service is still extinguishing the fire, Salvage arrives at the site and lists what can be done during and after the fire in order to prevent damage. After the fire, the organisation provides professional assistance for the salvaging of items including objects of cultural value. The various fire services in the Netherlands have information on people and organisations that have, in the general sense, more experience with the repair of fire damage to buildings.

3. In the Netherlands, there is a wide range of training options for restoration and the maintenance and management of historic buildings. There are training courses at all levels of restoration, from carpenter to architect, both full time and part time for those who are already employed at building companies.

Some examples of web sites that are related to fire fighting or prevention are: www.nibra.nl, www.brandweer.nl (both with contents in Dutch, English, German and French) www.fireforum.be (contents only in Dutch).

Information on Dutch contractors who are part of the Vakgroep Restauratie is available on the web site www.vakgroeprestauratie.nl (contents only in Dutch).

The monumentenwacht (historical society) web site www.monumentenwachtbrabant.nl contains information (only in Dutch) on preventive maintenance. Other interesting web sites are: www.monumentenzorg.nl (only in Dutch), www.icn.nl (Netherlands Institute for Cultural Heritage – contents in Dutch and in English), www.restauratieconvergent.nl, www.monumenten.nl (both only in Dutch).

In the Netherlands, a restoration trade fair is organised on a bi-annual basis that is comparable with the Denkmal trade fair in Leipzig (www.denkmal-leipzig.de - all European languages). This trade fair involves all the professional organisations operating in the field of cultural heritage. (The next trade fair will be held on 19, 20 and 21 April 2007 in 's-Hertogenbosch.) More information is available at www.restauratiebeurs.nl (in Dutch and in English).

Norway

1. In Norway Riksantikvaren, Directorate for Cultural Heritage, is responsible for the jurisdiction on a national level. The counties (a total of 20) are responsible for the jurisdiction of historical buildings on a local level. The owners are responsible both for the maintenance and fire protection of historical buildings.

2. In Norway there are skilled specialist contractors working on the rehabilitation of historical buildings, but not enough. It is a big problem to get competent craftsmen and surveyors when damage occurs to an historical building. There are not centrally provided lists (due to difficulties to keep them updated and complete) but the national antiquarian authorities (Riksantikvaren) has an informal overview, as have the county authorities.

3. As suggested databases on the subject can be listed the following websites:

- Riksantikvaren: www.ra.no (in Norwegian and English) ;
- NIKU (Norsk institutt for kulturminneforskning): www.niku.no (in Norwegian and English);
- Maihaugen: www.maihaugen.no (in Norwegian, English, German and French)

Insurance companies play always an important role when damage occurs to an historical building. Opus arkitekter as npa (a private professional studio - www.opusark.no/html/opusinfo.htm - only in Norwegian) has developed an execution model based on cooperation between the owner, insurance company and an independent building surveyor with sufficient knowledge to historic buildings and the impact of insurance conditions on historical buildings. The model also includes a final account of restoration or historical repairs. This execution model has successfully been carried out for hundreds of historical buildings during the last 10 – 15 years.

With reference to the training process of specialized manpower to operate on historical buildings, it was recently set up in Norway, promoted by the Norwegian Teknologisk Institutt of Oslo, the “Architectural Heritage and Crafts. A conservation programme for craftsmen” (AHAC) a research program funded by the European Commission, Directorate-General for Education and Culture, developed in the years 1996 – 1999 and led to the definition of the “Vocational and Pedagogical Guidelines” for the correct formation of manpower in the architectural restoration sector. To this program have participated the following Institutions spread all over Europe: the AEL Centre for Technical Training (Finland), the Academy of Cultural Heritage (Norway), the Blakstad Secondary School (Norway), the Centre for Research and Education Development CRED, the Gwent Tertiary School (United Kingdom), the EPICENTRE Training Education Centre (Greece), the European Centre for Conservation Restoration and Renovation ECCRR (Belgium), the European Environmental Research Consultores (Spain), the German Centre for Craft and the Preservation of Historical Monuments ZHD (Germany), the INATEL National Workerr’s Leisure Institute (Portugal), the italian Associazione Giovanni Secco Suardo (www.associazionegiovanniseccosuardo.it/ITALIANO/fprogetti.htm - only in Italian), the Institute for Maintenance Engineering IFIN (Germany), the Lom Secondary school (Norway), the National Training Centre for Traditional Building Techniques (Norway), the Norwegian Heritage (Norway), the Oulu Institute of Craft and Design OKTO (Finland), the Federation of Norwegian Craft Enterprises (Norway), the Robert Gordon University (Masonry Conservation Research Group) (United Kingdom), the ZEUS European Economic Interest Group (Greece), the Fraena Secondary School (Norway), the Valetta Rehabilitation Project (Malta).

Poland

1. In Poland the Minister of Culture appoints the General Conservator

of Historic Monuments who is responsible for three Centres established for the purpose of protecting historic monuments and public collections:

- the Centre for Protection of Public Collections,
- the National Centre for Historic Monuments Examination and Documentation,
- the Centre for Protection of Architectural Heritage.

The Centres work closely with the District Historic Monuments Protection Offices administered by the District Conservation Officers. The scope of activities of the District Historic Monuments Protection Office includes, in particular:

- carrying out tasks which result from the national programme for protection and preservation of historic monuments,
- supervising correctness of conservation and architectonic examination, conservation and restoration work, construction work and other activities being carried out on historic monuments as well as of archaeological investigation,
- establishing and maintaining control of historic monuments protection and preservation.

2. The Regulation of 9 June 2004 (OJ No 150, item 1579), by the Minister of Culture, on carrying out conservation work, restoration work and construction work, conservation and architectonic examination and other activities connected with historic monuments included in the national monument register, establishes the procedure and method to be applied when granting permissions for carrying out the above works and defines qualifications required from persons authorised to carry out such works. The Regulation states, among other things that:

- conservation work, restoration work and construction work or conservation examination can be carried out by persons who have a professional master degree awarded after completion of university studies in conservation and restoration of works of art or university studies with specialisation in conservation of historic monuments and who have gained after completing their studies at least a 12-month professional experience in conservation and examination of historic monuments,
- construction work connected with historic immovable monuments should be managed by persons who have relevant certificates of builder's qualifications and at least 2-year professional experience in construction work connected with historic immovable monuments.

The basis for performing independent technical functions in building engineering is an entry in the central register (kept by The Chief Building Inspector) and the fact of being included in the membership list of an appropriate chamber of the self-governing professional body.

The valid list of persons who represent firms awarded certificates (from 2004 to 2008) issued by the Centre for Protection of Public Collections, concerning planning and installation of protection systems for historic objects (including fire protection systems) is kept by this Centre.

3. In Poland persons authorised to carry out specialised conservation, restoration and construction work and installations for protection systems in historic objects must have appropriate qualifications. Whereas no special requirements are laid down for carrying out works in historic buildings damaged by fire. The competence requirements concerning fire safety issues relate, however, to fire protection experts.

The addresses of the most useful sites (mainly only in Polish) which offer information on the subject are the following:

www.mk.gov.pl, www.kobidz.pl (English version), www.archeointernet.pl, www.sarp.org.pl, www.piib.org.pl (English version), www.kgpc.gov.pl,
www.sitp.home.pl (English version – general information only).

Spain

1. In Spain Ministerio de Cultura (Ministry of Culture) takes care of historic buildings owned by the State through: the Dirección General de Bellas Artes y Bienes Culturales (General Department of Fine Arts and Cultural Property), the Subdirección General del Instituto del Patrimonio Histórico Español (General Subdepartment of the Institute of Spanish Historical Heritage) and the Secretaría del Consejo del Patrimonio Histórico (Department of the Council of Historical Heritage). Ministry of Culture creates national regulations with reference to historic buildings owned by private entities. Regional governments have their own regulations added to the national ones. Ministerio de Fomento (Ministry of Public Works): makes investments and gives subsidies to the BIC's (i.e.: Property of Cultural Interest or "listed buildings") that have to be previously approved by the Ministry of Culture. The Catholic Church owns some BIC's and they obliged by law to upkeep them. The State and the regional governments make investments, give subsidies and offer technical assistance by means of contracts in exchange for making the buildings available to public.

2. A list of contractors specialized to intervene in historic buildings can be found accessing the ARESPA (Asociación Española de Empresas de Restauración del Patrimonio Histórico - Spanish Association of Heritage Restoration companies - web site: www.arespaph.com - only in Spanish). The aim of the Association is to take interest in the Historic Patrimony conservation in general and to safeguard interests of Companies mainly involved in conservation and restoration works inherent such a Patrimony. On February 2003 this Association has approved a Deontological Code thought to assure service quality, loyalty, respect and collaboration among members, responsibility towards society for the Cultural Heritage Conservation, professional competence and best practice application developing restoration works.

3. The national employment organisation (INEM – Instituto Nacional de Empleo - www.inem.es/ - in English too) trains young unemployed people to become craftsmen on activities related to Heritage restoration and preservation.

Sweden

1. In Sweden the Organizations taking care and having jurisdiction on Historic Buildings are the National Property Board, the National Heritage Board and the 21 County Boards. NHB has the jurisdiction over government owned protected buildings and the County Boards have the jurisdiction over the other protected buildings (incl. churches). NHB has also supervision over the County Boards.

2. It does not exist, in Sweden, an official list of contractors or people specially skilled to operate on historic buildings in general or in case of fire. The Swedish National Property Board have an idée to make such a list, made as a catastrophe telephone-list to be used "just in time".

In 2001 it has been formed a non-governmental organization (NGO) named FIBOR (www.fibor.org - only in Swedish) with severe member admission conditions, that organise contractors and consultants with good skill for the tasks that they have declared. Some FIBOR member companies are skilled to operate in buildings damaged by a fire, but this is not specially mentioned in their "CV". This organization intends to cover the whole nation and it should have replaced all those seldom updated lists in the drawers of most of the civil servants. However, FIBOR is not under any control except from itself, and the companies within the organisation are not authorised, though they have discussed that possibility with the National Heritage Board.

3. Further useful information can be found on the National Property Board web site: www.sfv.se (with English version).

Switzerland

1. Switzerland has established procedures and instruments on a national level and in cooperation with the local fire brigades to react quickly and correctly in a case of a fire involving a cultural heritage object. It is now the responsibility of the Cantons (provinces) to implement the required procedures and measures. The intervention and guidance provided by specially trained counsellors is of great importance during the combat of the fire. For this reason it is required that the specialists of cultural heritage protection are on site in a short time (20 min after fire alarm). These specialist are nominated on cooperation with the building owner and operator. The selected specialists are involved already at the stage of the documentation and data acquisition on the building and they participate in

fire drills during which the procedures and measures are practiced on site. Thus, in Switzerland it is the obligation of the Cantons or regions to organize themselves (consult the following web site - in English, French, German and Italian: www.bevoelkerungsschutz.admin.ch/internet/bs/en/home/themen/kgs.html).

Domus antique Helvetica (<http://www.domusantiqua.ch/>) is an organization which promotes the special concerns of members to conserve historic buildings.

After a fire the owner himself is responsible of intervention with the inclusion of specialists (e.g. from the preservation of ancient monuments).

2. The Vereinigung der Schweizer Denkmalpfleger und Denkmalpflegerinnen VSD (Vereinigung der Schweizer Denkmalpfleger und Denkmalpflegerinnen - www.nike-kultur.ch/index.php?id=144&L=0 - in German and French) is an association of the cantonal and local specialist centres for the preservation of ancient monuments in Switzerland. At the moment, it has 34 members, the leaders of the cantonal centres for preservation of ancient monuments, the heads of preservation of ancient monuments of six cities as well as the persons in charge of the monuments of the federal government. VSD was founded in November 8, 1985 in Basel.

VSD is aiming to enhance the contact between the different centres of preservation of ancient monuments, as well as the continuing education. It tries to emphasize the concerns of the preservation of ancient monuments in the public. VSD collaborates with the “Landesgruppe Schweiz des ICOMOS” and the “Eidg. Kommission für Denkmalpflege” (EKD).

3 Further information can be found accessing the Swiss Conservation and Restoration Association web site (Schweizerischer Verband für Konservierung und Restaurierung SKR – www.skr.ch/ - at present only in German, later in French and Italian too) and consulting the companies database that can be found at the following address:

<http://fmp.powerhost.ch/skr/fmpro?-db=skrmitgl.fp5&-lay=cgi&-format=index2.html&-view>.

United Kingdom

England

1. In England Local Authorities have jurisdiction on all listed buildings, overseen by English Heritage who would be particularly involved with Grade I & II* buildings. Both are public organisations. Organisations such as the Trust would have to submit any applications to these bodies for repairs following any major fire.

2. In England there is are not special lists of contractors or people appropriately skilled to operate in historical buildings. Organizations like the Trust have their own regional databases of Contractors previously used, & individuals could also refer to the Building Conservation Directory for specialist Contractors.

Insurance companies may have lists of people appropriately skilled to operate in buildings damaged by a fire, but the Trust would wish to agree appropriately qualified Contractors in any case.

Useful information on contractors, professional skills, craftsmen, etc. to intervene in a historical building can be found through the SPAB (Society for the Protection of Ancient Buildings - www.spab.org.uk - English only) website, or the Building Conservation Directory website on www.Buildingconservation.com - only in English), although these do not relate specifically to fire damage.

3. It does not exist, in England, a pre-defined training that contractors or involved people must have followed to be eligible to operate in a historical building, although there are several historic building courses in general.

Formation activity on the subject is carried on at the WEST DEAN – The Edward James Foundation (www.westdean.org.uk/site/restor/index.htm).

St Blaise (a private firm founded in 1982 and one of the best recognized firms in Historic Building Repair and the Conservation of Architectural Works of Art) was set up following fires in historic buildings in England, Their Managing Director Mr Ian Constantinides often lectures at the Society for the Protection of Ancient Buildings.

Scotland

1. Historic Scotland is an Agency within the Scottish Executive Education Department and is directly responsible to Scottish Ministers for safeguarding the nation’s historic environment, and promoting its understanding and enjoyment. All functions performed by the Agency are carried out on behalf of Scottish Ministers. (www.historic-scotland.gov.uk/index/aboutus.htm - only in English)

Historic Scotland Heritage Policy Group and the Inspectorate provide policy advice on the historic environment to Scottish Ministers and administer historic environment grants on their behalf.

The Heritage Policy Group is divided into three Units: Heritage Policy Unit, Heritage Grants Unit and Heritage Planning Unit.

The Inspectorate provides expert support to Scottish Ministers on the identification, protection, conservation and management of Scotland's historic buildings, historic landscapes and archaeological sites. The Inspectorate's work includes thematic and area-based surveys to identify those worthy of statutory protection through listing and scheduling. Once these are protected, staff work closely with planning authorities, owners, developers and many other bodies to ensure that, where change is necessary, this does not adversely affect these important elements of Scotland's historic environment.

2. The remit of Historic Scotland's TCRE Group is to improve the quality and standards of conservation work on Scotland's built heritage. It operates within two Divisions: the Historic Scotland Conservation Bureau (HSCB) and the Historic Scotland Conservation Centre (HSCC).

Historic Scotland, TCRE Group, operate the Building Conservation Register for Scotland. This covers all aspects of building conservation, care and maintenance, and also supply of materials. To be entered on the HS database, the contractor / supplier / consultant organisation is required to have worked on one of HS properties, or have worked on a project which was grant aided by HS. This means that one of HS architects has noted the job was completed to their satisfaction. HS database is used to provide information and contacts to around 130 people per month seeking advice or information in this respect. Some of the specialisms are related to fire, but most are generic in relation to historic buildings.

3. The Historic Scotland Conservation Bureau (HSCB) addresses the issue of loss to the built environment through an integrated research and education program. It does this through commissioned research and negotiated partnerships, leading to the publication of a wide range of technical material. This is supported by a close working relationship with leading professional and industry bodies, educational institutes and training centres. Promoting and supporting the development of specialist, professional, technical and craft skills; the Bureau is also addressing the availability of traditional building material supplies.

Professional advice is available from the Bureau on a wide range of specialist and technical matters relating to the built environment. The Bureau Enquiry Service provides a central contact point for information on technical publications, research activities, specialist, professional and technical conservation matters. Details of contractors, suppliers and consultants are held in our Building Conservation Register for Scotland. (www.historic-scotland.gov.uk/conservationbureau)

The Bureau maintains, and is developing, a conservation support Resource Centre. This facility contains related books, periodicals, supplier information and audiovisual material.

(www.historic-scotland.gov.uk/sg/textonly/publications_list_11_05.pdf)

The Historic Scotland Conservation Centre leads the field in all aspects of practical and preventative conservation for the built environment in Scotland. Conservators specialise in stone, easel paintings, wall paintings, environmental monitoring and the analysis of historic decorative schemes. The Centre primarily provides specialist conservation advice to other groups in Historic Scotland, and carries out practical work on Properties in Care in the Agency's own estate. The conservators can undertake a limited amount of specialist repayment work for the private sector. (www.historic-scotland.gov.uk/index/conservation.htm)

During the last two years at HS, in collaboration with the Scottish Fire Services, has been created a database containing details of the most important buildings in the country. The database will give fire fighters crucial information about historic properties and will also highlight areas of importance that should be given priority in the event of a fire to limit the extent of the damage as much as possible.

(www.historic-scotland.gov.uk/sg/txtonly/news-full-article.htm?articleid=18785)

COST Action C17: WORKING GROUP 2

QUESTIONNAIRE: RESPONSE FINDINGS

Vincenzo Nuzzolese & Mirella Bindo

Denmark

In Denmark the National Cultural Heritage Agency has jurisdiction on all listed buildings – www.kuas.dk (only in Danish) while municipal Fire Brigades are responsible for fire prevention measures. The owner of a listed building would have to submit any application for repairs following any fire to the National Cultural Heritage Agency.

As there are no compulsory demands to people or contractors operating in historical buildings, no such register exists, and likewise there is not a special list of contractors or people appropriately skilled to operate in listed buildings. Insurance companies may have their own lists of people appropriately skilled to operate in buildings damaged by fire, but the National Cultural Heritage Agency would wish to agree on appropriately qualified contractors, especially concerning any reconstruction works of a listed building destroyed by fire. The National Museum of Denmark, www.natmus.dk (partly in English) has a wide range of specialists in restoring buildings, building details and interior design.

There is no pre-defined training that contractors or involved people must have followed to be eligible to operate in a historical building, although there are several historic building courses. Activity on the subject is carried on at the building heritage organisation Bygningskultur DK (Building Culture DK), www.bygningskultur.dk (only in Danish). The organisation is keeping a list of craftsmen and suppliers of traditional building materials for historical buildings and carries out some courses on restoration. The private enterprise, Center for Bygningsbevaring (Centre for Building Conservation), www.bygningsbevaring.dk maintains a list of craftsmen and contractors specially trained and skilled for restoration and continuously runs courses on restoration. There are training courses at all levels of restoration and repair, from carpenter to architect, both full time and part time for those who are already employed at building companies.

Lisbeth Pepke

Architect M.A.A.

The National Cultural heritage Agency,
Slotsholmsgade 1,
DK-1216 København K

England - Cullen Questionnaire

- Is in your Country someway stated which contractors can operate in a historical building ?

There is no such list as such. Organizations like the Trust have their own regional databases of Contractors previously used, & individuals could also refer to the Building Conservation Directory for specialist Contractors.

- Does it exist, in your Country, a special register or other recognized list for contractors, craftsmen and/or generic manpower appropriately skilled to operate in a historical building ?

As above.

- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a historical building damaged by a fire ?

Insurance companies may have such lists, but the Trust would wish to agree appropriately qualified Contractors in any case.

- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a generic building damaged by a fire ?

As above.

- Do exist, in your Country, lists of contractors dealing with restoration and fire protection in heritage buildings?

As above.

- Does it exist in your Country a defined training that contractors or involved people must have followed to be eligible to operate in a historical building in general or in a historical building damaged by a fire?

Not specifically to my knowledge, although there are several historic building courses in general.

- Can you suggest any Web sites where is available useful information on the subject (contractors, professional skills, craftsmen, etc. to intervene in a historical building or in a historical building damaged by a fire) ?

Try the SPAB (Society for the Protection of Ancient Buildings) www.spab.org.uk/ website, or the Building Conservation Directory website on www.Buildingconservation.com, although these do not relate specifically to fire damage.

- Which are in your Country the Organizations (public or private ones) taking care and having jurisdiction on historical buildings, on historical buildings damaged by a fire and on fire prevention in historical buildings ?

Local Authorities have jurisdiction on all listed buildings, overseen by English Heritage who would be particularly involved with Grade I & II* buildings. Both are public organisations. Organisations such as the Trust would have to submit any applications to these bodies for repairs following any major fire.

- Any useful information on specialist contractors working on rehabilitation or restoration of historical buildings in your Country.

See above.

- Any information on organisations such as trade associations or groups or any database which might be available on the subject.

See above.

- Any other useful news on the subject.

England - Emery Questionnaire

- Is in your Country (England) someway stated which contractors can operate in a historical building ?

No

- Does it exist, in your Country, a special register or other recognized list for contractors, craftsmen and/or generic manpower appropriately skilled to operate in a historical building ?

No

- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a historical building damaged by a fire ?

No

- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a generic building damaged by a fire ?

No

- Do exist, in your Country, lists of contractors dealing with restoration and fire protection in heritage buildings?

No

- Does it exist in your Country a defined training that contractors or involved people must have followed to be eligible to operate in a historical building in general or in a historical building damaged by a fire?

No

- Can you suggest any Web sites where is available useful information on the subject (contractors, professional skills, craftsmen, etc. to intervene in a historical building or in a historical building damaged by a fire) ?

- www.buildingconservation.com

- Which are in your Country the Organizations (public or private ones) taking care and having jurisdiction on historical buildings, on historical buildings damaged by a fire and on fire prevention in historical buildings ?

English Heritage, SPAB (society for the protection of ancient buildings), Local authority fire and rescue services, Local authority conservation officers, National trust.

- Any useful information on specialist contractors working on rehabilitation or restoration of historical buildings in your Country

- www.buildingconservation.com

- Any information on organisations such as trade associations or groups or any database which might be available on the subject.

- www.buildingconservation.com

- Any other useful news on the subject.

St Blaise was set up following fires in historic buildings in England, Their Managing Director Mr Ian Constantinides often lectures at the Society for the Protection of Ancient Buildings.

Finland - Jokkinen

Answers to Questionnaire 31.5.2005

1. Is in your country someway stated which contractors can operate in a historical building?

- No, there is no classification nor license nor list for such contractors

2. Does it exist in you country a special register or other recognized list for contractors, craftsmen and/or generic manpower appropriately skilled in a historical building?

- No and yes, there are no lists for contractors nor craftsmen nor architects. But there is a society of conservators where you can seek appropriate worker for restoration purposes. Email-address is konservaattorit@oulu.fi where you can send your wish and ask for help. There is also Finnish Union of Architects www.safa.fi, which is keeping a list of their members, but there is no classification nor special restoration architects. Besides, there are a lot of architects who are not members of this union. There is also a web site of restorers working on different topics www.restaurointi.net, which is maybe the best and only site available.

3. Does it exist in your country a special register or other recognized list for people appropriately skilled to operate in a generic building damaged by a fire?

- No, we don't have such a list.

4. Does is exist lists of contractors dealing with restoration and fire protection in heritage buildings?

- No, there exist not such a list. We don't have such kind of contractors.

5. ... a defined training that contractors or involved people must have followed to be eligible to operate in a historical building in general or in a historical building damaged by a fire?

- No, we don't have such kind of training.

6. Can you suggest any Web sites where is available useful information on the subject (contractors, professional skills, craftsmen etc to intervene in a historical building or in a historical building damaged by fire)?

National Board of Antiquities has a web site www.nba.fi and for built heritage there is site www.nba.fi/fi/rakennusperinto.

There are also such websites, only the above mentioned email-address of conservator society (konservaattorit@oulu.fi) and some local or regional centres for built heritage:

- Rakennuskulttuuritalo Toivo (House for Built Heritage “Toivo”) www.pori.fi/smu/toivo
 - Vanhan Rauman korjausrakentamiskeskus Tammela (Restore Center of Old Rauma “Tammela”- Old Rauma is a World Heritage Site) www.rauma.fi/ymparisto/html/tammela3.htm
 - Curatio Turunmaan korjausrakentamiskeskus r.y (Restore Center in Turku “Curatio”) www.curatio.parnet.fi
 - Länsi-Uudenmaan korjausrakentamiskeskus Rubrica (Restore Center “Rubrica”) www.kulturfonden.fi/rubrica/
 - Rakennuskulttuurikeskus Lastu (Cultural Center for Built heritage “Lastu”) www.saunalahti.fi/lastu2
 - Etelä-Pohjanmaan rakennuskulttuurikeskus Herrala (Cultural Center for Built Heritage “Herrala”) www.rakennuskulttuurikeskusherrala.fi
 - Oy Rakennusapteekki Ab (Pharmacy for Built Heritage Co) www.rakennusapteekki.fi
 - Stundarsin museo- ja kulttuurikeskus (Museum and Cultural Center of Stundars) www.stundars.fi/
 - Pohjois-Pohjanmaan korjausrakentamiskeskus Pora (Restore Center “Pora”) www.ouka.fi/pora
7. Which are in your country the organisations (public or private) taking care have a jurisdiction on historical buildings, on historical buildings damaged by a fire and on fire prevention in historical buildings?

- National Board of Antiquities (in Finnish Museovirasto)
- Provincial Museums
- Local Fire Officers

8. Any useful information on specialist contractors working on rehabilitation or restoration of historical buildings in your country?

- Yes, there are some small contractor companies which are known to National Board of Antiquities but there is no list.

9. Any information on organisations such as trade associations or groups or any database which might be available on the subject:

- No

Netherlands – Akerboom Questionnaire / Answers

- Is in your Country someway stated which contractors can operate in a historical building ?

In general, contractors in the Netherlands must be qualified to carry out building work. Minor maintenance work requires a less stringent qualification than is required for major construction work. No special qualification is needed to conduct work on historic buildings.

- Does it exist, in your Country, a special register or other recognized list for contractors, craftsmen and/or generic manpower appropriately skilled to operate in a historical building ?

The Netherlands does not have an official government register of contractors or professionals that are trained specifically for working with historic buildings.

However, there are voluntary registers. For example, the major restoration contractors in the Netherlands have joined forces in the Vakgroep Restauratie (restoration union). This is a joint venture in which they consult with the various organisations and governmental services on all aspects of monument restoration. An example of this is the consultation with the Rijksdienst voor de Monumentenzorg (Netherlands Department of Conservation) which involves discussion on the size of the hourly wages that restorers may charge for restorations.

In addition, all kinds of craftsmen, e.g. leaded glass companies, ornamental iron smiths, roofers, mill builders and restoration architects have formed associations.

- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a historical building damaged by a fire ?

The Netherlands does not have a register for companies or people who are authorised to repair fire damage. However, the insurance company sector has created an organisation named Salvage that is used when limiting fire damage to items including objects of cultural value. While the fire service is still extinguishing the fire, Salvage arrives at the site and lists what can be done during and after the fire in order to prevent damage. After the fire, the organisation provides professional assistance for the salvaging of items including objects of cultural value.

- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a generic building damaged by a fire ?

The various fire services in the Netherlands have information on people and organisations that have, in the general sense, more experience with the repair of fire damage to buildings. There is no official register.

- Do exist, in your Country, lists of contractors dealing with restoration and fire protection in heritage buildings?

There is no specific list of contractors that are involved in the restoration and fire safety of historic buildings.

- Does it exist in your Country a defined training that contractors or involved people must have followed to be eligible to operate in a historical building in general or in a historical building damaged by a fire?

In the Netherlands, there is a wide range of training options for restoration and the maintenance and management of historic buildings. There are training courses at all levels of restoration, from carpenter to architect, both full time and part time for those who are already employed at building companies.

- Can you suggest any Web sites where is available useful information on the subject (contractors, professional skills, craftsmen, etc. to intervene in a historical building or in a historical building damaged by a fire) ?

Some examples of web sites that are related to fire fighting or prevention are: www.nibra.nl , www.brandweer.nl , www.fireforum.nl .

The problem will be that the majority of the contents of these sites are in Dutch.

- Which are in your Country the Organizations (public or private ones) taking care and having jurisdiction on historical buildings, on historical buildings damaged by a fire and on fire prevention in historical buildings ?

First of all the owners of the building, together with the Rijksdienst voor de Monumentenzorg (Netherlands Department of Conservation), the insurance company and the local fire department

- Any useful information on specialist contractors working on rehabilitation or restoration of historical buildings in your Country.

Information on Dutch contractors who are part of the Vakgroep Restauratie is available on the web site www.vakgroeprestauratie.nl .

- Any information on organisations such as trade associations or groups or any database which might be available on the subject.

These are the organisations of which the web sites were specified in the previous question. The monumentenwacht (historical society) web site www.monumentenwachtbrabant.nl contains information on preventive maintenance. Other interesting web sites are: www.monumentenzorg.nl, www.icn.nl, www.restauratieconvergent.nl, www.monumenten.nl .

- Any other useful news on the subject.

In the Netherlands, a restoration trade fair is organised on a bi-annual basis that is comparable with the Denkmal trade fair in Leipzig. This trade fair involves all the professional organisations operating in the field of cultural heritage. The next trade fair will be held on 19, 20 and 21 April 2007 in Hertogenbosch. More information is available at www.restauratiebeurs.nl

Norway - Clausen Questionnaire

- Is in your Country somehow stated which contractors can operate in a historical building ?

Yes, there are quite few able to operate in historical buildings, but there are not enough. It is a big problem to get competent craftsmen and surveyors when damage occurs to an historical building.

- Does it exist, in your Country, a special register or other recognized list for contractors, craftsmen and/or generic manpower appropriately skilled to operate in a historical building ?

More or less. The national antiquarian authorities (Riksantikvaren) has an informal overview, as have the county authorities.

- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a historical building damaged by a fire ?

Not as far as I know

- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a generic building damaged by a fire ?

- Yes, but it is informal and unofficial.

- Do exist, in your Country, lists of contractors dealing with restoration and fire protection in heritage buildings?

Not as far as I know

- Does it exist in your Country a defined training that contractors or involved people must have followed to be eligible to operate in a historical building in general or in a historical building damaged by a fire?

No, but there exists contractors specialized in repairing general buildings after fires. However, it is my experience that these contractors practice their skills the same way either the building is general or historical.

- Can you suggest any Web sites where is available useful information on the subject (contractors, professional skills, craftsmen, etc. to intervene in a historical building or in a historical building damaged by a fire) ?

No

- Which are in your Country the Organizations (public or private ones) taking care and having jurisdiction on historical buildings, on historical buildings damaged by a fire and on fire prevention in historical buildings ?

1. The Directorate for Cultural Heritage (Riksantikvaren) <http://www.riksantikvaren.no>

2. Each county (20 counties in Norway) has their own jurisdiction for their county.

Einar Karlsen, a member of our group, knows the details of the Norwegian antiquarian authorities.

- Any useful information on specialist contractors working on rehabilitation or restoration of historical buildings in your Country.

No

- Any information on organisations such as trade associations or groups or any database which might be available on the subject.

No

- Any other useful news on the subject.

Yes. Regarding the insurance companies, they always play an important role when damage occurs to an historical building.

Norway - Einar Questionnaire

The situation in Norway:

- Is in your Country someway stated which contractors can operate in a historical building? NO
- Does it exist, in your Country, a special register or other recognized list for contractors, craftsmen and/or generic manpower appropriately skilled to operate in a historical building? NO
- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a historical building damaged by a fire? NO
- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a generic building damaged by a fire? NO
- Do exist, in your Country, lists of contractors dealing with restoration and fire protection in heritage buildings? NO
- Does it exist in your Country a defined training that contractors or involved people must have followed to be eligible to operate in a historical building in general or in a historical building damaged by a fire? NO
- Can you suggest any Web sites where is available useful information on the subject (contractors, professional skills, craftsmen, etc. to intervene in a historical building or in a historical building damaged by a fire)? NO
- Which are in your Country the Organizations (public or private ones) taking care and having jurisdiction on historical buildings, on historical buildings damaged by a fire and on fire prevention in historical buildings? Riksantikvaren, Directorate for Cultural Heritage, is responsible for the jurisdiction on a national level. The counties are responsible for the jurisdiction of historical buildings on a local level. The owners are responsible both for the maintenance and fire protection of historical buildings.
- Any useful information on specialist contractors working on rehabilitation or restoration of historical buildings in your Country. There are skilled specialist contractors working on the rehabilitation of historical buildings, but we do not provide lists as it is difficult to keep such lists updated and complete.
- Any information on organisations such as trade associations or groups or any database which might be available on the subject. Suggested databases, Riksantikvaren: www.ra.no <<http://www.ra.no/>> , NIKU: www.niku.no <<http://www.niku.no/>> Maihaugen: www.maihaugen.no <<http://www.maihaugen.no/>> (Norwegian only).

Poland – Muskalska

1. Conservation work – permissions and required qualifications

The Regulation of 9 June 2004 (OJ No 150, item 1579), by the Minister of Culture, on carrying out conservation work, restoration work and construction work, conservation and architectonic examination and other activities connected with historic monuments included in the national monument register as well as archaeological investigation and search for hidden or abandoned historic movable monuments, establishes the procedure and method to be applied when granting permissions for carrying out the above works and defines qualifications required from persons authorised to carry out such works.

The Regulation states that:

- applications for permissions should be submitted to the District Conservation Officer of the area where a given monument is situated or deposited,
- conservation work, restoration work and construction work or conservation examination can be carried out by persons who have a professional master degree awarded after completion of university studies in conservation and restoration of works of art or university studies with specialisation in conservation of historic monuments and who have gained after completing their studies at least a 12-month professional experience in conservation and examination of historic monuments,

- in the fields not included in the curriculum of the above mentioned studies, conservation work, restoration work and conservation examination can be carried out by persons who have at least secondary education in a given field and more than 5-year professional experience in the conservation and examination of historic monuments,
- construction work connected with historic immovable monuments should be managed by persons who have relevant certificates of builder's qualifications as set out in the Building Act and at least 2-year professional experience in construction work connected with historic immovable monuments.

2. Certificate of builder's qualifications, registers

According to the Building Act of 7 July 1994 (OJ No 207, 2003, item 2016), an independent technical function in the civil engineering is the activity connected with the necessity of professional assessment of the technical phenomena or with the independent solution of architectonic and technical as well as technical and organisational problems, in particular the activity which encompasses:

- designing, verification of architectural and building designs and exercising author's supervision;
- managing work sites or other construction work;
- managing the manufacture of structural elements of buildings as well as supervising and carrying out technical inspection of the manufacture;
- exercising investor's supervision;
- carrying out technical inspection of the building structures maintenance;
- providing expertise in building engineering.

An independent technical function in building engineering can be performed exclusively by persons who have both relevant technical education and professional experience, that suit the type and complexity level of the activity and meet other requirements connected with the performed function, confirmed by a decision hereinafter called "the certificate of builder's qualifications" issued by an appropriate self-governing professional body.

The certificate of builder's qualifications can only be awarded to persons who passed the exam both in law relating to the construction process and ability to put the technical knowledge into practice.

The basis for performing independent technical functions in building engineering is an entry (in the form of a decision) in the central register and – under separate regulations – the fact of being included in the membership list of an appropriate chamber of the self-governing professional body (OJ No 5, 2001, item 304), confirmed by the respective certificate issued by the chamber.

The certificate of builder's qualifications should define the speciality and potential technical and building-engineering specialization as well as the scope of designing and construction works covered by the certificate.

The certificates of builder's qualifications are awarded in the following areas:

- architecture;
- design and construction;
- road building;
- bridge building;
- installation systems within the scope of heating, ventilation, gas, water-supply and sewerage nets, installations and systems;
- installation systems within the scope of electrical and electrical-engineering nets, installations and equipment;
- other areas determined by the regulations of the competent Minister in charge of the building industry.

The Chief Building Inspector fulfils tasks set out in the building regulations and, among other activities, keeps registers of:

- persons who hold certificates of builder's qualifications,

- construction experts,
- persons penalized in connection with their professional liability.

3. Self-governing professional bodies of architects, building engineers and town planners

The Act of 15 December 2000, which contains regulations for self-governing professional bodies of architects, building engineers and town planners (OJ No 5, 2001, item 304), sets out both organization and tasks of the bodies as well as the rights and responsibilities of the members.

Self-governing professional bodies of architects, building engineers and town planners consist of members of chambers of architects, building engineers and town planners.

The bodies are independent in performing their tasks and are bound only by laws.

The members of Chambers of Architects, Chambers of Building Engineers and Chambers of Town Planners can be persons who hold respective certificates of builder's qualifications in the areas listed in point 2.

The right to perform independent technical functions in the building engineering and do independent local and district area planning or manage a team which does such planning can be granted exclusively to persons included in the membership list of the respective chamber of a self-governing body.

4. Firms authorized to carry out conservation work

The valid list of persons who represent firms awarded certificates (from 2004 to 2008) issued by the Centre for Protection of Public Collections, concerning planning and installation of protection systems for historic objects (including fire protection systems) is kept by the Centre and available on its Web site (www.icons.pl).

5. System for Protecting Historic Monuments in Poland

The Minister of Culture appoints the General Conservator of Historic Monuments who is responsible for three Centres established for the purpose of protecting historic monuments and public collections in Poland, i.e.:

- the Centre for Protection of Public Collections,
- the National Centre for Historic Monuments Examination and Documentation,
- the Centre for Protection of Architectural Heritage.

The Centres work closely with the District Historic Monuments Protection Offices administered by the District Conservation Officers.

The scope of activities of the District Historic Monuments Protection Office includes, in particular (www.uwoj.krakow.pl):

- carrying out tasks which result from the national programme for protection and preservation of historic monuments,
- keeping the register and district records of historic monuments as well as collecting respective documents,
- supervising correctness of conservation and architectonic examination, conservation and restoration work, construction work and other activities being carried out on historic monuments as well as of archaeological investigation,
- establishing and maintaining control of historic monuments protection and preservation,
- developing district plans for ancient monuments protection, needed in case of military conflicts or crisis situations, and coordinating the plans,
- promoting knowledge about historic monuments,
- dealing with matters which relate to granting single or multiple individual or general permits for temporary exportation of historic monuments,
- dealing with matters which relate to granting permissions:
 1. to carry out conservation and restoration work or construction work on the registered historic monument;

2. to carry out construction work in the area surrounding the historic monument;
 3. to conduct conservation examination of the registered historic monument;
 4. to conduct architectural examination of the registered historic monument;
 5. to conduct archaeological investigation;
 6. to dislocate the registered historic immovable monument;
 7. permanently relocate the registered historic movable monument, disrupting the décor of an interior in which the monument is set;
 8. to subdivide the registered historic immovable monument;
 9. to change the designation of the registered historic monument or the way it is used;
 10. to place some technical equipment, plates, advertisements or inscriptions on the registered historic monument, subject to Art. 12 item 1 of the Protection and Preservation of Historic Monuments Act;
 11. to undertake other activities which could potentially cause disruption of the substance or change of the appearance of the registered historic monument;
 12. to search for hidden or abandoned historic movable monuments, including archaeological monuments, using all types of electronic and technical gear and diving equipment,
- dealing with matters which relate to the movable or immovable historic monuments becoming the State property,
 - dealing with matters which relate to issuing permissions for relocation of historic monuments from burial grounds to proper places,
 - dealing with matters which relate to issuing permissions for removal of trees or shrubbery from the property registered in the register of historic monuments,
 - dealing with matters which relate to negotiating drafts of and changes in both district and local development plans for the areas covered by conservation protection,
 - expressing its opinion on modernization and construction of objects or on changes in the way of using the existing building structures or parts thereof registered in the register of historic monuments or situated in the areas which are not under strict conservation protection,
 - defining the scope and way of using the land on which archaeological excavations are carried out.

6. Web Sites

Much to my regret, I have to state the fact that the Web sites which offer information on the subject matter are all in Polish. However, I want to give the addresses of the most useful sites, some of them are also available in English:

www.mk.gov.pl

www.icons.pl

www.sarp.org.pl

www.piib.org.pl (English version)

www.kgsp.gov.pl

www.sitp.home.pl (English version – general information only)

Remarks

The cited regulations lead to the conclusion that in Poland persons authorised to carry out specialised conservation, restoration and construction work (for example in areas like architecture, design and construction, sanitary installations and nets, electrical and electrical-engineering installations and nets) (point 1-3) and installations for protection systems (point 4) in historic objects must have appropriate qualifications. Whereas no special requirements are laid down for carrying out works in historic buildings damaged by fire.

The competence requirements concerning fire safety issues relate, however, to fire protection experts. The function of a fire protection expert can be performed by a person who completed his/her university studies and:

- after completing them, he/she gained at least a five-year professional experience in fire protection units or by performing fire protection activities under the Fire Protection Act or working as a designer under the Building Act;
- has an adequate professional background to perform the aforesaid function.

The adequate professional background means familiarity with law regulations and principles of technical knowledge concerning fire protection, ability to apply their requirements and select the fire protection means which comply with the set requirements (OJ No 121, 2003, item 1137).

Appendixes – Legal Acts

1. Ustawa z dnia 23 lipca 2003 r. o ochronie zabytków i opiece nad zabytkami (Dz.U. 2003 r. Nr 162, poz. 1568),
The Protection and Preservation of Historic Monuments Act of 23 July 2003 (OJ No 162, 2003, item 1568),

2. Rozporz_dzenie Ministra Kultury z dnia 9 czerwca 2004 r. w sprawie prowadzenia prac konserwatorskich, restauratorskich, robót budowlanych, bada_ konserwatorskich i architektonicznych, a tak_e innych dzia_a_ przy zabytku wpisanym do rejestru zabytków oraz bada_ archeologicznych i poszukiwa_ ukrytych lub porzuconych zabytków ruchomych. (Dz.U. z 2004 r. Nr 150 poz. 1579),

The Resolution by the Minister of Culture of 9 June 2004, on carrying out conservation work, restoration work and construction work, conservation and architectonic examination and other activities connected with historic monuments included in the national monument register as well as archaeological investigation and search for hidden or abandoned historic movable monuments (OJ No 150, 2004, item 1579)

3. Ustawa z dnia 7 lipca 1994 r. - Prawo budowlane (tekst jednolity) (Dz.U. z 2003 r. Nr 207 poz. 2016),
The Building Act of 7 July 2004 (OJ No 207, 2003, item 2016)

4. Rozporz_dzenie Ministra Gospodarki Przestrzennej i Budownictwa z dnia 30 grudnia 1994 r. w sprawie samodzielnych funkcji technicznych w budownictwie (Dz.U. z 1995 r. Nr 8 poz. 38 wraz z pó_n. zm.),

The Resolution by the Minister of Development and Building of 30 December 1994 on the subject of independent technical functions in the building engineering (OJ No 8, 1995, item 38 with subsequent changes),

5. Ustawa z dnia 15 grudnia 2000 r. o samorz_dach zawodowych architektów, in_ynierów budownictwa oraz urbanistów (Dz.U. z 2001 r. Nr 5 poz. 304),

The self-governing professional bodies of architects, building engineers and town planners Act of 15 December 2000 of (OJ No 5, 2001, item 304).

6. Rozporz_dzenie Ministra Kultury z dnia 25 sierpnia 2004 r. w sprawie organizacji i sposobu ochrony zabytków na wypadek konfliktu zbrojnego i sytuacji kryzysowych (Dz.U. z 2004 r. Nr 212 poz. 2153),

The Resolution by the Minister of Culture of 25 August 2004 on the subject of organization and methods of historic monuments protection in case of military conflicts or crisis situations (OJ No 212, 2004, item 2153),

7. Ustawa z dnia 24 sierpnia 1991 r. o ochronie przeciwpo_arowej (tekst jednolity - Dz.U. z 2002 r. Nr 147 poz. 1229).

The Fire Protection Act of 24 August 1991 (uniform text – OJ No 147, 2002, item 1229).

8. Rozporz_dzenie Ministra Spraw Wewn_trznych i Administracji z dnia 16 czerwca 2003 r. w sprawie uzgadniania projektu budowlanego pod wzgl_dem ochrony przeciwpo_arowej (Dz. U. 2003 r. Nr 121 poz. 1137),

The Resolution by the Minister of Internal Affairs and Administration of 16 June 2003 on adjustment of building designs to fire protection requirements (OJ No 121, 2003, item 1137).

1. In Poland the Minister of Culture appoints the General Conservator

of Historic Monuments who is responsible for three Centres established for the purpose of protecting historic monuments and public collections:

- the Centre for Protection of Public Collections,
- the National Centre for Historic Monuments Examination and Documentation,
- the Centre for Protection of Architectural Heritage.

The Centres work closely with the District Historic Monuments Protection Offices administered by the District Conservation Officers. The scope of activities of the District Historic Monuments Protection Office includes, in particular:

- carrying out tasks which result from the national programme for protection and preservation of historic monuments,
- supervising correctness of conservation and architectonic examination, conservation and restoration work, construction work and other activities being carried out on historic monuments as well as of archaeological investigation,
- establishing and maintaining control of historic monuments protection and preservation.

2. The Regulation of 9 June 2004 (OJ No 150, item 1579), by the Minister

of Culture, on carrying out conservation work, restoration work and construction work, conservation and architectonic examination and other activities connected with historic monuments included in the national monument register, establishes the procedure and method to be applied when granting permissions for carrying out the above works and defines qualifications required from persons authorised to carry out such works. The Regulation states, among other things that:

- conservation work, restoration work and construction work or conservation examination can be carried out by persons who have a professional master degree awarded after completion of university studies in conservation and restoration of works of art or university studies with specialisation in conservation of historic monuments and who have gained after completing their studies at least a 12-month professional experience in conservation and examination of historic monuments,
- construction work connected with historic immovable monuments should be managed by persons who have relevant certificates of builder's qualifications and at least 2-year professional experience in construction work connected with historic immovable monuments.

The basis for performing independent technical functions in building engineering is an entry in the central register (kept by The Chief Building Inspector) and the fact of being included in the membership list of an appropriate chamber of the self-governing professional body.

The valid list of persons who represent firms awarded certificates (from 2004 to 2008) issued by the Centre for Protection of Public Collections, concerning planning and installation of protection systems for historic objects (including fire protection systems) is kept by this Centre.

3. In Poland persons authorised to carry out specialised conservation, restoration and construction work and installations for protection systems in historic objects must have appropriate qualifications. Whereas no special requirements are laid down for carrying out works in historic buildings damaged by fire. The competence requirements concerning fire safety issues relate, however, to fire protection experts.

The addresses of the most useful sites (mainly only in Polish) which offer information on the subject are the following:

www.mk.gov.pl, www.kobidz.pl (English version), www.archeointernet.pl, www.sarp.org.pl, www.piib.org.pl (English version), www.kgpsp.gov.pl, www.sitp.home.pl (English version – general information only).

Scotland - Beaton Questionnaire

Historic Scotland, TCRE Group, operate the Building Conservation Register for Scotland. This covers all aspects of building conservation, care and maintenance, and also supply of materials. To be entered on the database, the contractor / supplier / consultant organisation is required to have worked on one of our HS properties, or have worked on a project which was grant aided by us. This means that one of our architects has noted the job was completed to their satisfaction.

Our database is used to provide information and contacts to around 130 people per month seeking advice or information in this respect. Some of the specialisms are related to fire, but most are generic in relation to historic buildings. We also provide a technical enquiry service where people can request more specialist information from Historic Scotland, and this does include fire – related queries. We also promote the sale of TCRE technical publications via our enquiry service and at trade events.

Spain - Llinares Questionnaire

- Is in your Country someway stated which contractors can operate in a historical building ? YES
- Does it exist, in your Country, a special register or other recognized list for contractors, craftsmen and/or generic manpower appropriately skilled to operate in a historical building ? YES
- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a historical building damaged by a fire ? NO
- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a generic building damaged by a fire ? NO
- Do exist, in your Country, lists of contractors dealing with restoration and fire protection in heritage buildings? NO
- Does it exist in your Country a defined training that contractors or involved people must have followed to be eligible to operate in a historical building in general or in a historical building damaged by a fire? NO
- Can you suggest any Web sites where is available useful information on the subject (contractors, professional skills, craftsmen, etc. to intervene in a historical building or in a historical building damaged by a fire) ? YES
<http://www.arespaph.com/> (Spanish. NOT specific for FIRE DAMAGE) Spanish Association of Heritage Restoration companies.
- <http://www.inem.es/> (Spanish) The national employment organisation (INEM) trains young unemployed people to become craftsmen on activities related to Heritage restoration and preservation.
- Which are in your Country the Organizations (public or private ones) taking care and having jurisdiction on historical buildings, on historical buildings damaged by a fire and on fire prevention in historical buildings ? See attached document (compmodell042_Spain.doc), that I made for Kerstin some months ago. It is for historical buildings in general. Not specific for fire damage or fire prevention.
- Any useful information on specialist contractors working on rehabilitation or restoration of historical buildings in your Country.
- Any information on organisations such as trade associations or groups or any database which might be available on the subject. (The list than Miguel gave you last meeting in Siena. See attached document. ARESPA_addresses.doc).
- Any other useful news on the subject.

Spain – Linares & Gòmes-Heras
Direcciones de Empresas Asociadas a Arespa

TRYCSA
D. Adolfo Sánchez Gutierrez
C/ Oro, 36. Polígono San Cristóbal
47012 Valladolid
Teléfono: 983393444-983393399
Fax: 983300810
E.Mail: trycsa@trycsa.com
Actividad: Restauración.

CYMYAÑEZ, RESTAURACION Y CONSTRUCCION, S.A.
D. Jesus Yañez Rodriguez.
C/ Pío del Rio Hortega, 8-2ª pl. Ofic.8
47014 Valladolid
Teléfono: 983352194
Fax: 983356325
E. Mail: reyannezv@sinix.net
Actividad: Res-tauración.

TALLER DE RESTAURACION EL BARCO S.L.
D. Eduardo Benavente Gutierrez
C/ Postigo de San Martín, 9. 3º oficina 3
28013 Madrid
Teléfono: 915320198
Fax: 915322958
E. Mail: elbarco@elbarcosl.com
Actividad: Restauración de bienes muebles.

CLAR REHABILITACION, S.L.
D. José M. Ruiz Rodríguez
C/ Innovación, 11. Polígono Industrial Los Olivos.
28906 Getafe (Madrid)
Teléfono: 916654750. Fax: 916652023
E.Mail: patrimonio@clarrehabilitacion.com
Actividad: Restauración

ABREU CONSTRUCCIONES, S.A.
D. Antonio Abreu Tejero
C/ Parras, 39. Entpta. 1ª. Local 5
10004 Cáceres
Teléfono: 927247549. Fax: 927213745
E.Mail: abreu@camaras.org
Actividad: Restauración.

CUSA. CONSTRUCCIONES URCAYO, S.A.
D. Antonio González Sancho
Polígono Industrial de Tarazona.
C/ Castilla y León. Parcela 43
50500 Tarazona (Zaragoza)
Teléfono: 976640432. Fax: 976644133
Actividad: Restauración.
E.Mail: admin@urcayo.com

CONSERVACION Y RESTAURACION DE BIENES CULTURALES, S.A.L. (CORESAL).
Dª Pilar de Hoyos Alonso
C/ Donoso Cortés, 90
28015 Madrid
Teléfono: 915443489. Fax: 915442144
E.Mail: conservacion.b.c.@coresal.com
Actividad: Restauración.

TECNICAS DE ARQUITECTURA MONUMENTAL, S.A. (ARTEMON).

D.Vicente Aguilar Sánchez
Avenida de Somosierra, 12.C/ Uno. Nave 13 Edificio de Cristal.
28700 San Sebastián de los Reyes (Madrid)
Teléfono: 916517399. Fax: 916515479
E.Mail: artemon_sa@inicia.es
Actividad: Restauración

REFOART, S.L.

D. Leopoldo Alcaraz Jimenez
C/ Capitan Salom, 14-1ªA
07004 Palma de Mallorca
Teléfono: 971758242. Fax: 971203425
E.Mail: refoart@terra.es
Actividad: Restauración.

CONSTRUCCIONES Y RESTAURACIONES RAFAEL VEGA, S.L.

D. José Luis Vega López
C/ Los Barbadillos, 8
09346 Covarrubias (Burgos)
Teléfono: 947406561. Fax: 947406353.
E.Mail: vega@maptel.es
Actividad: Restauración

CONSTRUCCIONES RUBIO MORTE, S.A.

D. José Miguel Rubio Morte
C/ Alejandro Oliván, 20-22, local
50011 Zaragoza
Teléfono: 976230033. Fax: 976232570
E.Mail: gerencia@rubiomorte.com
Actividad: Restauración.

CONSTRUCCIONES MAURICIO ARREGUI, S.A.

D. Jesús Arregui Ayastui.
C/ Maztarreka, 14-16. 20570 Bergara (Guipuzcoa)
Teléfono: 943761123. Fax: 943763041
E.Mail: comarregui@terra.es
Actividad: Restauración.

RESTAURACION DE EDIFICIOS, ARTESONADOS Y RETABLOS ALONSO, S.A. (REARASA).

D. José Alonso Luengo
Polígono Industrial Los Llanos
Avda. de Asturias. Parcelas 102 a 106
49027 Zamora
Teléfono: 980538274. Fax: 980538272
E.Mail: rearasa@retemail.es
Actividad: Restauración

CONSERVACION DEL PATRIMONIO ARTISTICO

C.P.A., S.L.
D. Miguel Angel Gutierrez Merino
Polígono de Villalonquejar. C/ Merindad de Montija s/n
09001 Burgos
Teléfono: 947298055. Fax: 947473121
E.Mail: gerencia@cpa-sl.es. contratacion@cpasl.es
Actividad: Restauración

CONSTRUCCIONES ARANGUREN, S.A.

D. Jesús Aranguren
Plaza de la Paz, 3
31400 Sangüesa (Navarra). Teléfonos: 948430285- 948870259. Fax: 948430366
E.Mail: consaguren@infonegocio.com
Actividad: Restauración.

NEOR, S.A. EMPRESA CONSTRUCTORA

D. Gonzalo Rey
C/ Laureles, 9
15704 Santiago de Compostela (La Coruña)
Teléfono: 981563026. Fax: 981573226
E.Mail: gonzalo@neorsa.com
Actividad: Restauración

CCR/LA CATEDRAL, CONSERVACIÓN Y SERVICIOS DEL PATRIMONIO.

D. Francisco Javier Roldán
C/ Dormitallería, 5 BAJO
31001 Pamplona
Teléfono: 948207037. Fax: 948207703
E.Mail: la_catedral@telefonica.net
Actividad: Restauración bienes muebles.

GEOCISA

D. José Conde-Salazar
C/ Los Llanos de Jérez, 10 y 12
28820 Coslada (Madrid)
Teléfono: 916603000. Fax: 916716460 E.Mail: jpl-geocisa-madrid@dragados.com
Actividad: Restauración.

EDYCON, S.A.

D. Alfredo García Ropa
Polígono Industrial Belcaire. Parcela 501
12600 Vall D'Uixo (Castellón)
Teléfono: 964667274 .Fax: 964696506
E.Mail: agarcia@edycon.com
Actividad: Restauración.

CAMINOS Y CONSTRUCCIONES CIVILES, S.A.

D. Jorge Viñuales Lorient
Plaza del Pilar, 10, principal derecha.
50003 Zaragoza
Teléfono: 976296029. Fax: 976296695
E.Mail: caminos@grupocaminos.com
Actividad: Restauración

SOPSA. RESTAURACION ARQUITECTONICA

D. Leopoldo Durán Merino
Paseo de la Huerta de Guadian, 7 bajo
34002 Palencia
Teléfono: 979729444. Fax: 979729488
E.Mail: sopsaoftec@terra.es
Actividad: Restauración.

CONSTRUCCIONES LEACHE, S.L.

D. Javier Leache Aristu
Polígono Industrial s/n
31430 Aoiz (Navarra)
Teléfono: 948334075. Fax: 948334076
E.Mail: info@leache.com
Actividad: Restauración.

CONSTRUCCIONES ZUBILLAGA, S.A.

D. Raimundo Zubillaga Ugarte
C/ Alfonso el Batallador, 10. Entrep.B
31007 Pamplona
Teléfono: 948276862. Fax: 948263522
E.Mail: judith@construccioneszubillaga.e.telefonica.net
Actividad: Restauración

GOTICO, CONSTRUCCIONES Y REHABILITACIONES

D. Oscar Javier Cámara Gil
C/ Alfonso I, 12, pral. Izqda.
50003 Zaragoza
Teléfono: 976299005. Fax: 976299031
E.Mail: juan.martin@gotico.biz
Actividad: Restauración.

J.B.A. CONSTRUCCIONES BELLIDO, S.L.

D. José Bellido Aguilera.
C/ San Ignacio 4A
41018 Sevilla
Teléfono: 954583381. Fax: 954582837. Móvil: 619040791
E.Mail: admon@jbabellido.com
Actividad: Restauración.

CONABSIDE, S.A.

D. Carlos Jove Sandoval
C/ Morena, 37, bajo
47009 Valladolid
Teléfono: 983344611. Fax: 983375438
E.Mail: carlosjove@conabside.com
Actividad: Restauración.

CONSTRUCCIONES MAROBA, S.L.

D. Manuel Rodríguez Barriobero
C/, Mayor, 20
26375 Entrena (La Rioja)
Teléfono: 941446109. Fax: 941446109
E.Mail: marobasl@terra.es
Actividad: Restauración.

JJROS CONSTRUCCIÓN Y RESTAURACION, S.L.

D. Enrique Nicolás Franco
Crta. De Aguilas Puente Nuevo
Apartado de Correos 380
30080. Lorca- Murcia
Teléfono: 968215659. Fax: 968225239
E.Mail: jjros@jjros.com
Actividad: Restauración.

CONSTRUCCIONES LLABRES FELIU, S.A.

D^a Regula Kammerer
C/ Socías, 9, bajos.
07010 Palma de Mallorca (Baleares)
Teléfono: 971765500. Fax: 971768319
E.Mail: rkammerer@llabresfeliu.com
Actividad: Restauración.

TUCONSA

D. José Eugenio Martínez Lourido
Avenida Peña de Francia, 19-1º
49019 Zamora
Teléfono:980510726. Fax:980513151
E.Mail: lourido@tuconsa.es
Actividad: Restauración.

TEUSA. TECPROPASA EUSKADI, S.A.

D. Simón Garin Iradi
Paseo de los Olmos, 14-5º izqda.
20016 Donostia-San Sebastián
Teléfono: 943401340. Fax: 943401511
E.Mail: simon@teusa.com
Actividad: Restauración.

NS.NATUR SYSTEM, S.L.

D. Roger Valsells
C/ Castanyer, 19.
08022 Barcelona
Teléfono: 932530150. Fax: 932530151
E.Mail: natur@natursystem.com
Actividad: Restauración

STOA, S.L. Construcciones y Rehabilitaciones.

D. Jesús Sanz
C/ Arado, 10 bajo.
47014 Valladolid
Teléfono: 983361142. Fax: 983361143
E.Mail: stoasl@teleline.es
Actividad: Restauración

PROART, S.A.

D. Jerónimo García Gallego
Ctra. De Barajas a Paracuellos, Km.8
28860 Paracuellos del Jarama (Madrid)
Teléfono: 916580849. Fax: 916581581
E.Mail: proart@proart.e.telefonica.net
Actividad: Restauración

MC CONSERVACIONY RESTAURACION, S.L.

D. Miguel Castilla Sánchez
Polígono de Mora-Garay
C/ Isaac Peral y Caballero. Naves Municipales. Nave 2
33211 Gijón.
Teléfono:985308592. Fax: 985300963
E.Mail: mc-conservacion@mc-conservacion.com
Actividad: Restauración.

RESTAURARTE, S.L.

D. José Antonio Codesal Pérez
C/ Alfonso I, 16, 4ºB
50003 Zaragoza
Teléfono: 976397223. Fax: 976397223
E.Mail: wolflax88@hotmail.com
Actividad : Restauración

Spain - Llinares

The state as owner of property of great national value. An overview over different models in Europe. Table of contents

National Property Board in Sweden wants to collect information about how the European countries take care of their state owned property *with special notice on ownership of historic property of great national signification*. We would very much appreciate overview information about:

1) INSTITUTIONS/AUTHORITIES WHO "ACT AS OWNERS" OF PROPERTY OWNED BY THE STATE

- a. Name of the institutions?
 - Any of the Spanish ministries can own a property
 - Regional governments are responsible for the management of some historic buildings, but they don't own them
 - Municipalities
 - Self-governing bodies depending from different ministerial departments
 - The Catholic Church owns some BIC's (Properties of Cultural Interest, similar to say 'listed buildings'), and they obliged by law to upkeep them. The State and the regional governments make investments, give subsidies and offer technical assistance by means of contracts in exchange for making the buildings available to public.
- b. Type of property and use of the property (administration, universities, churches etc) ?
 - Public buildings owned by de State: administrative, cultural, scientific, educational, ...
 - Buildings owned by the Catholic Church: worship, exhibitions and museums.
 - Buildings transfered to de regional governments: administrative, cultural, scientific, educational, ...
- c. The assignment (task) of the institution ?
 - legal, technical (preserving) and financial management (letting)
 - Ministerio de Cultura (Ministry of Culture): legal and technical.
 - Dirección General de Patrimonio (Department of Wealth), from Ministerio de Economía y Hacienda (Treasury): financial management.
 - making available to public

Ministry of Culture and regional governments make the laws.

All the declared BIC's are accessible to the public, with particular timetables and measures.

- investments in new property
- Ministerio de Economía y Hacienda (Treasury)
- Regional governments

d. How the work is financed?

Private, public or mixed financing.

- e. Responsible ministry/authority/department of state etc
 - Ministerio de Cultura (Ministry of Culture): responsible for all the declared BIC's owned by the State
 - Ministerio de Fomento (Ministry of Public Works): makes investments and gives subsidies to the BIC's that have to be previously aproved by the Ministry of Culture
 - Treasury: ownership, valuations, rights, capital gains, transfers, ...
 - Catholic Church

If one of the institutions is specialised on historic property of national value please mention

- The Dirección General de Bellas Artes y Bienes Culturales (General Department of Fine Arts and Cultural Property), in the Ministerio de Cultura (Ministry of Culture):

- Subdirección General del Instituto del Patrimonio Histórico Español (General Subdepartment of the Institute of Spanish Historical Heritage)
- Subdirección General de Protección del Patrimonio Histórico (General Subdepartment of Protection of Historical Heritage)
- Secretaría del Consejo del Patrimonio Histórico (Department of the Council of Historical Heritage), which also belongs to the Ministry of Culture.

2) INSTITUTIONS WITH RESPONSIBILITY TO SAFEGUARD (LOOK AFTER) HISTORIC PROPERTY

a. Name of the institutions?

- Ministerio de Cultura (Ministry of Culture).
- Ministerio de Fomento (Ministry of Public Works), as investor.
- Administrative bodies using heritage buildings: regional governments, municipalities, self-governing bodies.
- Private foundations.

b. Does it safeguard property

- owned by the state?

Ministerio de Cultura. Dirección General de Bellas Artes y Bienes Culturales (General Department of Fine Arts and Cultural Property):

- Subdirección General del Instituto del Patrimonio Histórico Español (General Subdepartment of the Institute of Spanish Historical Heritage)
- Subdirección General de Protección del Patrimonio Histórico (General Subdepartment of Protection of Historical Heritage)

- owned by private interests and municipalities?
- Ministry of Culture creates national regulations.
- Regional governments have their own regulations, added to the national ones.

c. Does it work with the process of listing historic property?

- Ministry of Culture.
- Regional governments.

d. Does it give grants to preserve listed buildings to categories above?

- Ministerio de Cultura (Ministry of Culture).
- Ministerio de Fomento (Ministry of Public Works)
- Ministerio de Economía y Hacienda (Treasury)
- Private actions

d. Does it act in other ways with the aim to preserve historic property?

3) Are there other ways except legislation to protect historic property as

- a. Economic incentives as tax deduction? Yes
- b. Other incentives? Change of use and premises
- c. Free advice? Yes

Sweden – Erenmalm Questionnaire

- Is in your Country someway stated which contractors can operate in a historical building ? No, but there is a recently formed (2001) organisation NGO with severe member admission conditions, that organise contractors and consultants with good skill for the tasks that they have declared.
- Does it exist, in your Country, a special register or other recognized list for contractors, craftsmen and/ or generic manpower appropriately skilled to operate in a historical building ? Yes and no, the name of the organisation mentioned above is Fikor (www.fikor.org). It is (or intended to be) covering the whole nation and it should have replaced all those seldom updated lists in the drawers of most of the civil servants. However, Fikor is not under any control except from itself, and the companies within the organisation are not authorised, though they have discussed that possibility with the National Heritage Board.
- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a historical building damaged by a fire ? Yes and no, some of those member companies in Fikor are skill in that too, but it is not specially mentioned in their “CV”.
- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a generic building damaged by a fire ? No, but The Swedish National Property Board have an idée to make such a list, made as a catastrophe telephone-list to be used “just in time”.
- Do exist, in your Country, lists of contractors dealing with restoration and fire protection in heritage buildings? No, nothing except what is mentioned above.
- Does it exist in your Country a defined training that contractors or involved people must have followed to be eligible to operate in a historical building in general or in a historical building damaged by a fire? No.
- Can you suggest any Web sites where is available useful information on the subject (contractors, professional skills, craftsmen, etc. to intervene in a historical building or in a historical building damaged by a fire) ? www.fikor.org and www.sfv.se (National Property Board).
- Which are in your Country the Organizations (public or private ones) taking care and having jurisdiction on historical buildings, on historical buildings damaged by a fire and on fire prevention in historical buildings ? National Heritage Board and the 21 County Boards. NHB has the jurisdiction over government owned protected buildings and the County Boards have the jurisdiction over the other protected buildings (incl. churches). NHB has also supervision over the County Boards.
- Any useful information on specialist contractors working on rehabilitation or restoration of historical buildings in your Country. No.
- Any information on organisations such as trade associations or groups or any database which might be available on the subject. None, except for Fikor (see above).
- Any other useful news on the subject. No.

Sweden - Rohlen Questionnaire

- Is in your Country someway stated which contractors can operate in a historical building ?
NO
- Does it exist, in your Country, a special register or other recognized list for contractors, craftsmen and/or generic manpower appropriately skilled to operate in a historical building ?
NO
- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a historical building damaged by a fire ?
NO
- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a generic building damaged by a fire ?
NO – but we hope that we will get one soon. I am working with it.-
- Do exist, in your Country, lists of contractors dealing with restoration and fire protection in heritage buildings?
NO
- Does it exist in your Country a defined training that contractors or involved people must have followed to be eligible to operate in a historical building in general or in a historical building damaged by a fire?
NO
- Can you suggest any Web sites where is available useful information on the subject (contractors, professional skills, craftsmen, etc. to intervene in a historical building or in a historical building damaged by a fire) ?
NO
- Which are in your Country the Organizations (public or private ones) taking care and having jurisdiction on historical buildings, on historical buildings damaged by a fire and on fire prevention in historical buildings ?
NO
- Any useful information on specialist contractors working on rehabilitation or restoration of historical buildings in your Country.
NO
- Any information on organisations such as trade associations or groups or any database which might be available on the subject.
NO
- Any other useful news on the subject.
NO

Sweden – Westerlund Questionnaire

- Is in your Country someway stated which contractors can operate in a historical building ? no
- Does it exist, in your Country, a special register or other recognized list for contractors, craftsmen and/or generic manpower appropriately skilled to operate in a historical building ? no
- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a historical building damaged by a fire ? no
- Does it exist, in your Country, a special register or other recognized list for people appropriately skilled to operate in a generic building damaged by a fire ? no
- Do exist, in your Country, lists of contractors dealing with restoration and fire protection in heritage buildings? no
- Does it exist in your Country a defined training that contractors or involved people must have followed to be eligible to operate in a historical building in general or in a historical building damaged by a fire? no
- Can you suggest any Web sites where is available useful information on the subject (contractors, professional skills, craftsmen, etc. to intervene in a historical building or in a historical building damaged by a fire) ? no
- Which are in your Country the Organizations (public or private ones) taking care and having jurisdiction on historical buildings, on historical buildings damaged by a fire and on fire prevention in historical buildings ?

National Property Board and national Heritage Board owns historic property

- Any useful information on specialist contractors working on rehabilitation or restoration of historical buildings in your Country.

The private organisation FIBOR organises skilled enterprises

- Any information on organisations such as trade associations or groups or any database which might be available on the subject. no
- Any other useful news on the subject. no

Switzerland - Rush

Association for organizations running historic buildings:

Domus antiqua Helvetica (<http://www.domusantiqua.ch/>) is an organization which promotes the special concerns of members to conserve historic buildings.

Who is responsible for historic buildings after a fire?

The owner himself with the inclusion of specialists (e.g. from the preservation of ancient monuments). The Vereinigung der Schweizer Denkmalpfleger und Denkmalpflegerinnen VSD is an association of these specialists:

Source: <http://www.nike-kultur.ch/index.php?id=144&L=0>

Vereinigung der Schweizer Denkmalpfleger und Denkmalpflegerinnen (VSD)

The VSD is an association of the cantonal and local specialist centers for the preservation of ancient monuments in Switzerland. At the moment, it has 34 members, the leaders of the cantonal centers for preservation of ancient monuments, the heads of preservation of ancient monuments of six cities as well as the persons in charge of the monuments of the federal government. VSD was founded in November 8, 1985 in Basel.

VSD is aiming to enhance the contact between the different centers of preservation of ancient monuments, as well as the continuing education. It tries to emphasize the concerns of the preservation of ancient monuments in the public. VSD collaborates with the "Landesgruppe Schweiz des ICOMOS" and the "Eidg. Kommission für Denkmalpflege" (EKD).

President:
Brigitte Frei-Heitz
Denkmalpflegerin Kanton Basel-Landschaft

Secretary address:
VSD
Erlacherhof
Junkerngasse 47
Postfach 636
3000 Bern 8
T 031 321 60 90
F 031 321 60 99
denkmalpflege@bern.ch

Who is responsible for fire prevention measures in historic buildings?

The owner himself with consultation of the building insurance companies (<http://www.vkf.ch/> Vereinigung Kantonalen Feuerversicherungen) and the Vereinigung der Schweizer Denkmalpfleger und Denkmalpflegerinnen VSD.

Specialists for restoration:

Address of the swiss conservation and restoration association:

Schweizerischer Verband für Konservierung und Restaurierung SKR
Geschäftsstelle
Brunngasse 60
Postfach
3000 Bern 8

Tel. 031 311 63 03
Fax 031 312 38 01
E-Mail: info@skr.ch
Opening: Tu – Th 14.00 – 16.00
contact: Silvia Müller / Caroline Trebing

Homepage: <http://www.skr.ch/>

list of members: <http://fmp.powerhost.ch/skr/fmpro?-db=skrmitgl.fp5&-lay=cgi&-format=index2.html&-view>

Switzerland – Buchel, Moser

Mr. Rino Büchel, Chef Kulturgüterschutz, has prepared an answer to your inquiry. Translation by Alfred Moser.

Switzerland has established procedures and instruments on a national level and in cooperation with the local fire brigades to react quickly and correctly in a case of a fire involving a cultural heritage object. It is now the responsibility of the Cantons (provinces) to implement the required procedures and measures. The intervention and guidance provided by specially trained counselors is of great importance during the combat of the fire. For this reason it is required that the specialists of cultural heritage protection are on site in a short time (20 min after fire alarm). These specialist are nominated on cooperation with the building owner and operator. The selected specialists are involved already at the stage of the documentation and data acquisition on the building and they participate in fire drills during which the procedures and measures are practiced on site. Thus, in Switzerland it is the obligation of the Cantons or regions to organize themselves.

AGENTS (ORGANISATION AND PEOPLE) RESPONSIBLE FOR PROTECTION, PRESERVATION AND RESTORATION OF HISTORICAL HERITAGE IN BULGARIA

Petar Hristov, Galina Mileva

Agents (Organisation and People) in Bulgaria

Public institutions have a moral duty to preserve our heritage as a shared asset which is of benefit to the community. They operate at both central and local government level. But the need to mobilise a wide range of resources and indeed the sheer dynamics of any heritage project also call for the active support of the business world, private owners, the voluntary sector and society at large. In most cases, major heritage development projects rely on the combined, cross-sectoral efforts of some or all of these partners. The considerable expertise required, which is in itself often a form of heritage, accentuates the role of trainers.

The field **National administrations** provides a description of the different competent public organisations with formal responsibility in the field of cultural heritage on central, regional and local level:

- Ministry (s) responsible in the field of cultural heritage or related fields.
- Specialised State administration or service in the field of cultural heritage.
- Regional and/or local State administration or service in the field of cultural heritage.

It also provides a detailed list with names and addresses and an approximate estimate of staff employed in the different competent public organisations with a formal responsibility in the field of cultural heritage, on national, regional and/or local level.

This field also identifies the government organisations who have responsibility for the care of the heritage at a regional and local level. These may be autonomous regions, counties or districts, or parishes.

Eventually, this field gives an overview of private specialised enterprises involved in heritage conservation, and which main task is maintenance and conservation in the field of cultural heritage and gives a list of the main professional membership organisations in the heritage sector, including: postal address, Telephone / Fax and E-mail and website (when available).

The field **Voluntary initiatives** indicates if one country has a special legislation for establishing NGO's and especially in the field of cultural heritage, what is the administration policy regarding co-operation with NGO's and whether the administration is involved with the activities of the NGO's. The field gives answers to questions such as :

- Are there agreements between the administration and the NGO's?
- Is the administration involved with the activities of the NGO's?
- Are the NGO's supported financially by the administration?

The field also provides a detailed list and brief description of the 10-15 main NGO's, Association or Foundation in the field of cultural heritage at national level, including: postal address, Telephone / Fax and e-mail and website (when available).

The field **Networks** provides a detailed list and brief description of national networks in the area of cultural heritage (information networks, institutional networks, networks related to on-going cultural heritage projects), including address or contact point, plus e-mail and web-site (when available).

The field **National training structures** gives a detailed list and brief description of the main national training organisations and structures in the field of built cultural heritage, including particulars and the possible support by public funds.

Competent institutions

The Ministry of Culture

The Ministry of Culture formulates, administrates, coordinates and exercises control over the implementation of the government policy in the sphere of protection and promotion of the cultural-historical heritage; it outlines the priorities in this sphere; it also allocates the subsidy from the state budget allotted for protection of the cultural-historical heritage; it develops and improves the national system for heritage protection; represents or facilitates Bulgaria's participation in international projects in this field; attracts foreign investments for the preservation of the monuments of culture; puts forward to the Council of Ministers suggestions for the ratification of international agreements in this field.

The National Council for the Preservation of the Monuments of Culture

The National Council for the Protection of the Monuments of Culture assists the Minister of Culture in his activities relating to the preservation of the immovable monuments of culture. The members and functions of this Council are determined in compliance with Article 16 of the Culture Protection and Development Act (the Official Gazette No. 50/1st June 1999); the Council includes the representatives of unions of artists and intellectuals, concerned agencies and organizations, as well as individual authors, artists and experts.

The National Institute for the Monuments of culture (NIMC)

The National Institute for the Monuments of culture (NIMC) is a body within the Ministry of Culture, established in 1957 for assisting the Ministry in the implementation of the state policy for the protection of the immovable monuments of culture. The Statute for the Organization and Tasks of the NIMC (of No. 28/2000) and the Monuments of Culture and Museums Act provide for the main functions of the NIMC, namely:

Research, study, documentation, declaration and registration of the immovable monuments of culture and the monitoring of them;

Maintenance and administration of the National Archives Fund of the immovable monuments of culture;

Coordination and authorisation of all documents (territorial development sketches and plans for territories rich in cultural and historical heritage, programs, planning assignments, exploration, tender documentation, construction permits, investment projects, etc.) relating to any intervention on the immovable monuments of culture and their protected areas;

Control over the methodological cycle of the conservation and restoration work and other interventions in the monuments of culture; suggests discontinuation of illegal activities;

Establishment of the violations of the regimes for protection of the immovable monuments of culture and issues indictments to the perpetrators;

Preparation of stands on the issuance of permits for archaeological excavations, prospecting by drilling, underwater exploration, geophysical and other research and examination of monuments of culture;

Developing of the specific requirements for preservation under concessions of the monuments of culture and determines, in coordination with the owners, the conditions and order for public access to them;

Scientific research and training in the field of preservation of the immovable cultural-historical heritage;

Promotion of the Bulgarian immovable monuments of culture in Bulgaria and abroad.

The NIMC has its field representatives (inspectors) in the cities of Plovdiv, Veliko Tarnovo, Rousse and Bourgas; they exercise control and supervision over the monuments of culture and develop papers for approval or rejection concerning any interventions on monuments of culture relating to the monuments of culture in the respective region.

The Ministry of Regional Development and Public Works

The Ministry of Regional Development and Public Works, in compliance with the Territorial Development Act (which entered into force on 31st March 2001) and the Ordinances supporting it, takes part in the activities for protection of territories, which are protected pursuant to The Monuments of Culture and Museums Act, or areas, which have a specific structure of the population centres – with respect to such areas specific rules and standards are established further to the territorial development plans and are approved by the Minister of Regional Development and Public Works.

The Ministry of Environment and Water

The Ministry of Environment and Water formulates and enforces the government policy in the sphere of the preservation of protected natural areas in compliance with the Protected Areas Act. This Ministry has units, at both regional and local level, which monitor and exercise control over the conducting of environmental protection activities – these units are: the regional environment and water inspectorates (REWIs) with offices in the cities, which are district centres, and the national parks directorates.

The National Tourism Council

The National Tourism Council with the Ministry of Economy, which consists of the Ministry of Environment and Water, the Ministry of Culture and other concerned ministries and bodies, develops and enforces the national policy for the development of cultural tourism; it approves of thematic cultural routes related to the cultural-historical heritage, which are of national and European importance, as well as, with the involvement of the municipalities, local cultural routes.

The Ministry of Education and Science

The Ministry of Education and Science, jointly with the Ministry of Culture, develops educational programs and projects related to raising awareness of the cultural-historical heritage, aimed at young people; the universities and other tertiary educational establishments, which this Ministry is in charge of, train professionals in the field of preservation of the cultural-historical heritage.

The Bulgarian Academy of Sciences

The Bulgarian Academy of Sciences conducts activities in connection with the research and promotion of the cultural-historical heritage in the following of its institutes:

Archaeological Institute and Museum;

Architectural Science Centre;

Science of Art Centre.

Addresses of the Institutions
Ministry of Culture 17, Alexander Stambolijski blvd

1000 Sofia

tel. : 359 2/980 53 84

fax : 359 2/981 81 45

email : danailova_d@yahoo.com

National Council for Preservation of the Monuments of Culture

17, Alexander Stambolijski blvd.

1000 Sofia

tel. : 359 2/980 53 84

fax : 359 2/981 81 45

email : danailova_d@yahoo.com

National Institute for the Monuments of Culture

16, Knyaz Dondoukov blvd.

1000 Sofia

tel. : 359 2/987 48 01

fax : 359 2/987 48 01

email : nipk-sof@einet.bg

Ministry of Regional Development and Public Works

17-19, Sv. Sv. Kiril i Metodij Street

1000 Sofia

tel. : 359 2 940 59

fax : 359 2 983 56 85

web : [http:// www.mrrb.government.bg](http://www.mrrb.government.bg)

Ministry of Economy

8, Slavyanska Street
Sofia
tel. : 359 2 940 71
fax : 359 2 940 71
web : [http:// www.mi.government.bg](http://www.mi.government.bg)

National Tourism Council with the Ministry of Economy

4, Legue Street
1000 Sofia
tel. : 359 2 980 82 78
fax : 359 2/981 25 15
web : [http:// www.mi.government.bg](http://www.mi.government.bg)

Ministry of Environment and Water

67, William Gladstone Street
1000 Sofia
tel. : 359 2/940 60 00
fax : 359 2 986 48 48
web : <http://www.moew.government.bg>

Ministry of Education and Science

2a, Knyaz Dondoukov blvd.
1000 Sofia
tel. : 359 2 921
fax : 359 2 988 24 85
email : press@minedu.government.bg

Bulgarian Academy of Sciences (BAS)

Academic G. Bonchev Str., Block 25-A
1113 Sofia
tel. : 359 2 70 84 94
fax : 359 2 70 72 73

Archeological Institute and Museum with the BAS

2, Saborna Street
1000 Sofia
tel. : 359 2 881 473, 359 2 882 406
fax : 359 2 882 405

Architectural Science Centre with the BAS

Academic G. Bonchev Street, Bl. 1
1113 Sofia
tel. : 359 2 955 42 90, 359 2 955 42 80
fax : 359 2 980 42 60
email : NIM@einet.bg

Science of Arts Centre with the BAS

21, Krakra Street
21, Krakra Street
tel. : 359 2 943 19 69
fax : 359 2 943 30 92
email art@musicart.imbm.bas.bg

Personnel working on conservation

The Ministry of Culture has a total of 122 staff, of which 92 have university degrees, and 30 have specialized high-school diplomas; the administrative staff is 28 employees.

The National Institute for the Monuments of Culture has a total of 69 staff, of which 57 constitute the specialized administration dealing with preservation of the immovable monuments of culture.

The National Council for Preservation of the Monuments of Culture under the Minister of Culture is comprised of 15 members at present, and it may involve additional experts for discussion of specialized matters.

The divisions of the Bulgarian Academy of Sciences, namely the Archaeological Institute and Museum, the Architectural Science Centre and the Science of Arts Centre, employ 260 people.

In the district governor administration and the municipal administrations the functions for preservation of the cultural heritage have been assigned either to specialized offices, or as a joint activity, to other services, which have a bearing on that activity (in most cases Culture or Construction and Architecture Services); that is why at present it is difficult to state a definitive number of bodies and individuals involved in this activity at regional and local level.

Regional and local government

The heritage preservation is implemented at regional and local level through the state structures and the local government bodies (i.e. municipalities).

State structures

The Ministry of Culture administrates and supervises the preservation of the immovable monuments of culture with the assistance of the district administration.

The District Governors enforce the state policy for preservation of the cultural-historical heritage on the territory of the respective district, by: coordination of the preservation activities with the local bodies of the executive power; organizing, in coordination with the bodies of the central executive power, the development and implementation of programs for preservation of the monuments of culture; exercising supervision over and being in charge of the monuments of culture, which are owned by the state, within the territory of the district.

The regional historical museums facilitate the implementation of the state policy for preservation at regional level. They take part in the preparation of the suggested allocation of funds from the state budget for restoration and conservation, exercise supervision on the monuments of culture preservation, promote the cultural heritage and assist the municipalities in the preparation of programs and projects for preservation of the monuments and for raising investments and aids.

The local self-government bodies

The Municipal Councils, mayors of municipalities and mayors of regions and mayoralties take part in the preservation of the immovable cultural-historical heritage within their territory by: preparing suggestions for granting, or changing, the statute of “monument of culture”; inserting in the cadastre updated information about the monuments of culture; exercising control over the condition of the immovable monuments of culture; determining the subsidies from the municipal budget and the Municipal Culture Fund for preservation and promotion of the cultural-historical heritage and exercising control over their spending; preparing jointly with NIMC suggestions for financing the conservation restoration work from the annual state subsidy and undertaking the developer functions for their implementation; the running and maintenance of the immovable monuments of culture, which are municipal property; assigning the preparation of detailed development plans stating specific preservation requirements and standards relating to territories containing cultural historical heritage, as well as with the specific structure of the population centres.

Specialized municipal units with defined functions in the running and preservation of the monuments of culture operate in certain municipalities, within the territory of which there are reserves, as well as in the municipalities of Sofia and Plovdiv (the two biggest cities in Bulgaria, having the largest number of monuments of culture) and in the municipality of Nessebar (World Heritage); these units are as follows:

Municipal Company “Old Sofia” – with the Capital City municipality

Ancient Plovdiv Association – with Plovdiv Municipality

Ancient Nessebar Association – with Nessebar Municipality

Reserve Directorates – special management units have been established with some municipalities (depending on the situation) for the management, supervision and control of the preservation of reserves and the activities carried out in them.

The municipal historical museums deal with such activities, too, but at a lower level – only within the territory of the respective municipality.

Enterprises

The companies operating in the field of conservation and restoration of monuments of culture are specialized in different exploration, research, design and implementation activities – such as architecture and civil and construction, arts, technical and technological, and other activities. They have on their staff highly qualified experts with long-term experience acquired in most cases at the NIMC during the period when (prior to the reform conducted in the Institute in 1990) it used to perform the whole cycle of all preservation activities, including design and implementation of conservation and restoration activities. This holds true for the two state-owned companies established after the respective structural units were detached from the NIMC and registered as independent legal bodies, as well as for the numerous private companies with different profiles and capacity, which were established later on.

“Restoration EAD”

No. 26, 170th Street, Izgrev complex
1113 Sofia
tel. : 359 2 70 81 24
fax : 359 2 70 81 24
email : restavsf@bulinfo.net

“Restoration EAD (Sole-proprietor Joint-stock Company) – state-owned company for the fulfilment of architectural and construction conservation and restoration of architectural and archaeological monuments of culture, which has worked on a number of sites of national importance.

Conservation and Restoration Centre

16, Dondoukov blvd.
1000 Sofia
tel. : 359 2 988 20 06
email : 359 2 988 20 06

Conservation and Restoration Centre – state-owned company for exploration, design and implementation of conservation and restoration of monuments of art, such as painted works of art (frescoes, icons), mosaics, plastic works of art (made of wood, metal, stone, etc.)

“Cultural Heritage ” EOOD

11, Slaveykov Square
1000 Sofia
tel. : 359 2 980 60 50, 359 2 980 56 56
fax : 359 2 980 60 50
email : icomosbg@bgnet.bg

“Cultural Heritage” EOOD (Sole-proprietor Limited Liability Company) – a company of the Bulgarian National Committee of ICOMOS for conservation and restoration of monuments of culture

“EKSA” AD

41, Laiosh Koshout Street, 1st floor
1000 Sofia
tel. : 359 2/ 953 25 63, 359 2/953 07 62
fax : 359 2/953 07 62
email : eksa@ttm.bg

“EKSA” AD (Joint-stock Company) – private company for design and implementation of architectural and construction restoration with large capacity and a number of considerable finished works throughout Bulgaria.

“ETICONS – P.Popov” ET

30, Alabin Street
1000 Sofia
tel. : 359 2 989 04 20

“ETICONS – P.Popov” ET (Sole Trader) – a private company for conservation and restoration of works of art and monuments of culture

“REST-DIMITROV” OOD

131, Rousski blvd., Entrance B
131, Rousski blvd., Entrance B
tel. : 359 32 456 568
fax : 359 32 456 815
email : rest@plovdiv.techno-link.com

“REST-DIMITROV” OOD (Ltd.) – private company for architectural and construction conservation and restoration

Professional membership organisations

Union of Architects in Bulgaria

11, Krakra Street
1504 Sofia
tel. : 359 2 944 26 73
fax : 359 2 946 51 32
email : s(b)bgnet.bg

It is a union of artists and intellectuals, which has the objective to protect and facilitate the freedom and creative manifestation of architects. This organization was registered in 1967 and re-registered in 1996. It is a member of ICOMOS and of the International Union of Architects. Its supreme body is the Congress of the Union, which is held every three years, and elects a Managing Board and a Chairperson. A number of sections have been formed within the Union, one of them being “ADON-Restoration”, which is completely oriented towards the theoretical and implementation issues of the architectural heritage preservation.

Union of Bulgarian Artists

6. Shipka Street
1504 Sofia
tel. : 359 2 944 41 41
fax : 359 2 946 02 12
email : maripavlova@abv.bg

The objectives of this organization are to cooperate for the development of Bulgarian fine art. This organization was registered in 1932 and re-registered in 1996.

Chamber of Architects in Bulgaria

108, Rakovski Str., Office 111 M
1000 Sofia
tel. : 359 32 456 815, 359 2 87 20 93
fax : 359 2 87 51 27

Bulgarian Construction Chamber

23, Choumerna Street
1202 Sofia
tel. : 359 2 988 63 93, 359 2 988 63 92
fax : 359 2 988 68 80
email : bbcc@bnc.bg
web : http:// www.bbcc.bnc.bg

Voluntary initiatives

The activities of the voluntary and non-governmental organizations in Bulgaria are regulated by and in compliance with:

The Not-for-Profit Legal Bodies Act (the Official Gazette No. 81 of 2000), entered into force on 01.01.2001. According to this Act the voluntary organizations – associations and foundations – should be registered as Legal Bodies whose activity for the benefit of society may be encouraged and assisted by the State by means of taxation and other financial and economic preferences.

The European Social Charter (revised) ratified pursuant to a law passed by the 38th National Assembly on 29th March 2000 (The Official Gazette No. 30 of 2000) and issued by the Ministry of Labour and Social Policy (The Official Gazette No. 43 of 2000)

The cooperation between the public authorities and NGOs is manifested in joint participation in projects and programs for protection of the immovable monuments of culture and in the implementation by NGOs of various activities, assigned to them by the authorities under a contract and against remuneration – under the current economic situation this is basically the only form of indirect financial assistance from the State for the voluntary organizations.

The voluntary sector in the sphere of cultural heritage is not developed widely enough in Bulgarian society; against this background some traditionally strong non-governmental organizations stand out, mostly organizations of professionals in various fields that have a bearing on heritage, as well as some associations and foundations actively involved in this field.

Bulgarian National Committee of ICOMOS

11, Slaveykov Square
1000 Sofia
tel. : 359 2 980 60 50, 359 2 980 56 56
fax : 359 2 980 60 50
email : icomosbg@bgnet.bg

Bulgarian National Committee of ICOMOS (International Council on Monuments and Sites) is a not-for-profit organization registered in 1996 and uniting individuals and institutions that are professionally involved in the preservation of the cultural heritage. The objectives of this organization are to take active part in the activities of ICOMOS, to assist in the protection, presentation and reasonable usage of the cultural heritage and to cooperate with the central and local government authorities in this field. The organization's supreme body is the General Assembly, which is held once every three years and elects the Managing Board and the Supervisory Board, as well as a Chairperson.

Bulgarian National Committee of ICOM

66, Opalchenska Street
1202 Sofia
tel. : 359 2 31 80 18
fax : 359 2 31 40 36

Bulgarian National Committee of ICOM (International Council on Museums) – a not-for-profit organization established in 1948 and re-registered in 1996, which unites individuals and institutions that are professionally involved in museums organization and work, and in the preservation of the movable cultural heritage.

Bulgarian Chapter of DOCOMOMO

92-94, Tsar Assen Street, 4th floor, flat 9
1463 Sofia
tel. : 359 2 953 05 89, 359 2 54 57 67
fax : 359 2 988 68 80
email : ljupe@sf.icn.bg; parp@gea.uni-Sofia.bg

Bulgarian Chapter of DOCOMOMO (Documentation and Conservation of the Monuments of Modern Movement) – The Bulgarian working group of DOCOMOMO has existed since 1993 and at present it is one of the 42 national/regional working groups and one of only 24 groups with a voting right in the General Meeting and representation on the Council.

Union of Bulgarian Foundations and Associations

47-51, Tsvetna Gradina Street
 1421 Sofia
 tel. : 359 2 656 522, 359 2 657 600
 fax : 359 2 657 600
 email : ubfa@techno-link.com

Union of Bulgarian Foundations and Associations – it unites non-governmental organizations in the country, assists in the interaction of NGOs at national and international level, and contributes to the development of the civil society. It protects the interests of its members.

The professional associations listed under Theme 2, point 4 have been registered as non-governmental organizations, too: the Union of Architects in Bulgaria, the Union of Bulgarian Artists, the Chamber of Architects in Bulgaria, and the Bulgarian Construction Chamber.

Union of Scientists in Bulgaria

38, Madrid blvd.
 1505 Sofia
 tel. : 359 2 944 11 57, 359 2 463 318, 359 2 430 128
 fax : 359 2 944 15 90
 email : science@bitex.com

Christian Architecture and Arts Foundation Nikola Fichev – Zachari Zograf

11, Krakra Street
 1504 Sofia
 tel. : 359 2 944 26 73
 fax : 359 2 946 51 32
 email : sab@bgnet.bg

Networks

The network of institutions and professionals that cooperate with each other in the cultural heritage preservation, are listed in Theme 2.

National training structures

The training of specialists in cultural-historical heritage preservation is conducted at high school level, university level, post-graduate level and doctorate level. Alongside which, professional skills in restoration and conservation can be acquired in the National Crafts Chamber.

Specialized High Schools

Arts high schools for applied arts, which have established traditions relating to the heritage, exist in: Tryavna (wood plastic art), Sliven (iconography) in Sofia (painting and plastic art), in Troyan (ceramics).

Universities Sofia University St. Climent Ochridski

Sofia University St. Climent Ochridski where the Archaeology department within the Faculty of History educates specialists in finding out, research studies and interpretation of the archaeological heritage.

Sofia University St. Climent Ochridski

15, Tsar Osvoboditel blvd.
 1504 Sofia
 tel. : 359 2 876 292, 359 2 930 83 22
 fax : 359 2 463 022
 email : RectorsOffice@admin.uni-sofia.bg
 web : [http:// www.uni-sofia.bg/](http://www.uni-sofia.bg/)

University of Architecture, Civil Engineering and Geodesy

University of Architecture, Civil Engineering and Geodesy – The Department of History and Theory of Architecture, in the subject Architectural Heritage Preservation, prepares specialists with Master's and Doctor's degrees.

University of Architecture, Civil Engineering and Geodesy
1, Hristo Smirnenski blvd.
1046 Sofia
tel. : 359 2 63 321
fax : 359 2 656863;Telex: 067 23574
email : aceadm@uacg.bg
web : [http:// www.uacg.bg](http://www.uacg.bg)

National Arts Academy

National Arts Academy offers training in restoration, as well as subjects relating to the traditional techniques eg. Woodcarving, Mural painting, Wrought iron, and Ceramics.

National Arts Academy
1, Shipka Street
1505 Sofia
tel. : 359 2 988 17 01
web : [http:// www.art.acad.bg/art/index-b](http://www.art.acad.bg/art/index-b).

New Bulgarian University

New Bulgarian University with its departments of Archaeology, History and Culture History offer courses on education in history, archaeology, cultural science, cultural heritage, and spiritual culture of Bulgarians, placed in the wider European context of mutual connections, parallels and influences.

New Bulgarian University
21, Montevideo Street
1618 Sofia
tel. : 359 2 957 13 21
fax : 359 2 955 60 78
email : info@nbu.bg
web : [http:// www.nbu.bg/](http://www.nbu.bg/)

University Sv. Sv. Kiril i Metodij in Veliko Tarnovo

University Sv. Sv. Kiril i Metodij in Veliko Tarnovo – one of the leading Bulgarian centres for education in history, archaeology, Bulgarian ethnography, Balkan studies and geography.

University Sv. Sv. Kiril i Metodij
2, Teodosij Tarnovski Street
5000 Veliko Tarnovo
tel. : 359 62 20 070
fax : 359 62 62 80 23
email : mbox@uni-vt.bg

University of Forestry

University of Forestry offers courses on landscape architecture, which is directly related to the preservation of certain types of valuable sites and is a part of the interdisciplinary approach to heritage preservation.

University of Forestry
10, St. Kliment Ochridski blvd.
1756 Sofia
tel. : 359 2 9-19-07
fax : 359 2 62-28-30
email : webmaster@ltu.acad.bg
web : [http:// www.ltu.acad.bg/](http://www.ltu.acad.bg/)

Postgraduate StudiesCentre for Qualification in the Field of Cultural-historical Heritage Preservation with the National Institute for the Monuments of Culture (NIMK)

Specialized Centre for Qualification in the Field of Cultural–historical Heritage Preservation with the NIMC – this Centre conducts a two-year postgraduate training course in preservation of immovable monuments of culture for architects; some of the lectures in the course are held by specialists of Le Centre des Hautes Etudes de Chaillot (dit Ecole de Chaillot), Paris.

Specialized Centre with the NIMC

16, Knyaz Dondoukov blvd.

1000 Sofia

tel. : 359 2 987 48 01

fax : 359 2 987 48 01

email : nipk-sof@einet.bg

A Doctor's Degree in the field of cultural heritage preservation may be acquired at any of the above listed tertiary educational establishments and at the three divisions of the BAS in the following subjects: theory and history of architecture; preservation, restoration and adaptation of monuments of architecture; synthesis of architecture with the other arts, interior design and architectural design; territorial and landscape planning and urban development; scientific information theory.

Contracting authorities

The contracting authority, namely the Ministry of Culture, submits the local government authorities on an annual basis through its budget with the state subsidy for activities for preservation of the immovable monuments of culture. The Minister of Culture concludes contracts with the municipalities for carrying out of work on the monuments included in the program made in advance for the allocation of the annual state subsidies (the so-called “State Assignment”).

An integral part of the contract is an excerpt of the State Assignment for the respective municipality – a list of the monuments with a detailed description of the types of restoration–conservation activities on them and the conditions and requirements of the Ministry of Culture, which is the assignor.

The municipalities conclude contracts with sub-contractors for the restoration–conservation work; the contracts are in a format approved by the Minister of Culture and are on the basis of sets of documents coordinated with the National Institute for the Monuments of Culture. Furthermore, the municipalities ensure and finance the developers' control, author's supervision and the independent construction supervision.

The Ministry of Culture transfers advance payments under the State Assignment after the submission of the contracts signed by the municipalities with the sub-contractors of the conservation and restoration work, with the assignee of the author's supervision, the assignee for the developers' control and the assignee for the independent construction supervision.

The National Institute for the Monuments of Culture, in compliance with its powers provided for by law, exercises control over the fulfillment of the activities under the State Assignment at all times.

For acceptance of the accomplished stages of the conservation–restoration work, which is the subject of the contracts for the respective year, the municipality appoints acceptance commissions and finances their work, and also takes care for ensuring the participation in them of representatives of the Ministry of Culture and the National Institute for the Monuments of culture.

The final payment for the performed work is made on the basis of a positive finding and assessment made by the acceptance commission and stated in the relevant statement of findings.

Public contracts

The assignees of conservation and restoration work on monuments of culture, which are public property, obtain the assignment through conducted bidding procedures, one of the requirements being that the bidders are specialists and are proven to have professional experience in this field.

The assignees of design work for such monuments are also required to be specialists with professional experience, priority being given to natural and juridical persons (people or organizations?), who are registered pursuant to the Commercial Law with a subject of activity “conservation and restoration of immovable monuments of culture”.

The owners of immovable monuments of culture may, themselves, hire designers and assignees for the conservation and restoration work, provided that the former provide the financing for the latter completely by themselves, however the lack of an information system and of advertising of the companies specialized in this field causes serious problems to the private developers.

The Chief Architects at the municipalities and practicing architects, who are willing to work in the field of monuments of culture preservation, may acquire the required additional training in the Specialized Training Centre with the NIMC. In this Centre graduates in architecture attend a two-year postgraduate course in preservation of immovable monuments of culture.

Selection of contractors

The selection of contractors (assignees) is provided for by the Public Procurement Act (PPA) and the Ordinance for Assignment of Public Procurement Orders Larger than the Thresholds as specified in Article 7, paragraph 1 of the PPA.

The municipalities are obliged to announce the procedures depending on the amount of the allocated funds and the type of the conservation–restoration work.

The bidding documentation is coordinated with the National Institute for the Monuments of Culture (NIMC).

Representatives of the Ministry of Culture and the NIMC take part in the bidding procedures.

After the completion of the conservation–restoration work, by an order issued by the mayor of the respective municipality a commission for acceptance of the completed work is appointed. A representative of the Ministry of Culture or the NIMC is involved in this Commission.

Programming of works

In the cases of monuments of culture, whose preservation is financed by the state, the programming, budgeting and prioritization is still stipulated precisely in the State Assignment (See Theme 3).

In the cases of monuments, whose preservation is financed from other sources, the above parameters are determined by the owner, the developer and the assignee, but has to be coordinated with the National Institute for the Monuments of Culture (NIMC).

Use, re-use and enhancement

The monuments of culture in the country are used both for their original purpose, as well as being adapted to the present day functions.

The original functions have for the most part remained unchanged in the case of residential buildings and many of the administrative buildings, which are monuments of culture.

One of the most commonly observed types of contemporary usage of buildings–monuments of culture is their being adapted to serve as museums, where the building (generally of a high category), beside the exposition it hosts, exhibits also the architecture, decorative art and all other merits of the monument.

It is, more often than not, the municipality, and not the state, that initiates the contemporary use of buildings which are monuments of culture.

Maintenance policy

According to the Law for monuments of culture and museums the owners of the movable and immovable monuments of culture are obliged to maintain them in good condition, financing by themselves all repair works and activities, which they initiate. If the owners of the immovable monuments of culture cannot provide financial means for urgent repair works and maintenance of the monuments of culture, the expenses are paid by the municipality or the state, against mortgage of the property.

The state and the municipalities provide the maintenance of the monuments of culture which are state or municipal property.

The State budget, adopted annually in the Parliament, provides – through the budget of the Ministry of Culture – funds for monitoring and promotion of the monuments of culture.

The movable monuments of culture are managed by the museums, whose funds they are part of. When conditions for their proper management are lacking (objective and subjective), the Ministry of culture may order transfer of movable monuments of culture from state, municipal and departmental museum collections into funds of other state and municipal museums.

The new draft law for monuments of culture submits changes aimed at achieving more efficient results in this field of activity.

Insertion of contemporary creative work

The creation of an appropriate new architecture, as well as the interpretation of the traditional architecture found in the historical ensembles, is being encouraged. The training at the University of Architecture, Civil Engineering and Geodesy and in the Specialized Training Centre within the NIMC is conducted with a view to this aspect, namely: mastering the principles and skills for building and development of the architectural context.

In those population centres, which are reserves, new construction is allowed, in strict compliance with the regimes for their preservation, and this may vary from an interpretation of the relevant architectural style through to modern design, which is in harmony with the volumetric-spatial nature of the original.

Prevention of natural disasters and human damage

The Law for monuments of culture and museums and the Criminal code considers sanctions for people and organizations who, with their actions (or lack of actions), cause the damage or removal of monuments of culture.

The Regulations for the organization and activities for prevention and elimination of damages resulting from natural calamities, accidents and disasters, adopted by a Decree of the Council of Ministers_ 18 dated 23rd January 1998, determines the state bodies, the bodies of local self-management and of local administration as well as their main functions and tasks, aiming at non-admission, decreasing or eliminating the damages that occurred in times of peace, as a result of calamities, accidents and disasters. One of the main tasks of the State agency "Civil protection", having a regional structure, is the carrying out of rescue and urgent restoration activities in cases of calamities, accidents and disasters.

According to the Law for the environment, its preservation includes its effective protection from natural calamities and disasters, caused by destructive processes, a result of human activities.

The determination and imposition of sanctions, when damage or contamination of the surrounding environment exceeding the standard is noticed, is fixed by regulations of the Council of Ministers.

The present Law for monuments of culture and museums makes no provision for the responsibilities and special measures for preservation of the monuments of culture in cases of natural calamities and disasters. Such clauses are set in the new draft law for the monuments of culture.

COST Action C17: WORKING GROUP 3 CULTURAL VALUE

Sakari Mentu



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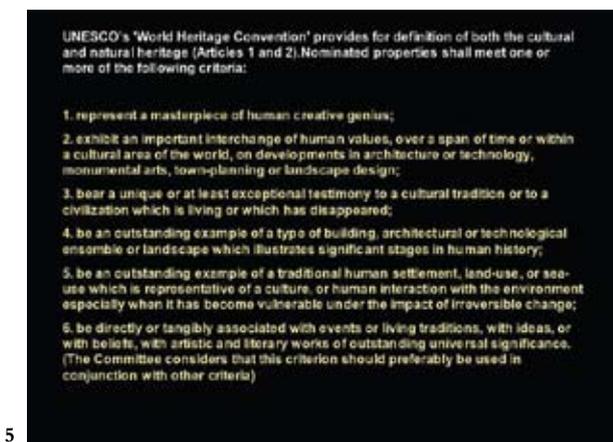
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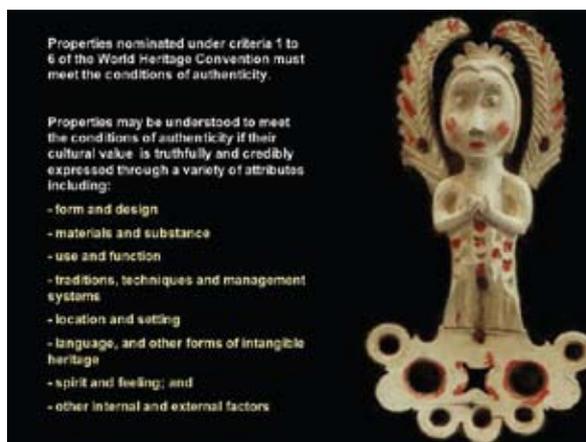
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INTERNATIONAL DOCUMENTS

ATHENS CHARTER (1931)
 By defining the basic principles the preservation and restoration of ancient buildings for the first time, the Athens Charter of 1931 contributed towards the development of an extensive international movement which has assumed concrete form in national documents.

EUROPEAN CULTURAL CONVENTION (Paris, 19.12.1954)
 The European Cultural Convention was opened for signature in Paris on 19 December 1954, and entered into force on 5 May 1955. The initial aims of the Convention were to encourage Europeans to safeguard their own cultural heritage (including their language, history and civilisation) and to recognise it as being part of a wider "European" heritage. There are currently 48 signatories to the Convention (all 46 Council of Europe member states, plus Belarus and the Holy See - i.e. every state in Europe).

THE HAGUE CONVENTION (1956)
 The reconstruction period after World War II between 1945-1955 was characterized by large-scale restorations of destroyed cities. This prompted the Hague Convention of 1954 that produced the Convention for the Protection of Cultural Property in the Event of Armed Conflict, issued in 1956.

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VENICE CHARTER (May 1964)
 The Second International Congress of Architects and Technicians of Historic Monuments, which met in Venice in May 1964, approved the text of an International Charter for the Conservation of Monuments and Sites (the Venice Charter), which superseded the Athens Charter. The Venice Charter was adopted by the newly formed International Council on Monuments and Sites (ICOMOS) in 1956 and published in 1966.

CONVENTION FOR THE PROTECTION OF THE ARCHITECTURAL HERITAGE OF EUROPE, GRANADA (1985, Council of Europe)
 The Council of Europe's 'Granada Convention' defines the architectural heritage and also includes places of 'conspicuous historical, archaeological, artistic, scientific, social or technical interest', comprising 'monuments' (buildings including fixtures and fittings, and structures), 'groups of urban or rural buildings', and 'sites' that are partially built on.

NARA DOCUMENT ON AUTHENTICITY (1994)
 The Nara Document on Authenticity is conceived in the spirit of the Charter of Venice 1964, and builds on it and extends it in response to the expanding scope of cultural heritage concerns and interests in our contemporary world.

THE RIGA CHARTER ON AUTHENTICITY AND HISTORICAL RECONSTRUCTION IN RELATIONSHIP TO CULTURAL HERITAGE (2000)

THE KRAKOW CHARTER (2000)
 By the International Conference on Conservation "Krakow 2000"; Plenary Session "Cultural Heritage as the Foundation of the Development of Civilisation."

COUNCIL OF EUROPE FRAMEWORK CONVENTION ON THE VALUE OF CULTURAL HERITAGE FOR SOCIETY (Faro, 2005)
 On the occasion of the Faro Ministerial Conference, the Council of Europe Framework Convention on the Value of Cultural Heritage for Society was opened for signature on 27 October 2005.

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DOCUMENTS on CRITERIA

historic interest
 "The intention in conserving and restoring monuments is to safeguard them no less as works of art than as historical evidence." (Venice Charter)
 "The valid contributions of all periods to the building of a monument must be respected, since unity of style is not the aim of a restoration." (Venice Charter)
 "A monument is an entity identified as a bearer of worth and forming a support to memory. In it, memory recognizes aspects that are pertinent to human deeds and thoughts, associated with the historic time line. This may still be within our reach." (Krakow Charter)

architectural interest
 "Wherever the traditional setting exists, it must be kept. No new construction, demolition or modification which would alter the relations of mass and color must be allowed." (Venice Charter)
 "Items of sculpture, painting or decoration which form an integral part of a monument may only be removed from it if this is the sole means of ensuring their preservation." (Venice Charter)

12

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emotional interest
 "Responsibility for cultural heritage and the management of it belongs, in the first place, to the cultural community that has generated it, and subsequently to that which cares for it." (Nara Document)
 "The assembly established a presumption against reconstruction of the cultural heritage, excepting circumstances where reconstruction is necessary for the survival of the place; where a 'place' is incomplete through damage or alteration; where it recovers the cultural significance of a place; or in response to tragic loss through disasters whether of natural or human origin." (Riga Charter)
 "Reconstruction of an entire building, destroyed by armed conflict or natural disaster, is only acceptable if there are exceptional social or cultural motives that are related to the identity of the entire community." (Krakow Charter)
 "Identity is understood as the common reference of both present value generated in the sphere of a community and past values identified in its authenticity." (Krakow Charter)



group value
 "...the buildings that form historic areas may not have a special architectural value in themselves, but they should be safeguarded because of their organic unity, distinctive dimensions, and their technological, spatial, decorative and chromatic characteristics as connecting elements, irreplaceable in the organic unity of the town." (Krakow Charter)
 "...the expression "architectural heritage" shall be considered to comprise the following permanent properties:
 monuments: all buildings and structures of conspicuous historical, archaeological, artistic, scientific, social or technical interest, including their fixtures and fittings;
 groups of buildings: homogeneous groups of urban or rural buildings conspicuous for their historical, archaeological, artistic, scientific, social or technical interest which are sufficiently coherent to form topographically definable units;
 sites: the combined works of man and nature, being areas which are partially built upon and sufficiently distinctive and homogeneous to be topographically definable and are of conspicuous historical, archaeological, artistic, scientific, social or technical interest." (Granada Convention)

14

usefulness/functionality

"The conservation of monuments is always facilitated by making use of them for some socially useful purpose...but it must not change the layout or decoration of the building." (Venice Charter)

"Due regard being had to the architectural and historical character of the heritage, each Party undertakes to foster the use of protected properties in the light of the needs of contemporary life; the adaptation when appropriate of old buildings for new uses." (Granada Convention)

"The purpose of conservation of historic buildings and monuments, whether in the urban or rural context, is to maintain their authenticity and integrity (...). In many cases, it also requires an appropriate use, compatible with the existing space and significance." (Krakow Charter)

15

cultural diversity

"The respect due to all cultures requires that cultural heritage must be considered or and judged primarily within the cultural contexts to which it belongs." (World Heritage Convention)

"Cultural heritage diversity exists in time and space, and demands respect for other cultures and all aspects of their belief systems. In cases where cultural values appear to be in conflict, respect for cultural diversity demands acknowledgment of the legitimacy of the cultural values of all parties." (Nara Document)

"The principles guiding the preservation and restoration (...) should be agreed and be laid down on an international basis, with each country being responsible for applying the plan within the framework of its own culture and traditions." (Venice Charter)

"...the concept and application of authenticity as it relates in cultural heritage is rooted in specific cultural contexts and should be considered accordingly." (Nara Document)

"In some languages of the world, there is no word to express precisely the concept of authenticity". (Nara Document)

16

"All judgments about values attributed to cultural properties as well as the credibility of related information sources may differ from culture to culture, and even within the same culture. It is thus not possible to base judgments of values and authenticity within fixed criteria." (Nara Document)

"Each community, by means of its collective memory and consciousness of its past, is responsible for the identification as well as the management of its heritage. This cannot be defined in a fixed way. One can only define the way in which the heritage may be identified. Plurality in society entails a great diversity in heritage concepts as conceived by the entire community. The monuments, as individual elements of this heritage, are bearers of values, which may change in time." (Krakow Charter)



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Presentation by Sakari Mentu / National Board of Antiquities, Finland
December 2006

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authenticity

"The process of restoration[...]is based on respect for original material and authentic documents. It must stop at the point where conjecture begins, and in this case moreover any extra work which is indispensable must be distinct from the architectural composition." (Venice Charter)

"Authenticity means the sum of substantial, historically ascertained characteristics; from the original up to the current state, as an outcome of the various transformations that have occurred over time." (Krakow Charter)

"When a building includes the superimposed work of different periods, the revealing of the underlying state can only be justified in exceptional circumstances and when what is removed is of little interest and the material which is brought to light is of great historical, archaeological or aesthetic value, and its state of preservation good enough to justify the action." (Venice Charter)

"...relation to authenticity, the reconstruction of archaeological remains or historic buildings or districts is justifiable only in exceptional circumstances. Reconstruction is acceptable only on the basis of complete and detailed documentation and to no extent on conjecture." (World Heritage Convention)

19

clarity and educational potential

"Our ability to understand these values depends, in part, on the degree to which information sources about these values may be understood as credible or truthful. Knowledge and understanding of these sources of information, in relation to original and subsequent characteristics of the cultural heritage, and their meaning, is a requisite basis for assessing all aspects of authenticity." (Nara Document)

the degree of importance

"The concept of an historic monument embraces not only the single architectural work but also the urban or rural setting in which is found the evidence of a particular civilization, a significant development or an historic event. This applies not only to great works of art but also to more modest works of the past which have acquired cultural significance with the passing of time." (Venice Charter)

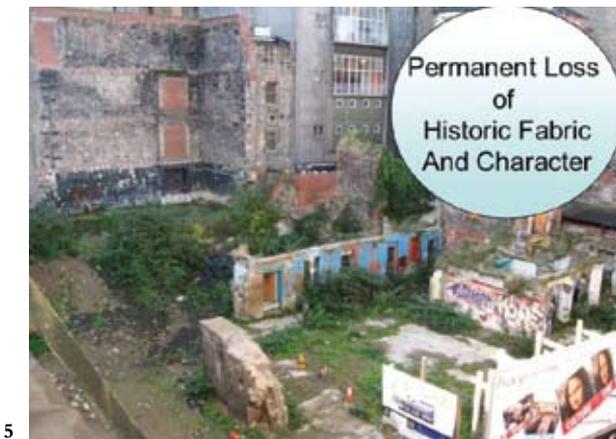
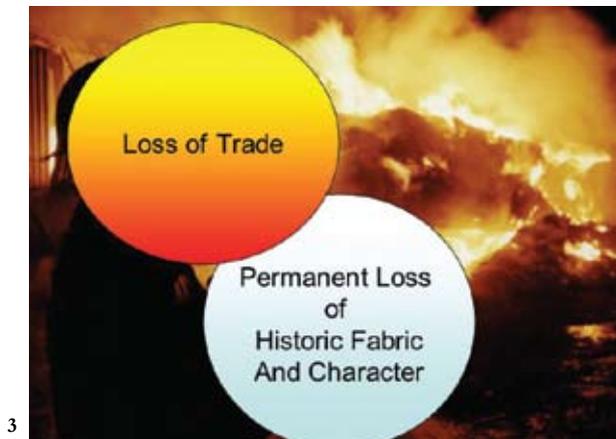
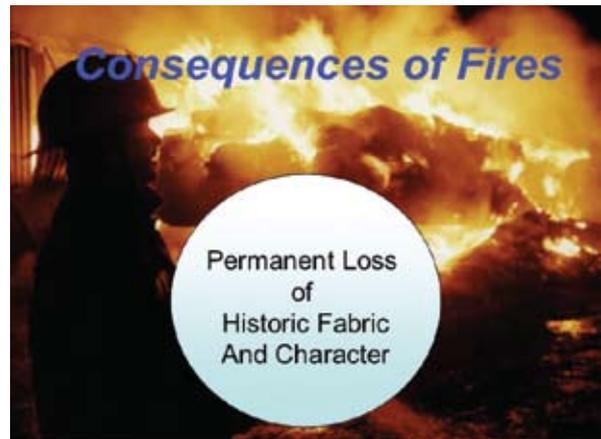
quality or state of maintenance

"Integrity is a measure of wholeness and intactness of the natural and/or cultural heritage and its attributes. Examining the conditions of integrity, therefore requires assessing the extent to which the property includes all elements necessary to express its outstanding universal value: is of adequate size to ensure the complete representation of the features and processes which convey the property's significance; suffers from adverse effects of development and/or neglect." (World Heritage Convention)

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CONSEQUENCES & PROBABILITY OF FIRE IN HISTORIC BUILDING

Steve Emery





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11

Estimate of cost of Chester Rows Fire

£260,000	Emergency Works
£500,000	Loss of Retail Income
£450,000	Business Interruption
£1,050,000	Rebuilding
£ Unknown	Shopfitting, stock, Rent for alternative accommodation
<u>Total over</u>	<u>£3,000,000</u>

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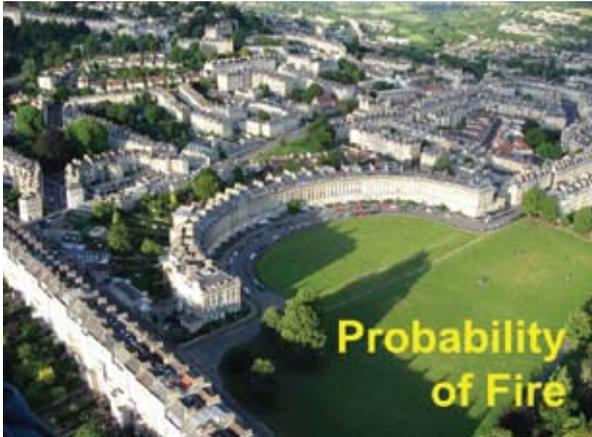
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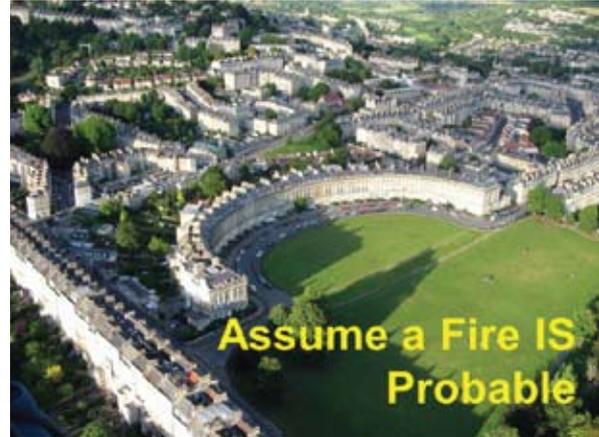
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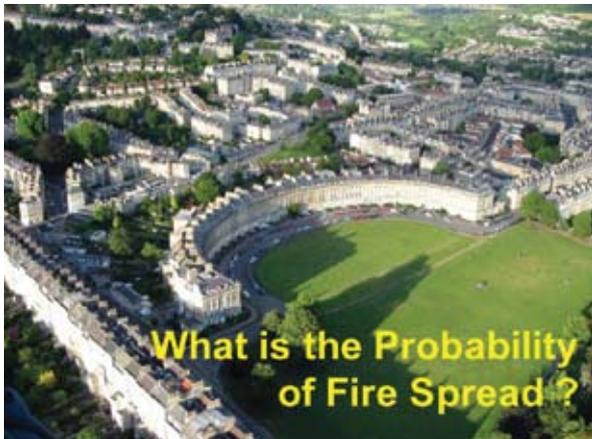
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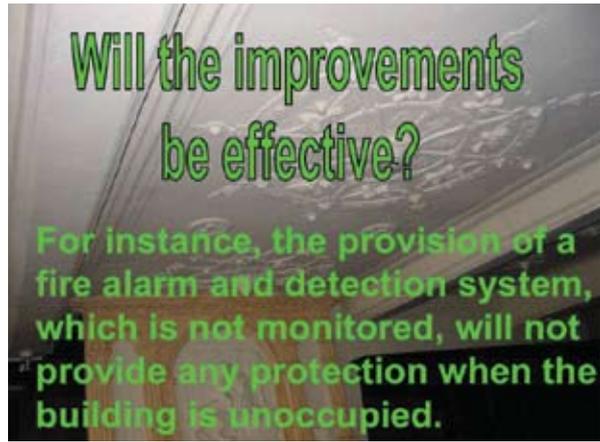
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POST-FIRE DECISIONS: NORWEGIAN EXAMPLES

Einar Karlsen

Post-fire Decisions: Norwegian examples

Einar Karlsen



Case 1. Bryggen in Bergen Fire 1955



Case 1. Bryggen, Bergen



Case 1. Bryggen, Bergen



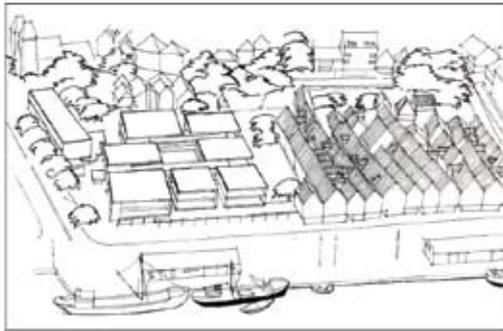
Case 1. Bryggen, Bergen



Case 1. Bryggen, Bergen



Case 1. 1962 Shopping Center Project



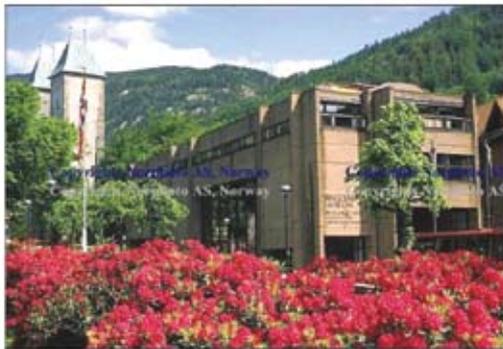
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Case 1. 1974 Two alternatives



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Case 1. Bryggen. Bergen Museum. 1976



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Case 1. Bryggen area as reconstructed



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Case 1. SAS Hotel completed 1983



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Case 1. Bryggen, Bergen



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Case 2. Archbishop's Palace, Trondheim



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Case 2. Archbishop's Palace, Trondheim



14

Case 2. Archbishop's Palace, Trondheim

Fire: 10 August 1983



15

Case 2. Archbishop's Palace, Trondheim



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Case 2. Archbishop's Palace, Trondheim



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Case 2. Archbishop's Palace, Trondheim



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Case 2. Archbishop's Palace, Trondheim



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Case 2. Archbishop's Palace, Trondheim



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Case 2. Archbishop's Palace, Trondheim



21

Case 3. Trondheim. Nordre gate

Fire. 7. December 2002



22

Case 3. Trondheim. Nordre gate



23



Case 3. Trondheim. Nordre gate



24



Case 3. Trondheim. Nordre gate



25



Case 3. Trondheim. Nordre gate



26



INSURANCE OF HISTORICAL BUILDINGS: FINANCIAL DATA MEMORANDUM FOR UNDERSTANDING

Ivar Clausen

**HISTORIC BUILDINGS AND
INSURANCE**

**3.3 INSURANCE OF HISTORICAL BUILDINGS, FINANCIAL DATA
MEMORANDUM FOR UNDERSTANDING**

Ivar Clausen

Conclusions and recommendations

1

PRESENTATION

Ivar Clausen, Architect and Engineer

Principal of Opus arkitekter as npa, situated in Haugesund on the western coast of Norway

Has specialised in the impact of general insurance conditions on historic buildings

Has practiced for the last 25 years as a building surveyor on historical buildings in the event of damage caused by fire, water and natural perils (storm- and flood damages).

2

1 LEGISLATION

All countries should have a law which ensures owners of historic buildings the right to insure their properties and that the cost will reflect the risk of damage and the required cover, i.e. the same insurance system as for others.

i. Increasingly insurance companies do not wish to insure historic buildings because they think listed buildings are of special risk to insure, and due to the status these buildings have achieved, they become more expensive to repair than unlisted buildings of a similar sizes.

ii. This tendency can threaten historic buildings because without insurance cover, there will be no indemnity to be paid after damage occurs.

3

2 STANDARD INSURANCE CONDITIONS

To avoid requiring an extra insurance or specialist knowledge, there ought to be a single set of terms and conditions that include and regulate a buildings cultural or historic importance.

i. There is a tendency that insurance companies try to make special insurance agreements beyond the standard conditions (which include historical interests anyway). This leads to two consequences; insurance cost increases unnecessarily and it becomes difficult in the event of damage to assess the indemnity for this special antiquarian value.

ii. Some owners are not aware that their building has a special historic or a cultural interest. This means that standard insurance conditions always will take care of the actual historical value in any indemnities after damage.

4

3 EASY AND CLEAR INSURANCE CONDITIONS

To avoid misunderstandings, insurance conditions should be formed so that the replacement or the repair indemnity covers the necessary costs to maintain the buildings historic and cultural interest when damage occurs:

i. The insurance conditions should reflect the risks and duties that are reasonable to expect from the insurers when there occurs damage to an historic building.
-to execute a repair within historic or antiquarian principles is reasonable to expect

5

ii. The insurance conditions should be easy to use and clearly state that; Additional costs rendering from building techniques or equipment being irrational by modern building standards are not included and The insurance does not cover artistic embellishment cannot be used as a reason to overlook or leave out respecting the historic or cultural value inherent in aesthetic decoration, original choice of materials and construction principles, etc.

iii. The indemnity must cover all relevant costs for administration, planning and investigations to find out the appropriate method of repair or reconstruction.

iv. The payout must also ensure funds to acquire and utilise the skills of a competent team to complete necessary historic and cultural repairs to a highly professional level on site.

v. The insurance terms must ensure sufficient funds to cover additional expenses due to obligatory orders given by law.

6

4 COMPETENCE

Insurance companies should have the necessary competence and an established quality control system both to enter in to insurance agreements and also to deal with damage to buildings of historic interest.

- i. Lack of competence often leads to conflict between the insurance companies, and the owners, and the cultural authorities.*
- ii. Lack of competence for the participating parties (insurance functionaries, building surveyors, clearance operatives, craftsmen etc) often leads to increase the cultural damage and also the cost to repair.*

7

5 OBJECTIVITY

An insurance company ought not to use their own surveyors, so as to ensure an objective translation of the insurance terms and conditions in relation to cultural and historic interest in an insurance agreement.

- i. An insurance agreement is an agreement between two equal parts, the insurance company and the owner of the building. After a damage the indemnity for the owner will be a result of the right interpretation of the insurance conditions within the chosen agreement (full value or first risk insurance).*

8

WORKING GROUP 3 CULTURAL AND FINANCIAL VALUE

Kirsten Westerlund Bjurström

WG 3 Cultural and Financial Value

*Introduction; Kerstin Westerlund Bjurström
National Property Board Sweden SFV*

- Cultural Value
- Cultural Value and Economy
- Insurance of Historic buildings Financial data
- Evaluation of Risks and special measures to take regards to historic buildings
- Loss Recovery from Ethical point of view

COST 17 - Fire Loss To Historic Buildings

1

WG 3 Presentations; Rome 2006

Cultural Historic Value; International documents and definitions *Sakari Mentu; National Board of Antiquities; Finland*

Consequences and probability of fire in historic buildings *Steve Emery; English Heritage; United Kingdom*

Post fire decisions; Principles and some examples *Einar Karlsen; Directorate for Cultural Heritage; Norway*

Recommendations for Insurance of Historic buildings *Ivar Clausen; Opus Arkitekter as; Norway*

Importance of historic and cultural value for economy *Kerstin Westerlund Bjurström; National Property Board; SFV; Sweden*

COST 17 Fire Loss To Historic Buildings; WG 3 Cultural and Financial Value; Introduction; Kerstin Westerlund Bjurström National Property Board Sweden

2

WG 3 Cultural and Financial Value

Members WG 3:

Kerstin Westerlund Bjurström (Sweden), Jacques Akerboom (Netherlands), Andre De Naeyer (Belgium), Steve Emery (UK), Konrad Fietko (Poland), Helene Hanas (Sweden), Sjur Helseth (Norway), Einar Karlsen (Norway), Ivar Clausen (Norway), Josip Korosec (Slovenia), Respondak Jerzy (Schweitz), Marlana Llinares (Spain), Sakari Mentu (Finland), Ingvall Maxwell (UK), Galina Mileva (Bulgaria), Juri Minin (Israel), Luigi Pastorelli (Italy), Andrej Rebec (Slovenia), Simon Sirtog (France), Valentine Vladimirov (Bulgaria), Louis Vega Catalan (Spain), Dietman Wohltan (Austria)

COST 17 Fire Loss to Historic Buildings; WG 3 Cultural and Financial Value
Introduction; Kerstin Westerlund Bjurström National Property Board Sweden

3

Importance of historic and cultural value for economy

The economic value consist of value for the:

- **owner in terms of market value and emotional value**
- **tourist industry who really consume historic property**
- **enterprise that can use the value as symbols in marketing**
- **society use Cultural heritage as identity to attract people and enterprise**

COST 17 Fire Loss to Historic Buildings; WG 3 Cultural and Financial Value
Kerstin Westerlund Bjurström National Property Board Sweden

4

Importance of historic and cultural value for economy

*The Palace is invaluable and priceless.
Original in most details with no market value.
Big economic value for society
It is easy to forget that something priceless costs a lot to protect and is extremely difficult and expensive to recreate*

Therefore It is important to handle recreation costs and value for society, in risk analysis, insurance, in management as a whole (especially in not insured property)

COST 17 Fire Loss to Historic Buildings; WG 3 Cultural and Financial Value
Kerstin Westerlund Bjurström National Property Board Sweden
Läckö Palace

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Importance of historic and cultural value for economy

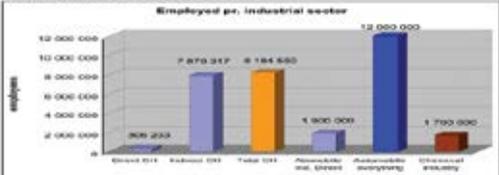
- **Recreation costs has to be regarded as part of the economic value of the building**
- **The property manager has to have an idea about it**
- **It is an important factor in risk analysis and in estimating insurance amount**

COST 17 Fire Loss to Historic Buildings; WG 3 Cultural and Financial Value
Kerstin Westerlund Bjurström National Property Board Sweden

6

Built heritage: Generating jobs

- Heritage Lottery Fund, English Heritage, and the East of England Development Agency; Heritage report (2003); In East England, £10,000 of heritage investments has levered in an average of £45,000 match funding from private sector and public sources. This has generated on average 55 m2 of commercial floor space, one improved building and one improved home.
- Norwegian Directorate of Cultural Heritage report: "Cultural heritage sector creates app 26.7 jobs for every direct one, compared to the auto industry where the factor is only 6.3



7

The Action recommends to the State and the Responsible Authorities that:

- the responsibility to protect a building against fire and to insure it should be clarified in the regulations for at least listed building
- fire prevention measures for listed buildings shall be paid from grants from the community as well as some part of other preservation measures.
- responsible government body ought to study the possibility to give money back to the built heritage from tourist industry
- research on the influence of historic buildings and surroundings on economy is initiated and supported by governments and responsible institutions

COST 17 Fire Loss to Historic Buildings; WG 3 Cultural and Financial Value
Kerstin Westerlund Bjuström National Property Board Sweden

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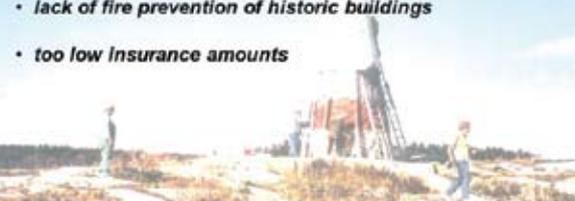
The Action recommends the property owners to:

- Be aware of the economic value for society of their historic buildings and of the costs to reconstruct them
- And that:
 - Tenancy agreement shall include information about –the special value of the building, –its vulnerability and –what is forbidden because of that
 - It has to be clearly motivated and formally decided if fire prevention measures cannot be undertaken because of economy or other reasons
 - It has to be formally decided if the building is planned to be used by an enterprise that could cause danger to the building

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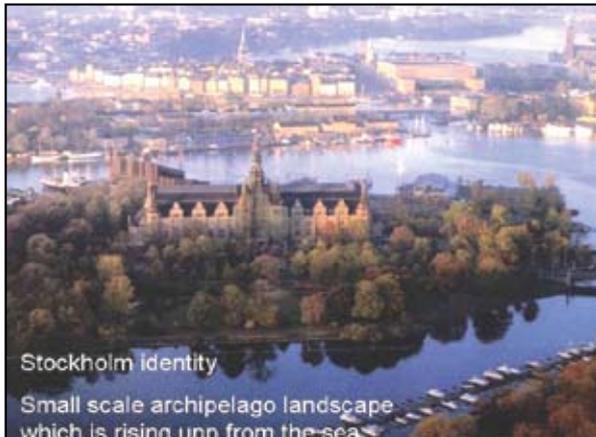
The Action recommends that all people should be engaged to encourage the media to pay attention to:

- how insurance companies and owners take their responsibility
- lack of fire prevention of historic buildings
- too low insurance amounts



COST 17 Fire Loss to Historic Buildings; WG 3 Cultural and Financial Value
Importance of cultural historic value for economy; Kerstin Westerlund Bjuström National Property Board Sweden

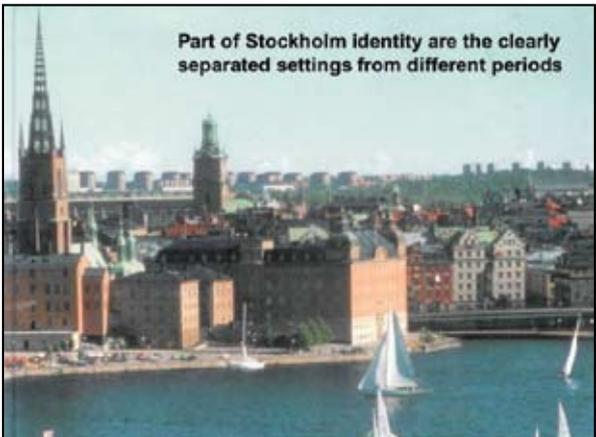
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The owner doesn't gain from strong identity especially if it is based on historic value

- The market price can be low because of restrictions etc. Usually it is impossible for the owner to use the property in a prosperous way. Also if the owner can use the value it is normally problematic to earn money from it.
- Very special architecture or architecture related to its history can add to a strong brand for a company. But that is very special
- Still we are dealing with buildings or settlements of great importance for local, regional or national economy:
 - for tourist industri (hotels, restaurants, entertainment etc)
 - for people, enterprise and society because it creates added value to the place, district or area where it is situated in terms of attraction.
 - It gives more interest in the place, more jobs and more incomes
 - It is used in advertisement etc to attract people

13





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16

COST Action C 17 - BUILT HERITAGE:
FIRE LOSS TO HISTORIC BUILDINGS
FINAL CONFERENCE SESSION 3: THE WORK OF
WORKING GROUP 3: SUMMARY REPORT

Ingval Maxwell



Kerstin Westerlund Bjurström

Session 3.1 Cultural Historic Value; International documents and definitions: Sakari Mentu

With reference to a wide range of international charters and conventions, Sakari Mentu addressed the issues of cultural values.

He noted that the main criteria of cultural historic value included:

- historic interest includes buildings which illustrate important aspects of social, economic, scientific, cultural (literature, theatre, film, art, architecture etc) or military history
- architectural interest; buildings of interest for their architectural design, decoration and craftsmanship
- technical interest; buildings of interest because of technical innovations. This dimension in many countries is included in architectural interest
- emotional interest; buildings which are associated with important people or events, or have great symbolic value
- group value; buildings which are important as elementary parts of an interesting or beautiful unity

He also explained that enhancing factors or added value can be:

- authenticity or genuineness
- representative-ness or rareness, if the building is very typical or very special
- clarity and educational potential, if the building is suitable for presenting or displaying its history and other values as education or for tourists
- the degree of importance; significance for a village, a town, a region; national or global importance

Aspects that also needed to take into account included:

- quality or state of maintenance
- usefulness/functionality

He noted that the definitions from the different countries in Europe seem to correspond very well, but different traditions give different emphasis on some aspects and slightly different expressions in their definitions. With reference to a variety of international conservation charters and conventions, he selected appropriate aspects of these that were relevant to the Action's intentions, and succinctly set out operational parameters that should be followed in the future.



With reference to a wide range of international charters and conventions, Sakari Mentu addressed the issues of cultural values.

Session 3.2 Consequences and probability of fire in historic buildings: Steve Emery



Steve Emery considered three aspects in dealing with the consequences and probability of fire in historic buildings - the loss of building; the loss of trade; and the cost of rebuilding what was destroyed. He made reference to a number of case studies including the Cowgate, Edinburgh; Chester Rows; a thatched cottage and a lodge.

He suggested that some changes in emphasis and approach should be made that starts to change the emphasis of the probability of to the assumption that a fire is probable to consider the probability of fire spread when a fire occurs. Consequently, there was a need to identify what the biggest threats were and consider how to reduce them.

Session 3.3 Post-fire decisions; Norwegians examples: Einar Karlson



Einar Karlson reviewed the case study of the reconstructed section of Bergen's Bryggen district following the fire in the 1950s. He traced the development of various proposals, and the dilemmas and solutions of the difference schemes which were played out throughout the 1960-70's to reveal the eventual answer.

He also presented an analysis of the Archbishop's Palace fire in Trondheim in 1983 together and with its solutions, and the emerging scheme which has since been adopted for the Nordegate 2002 fire site in Trondheim.

Session 3.4 Recommendations for Insurance of Historic buildings: Ivar Clausen



Based on many years of professional involvement, Ivar Clausen considered that the insurance aspect in the Action's Memorandum of Understanding was an important part of the Actions work.

In an important presentation, he offered a range of recommendations for owners to consider under the legislation; standard insurance conditions; easy and clear insurance conditions to understand; competence by the insurance companies in assessing the issues; and objectivity.

Session 3.5 Importance of cultural value and economy: Kerstin Westerlund Bjurstrom



In providing a scene-setting overview of the cultural heritage sector and a broader or industry interests, Kerstin Westerlund Bjurstrom summarised the recommendations and findings of Working Group 3's activities. WG 3 Cultural and Financial Value to deal with:

- Cultural value
- Cultural value and economy
- Insurance of Historic buildings financial data
- Evaluation of Risks and special measures to take regards to historic buildings
- Loss Recovery from ethical point of view

She noted that the economic value consists of value for the:

- owner in terms of market value and emotional value
- tourist industry which consume historic property
- enterprise use of the value as symbols in marketing
- societies use of cultural heritage as an identity to attract people and enterprise

From WG3's point of view she suggested that the Action recommends to each State and the responsible authorities that:

- the responsibility to protect a building against fire and to insure it should be clarified in the regulations for listed buildings at least
- fire prevention measures for listed buildings should be paid from grants from the community in addition to some part of other preservation measures.
- responsible government bodies ought to study the possibility to give money back to the built heritage from the tourist industry
- research on the influence of historic buildings and their surroundings on the economy is initiated and supported by governments and responsible institutions

With regards to property owners the Action recommends:

- to be aware of the economic value for society of their historic buildings, and of the costs to reconstruct them, and that:
- that tenancy agreement should include information about the special value of the building, its vulnerability and what is forbidden because of that
- it has to be clearly motivated and formally decided if fire prevention measures cannot be undertaken because of economy or other reasons
- it has to be formally decided if the building is planned to be used by an enterprise that could cause danger to it

The Action recommends that all parties should encourage the media to pay attention to:

- how insurance companies and owners take their responsibility
- the lack of fire prevention of historic buildings
- under-insured amounts in relation to cultural value of buildings

Session 3.6 Discussion

In considering the value of the built heritage Jacques Akerboom noted that in 2005 some 4.5 million tourists visited the city of Amsterdam, and spent some € billion. The point was made and that if this element of value of the built heritage could be aggregated across Europe the importance and significance of retaining Europe's historic buildings in an intact, original, state could not be underestimated. The discussion recognised the critical need of disseminating information such as this, which had been accumulated as a result of the work of the Action.

RESULTS OF WG 4: PROPERTY MANAGEMENT STRATEGIES

Wolfgang Kippes

COST C 17 WG 4   Kippes Wolfgang
Schloss Schönbrunn
Roma, Dec. 2006

Results of WG4: Property Management Strategies
Wolfgang Kippes:

MoU

Best practice approach to the management of cultural resources properties regarding the whole range of management regimes for risk preparedness.

**Risk Management
Risk Assessment
Technical Support**
are integral parts of the property management process.

1

COST C 17 WG 4   Kippes Wolfgang
Schloss Schönbrunn
Roma, Dec. 2006

Interdependence with the output of WG1 to WG3

Work started significantly later than all other WGs
Waiting for the first results to be used.

Series of interesting reports (GB, Sweden, NI, Austria, etc.)

Personal comment on the results achieved:

- Outcome from WG 1 to WG 3 convinced me totally
- Outcome from WG 4 ???

2

COST C 17 WG 4   Kippes Wolfgang
Schloss Schönbrunn
Roma, Dec. 2006

Table of content:

1. Documentation
of premises, collections, know how and organisation (including regulations and control)

Possible Recommendations:

- Fire Safety Handbook
- Control of hot building works
- Fire Safety Log Book
- Address location of records/archives to ensure business continuity

3

COST C 17 WG 4   Kippes Wolfgang
Schloss Schönbrunn
Roma, Dec. 2006

2. Management Plans:

Emergency Planning:
Information- and Alarmlogistics, opening/closing procedures of the premises, evacuation plan for visitors and staff, artefact evacuation / damage limitation plans, public relations, post alarm reaction plan, key control

Coordination and integration of emergency services response:
Best practice results for liaison with emergency rescue services

Building upgrading planning:
Recommendation:
Publish access to risk analysis in business annual accounts balance sheets and offer advice on how to analyse and release information.

4

COST C 17 WG 4   Kippes Wolfgang
Schloss Schönbrunn
Roma, Dec. 2006

3. Training:

Special report coming up

5

COST C 17 WG 4   Kippes Wolfgang
Schloss Schönbrunn
Roma, Dec. 2006

4. Evaluation / Audits:

Risk Assessment on a regular basis
External audit
Evaluating the experience

6

COST C 17 WG 4   Kippen Wilfang
Schloss Schindhamm
Rome, Dec. 2008

5. Decision making tools:

Use of statistical data and lessons learned for managerial needs

7

COST C 17 WG 4   Kippen Wilfang
Schloss Schindhamm
Rome, Dec. 2008

6. Loss recovery:

Ethics, aspect of value, etc (cf. WG 3)

**management of loss recovery:
priorities, funding, documentation, etc.**

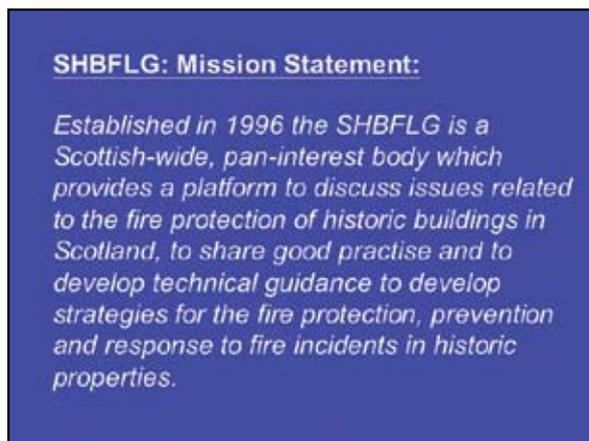
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SCOTTISH HISTORIC BUILDINGS FIRE LIAISON GROUP (SHBFLG)

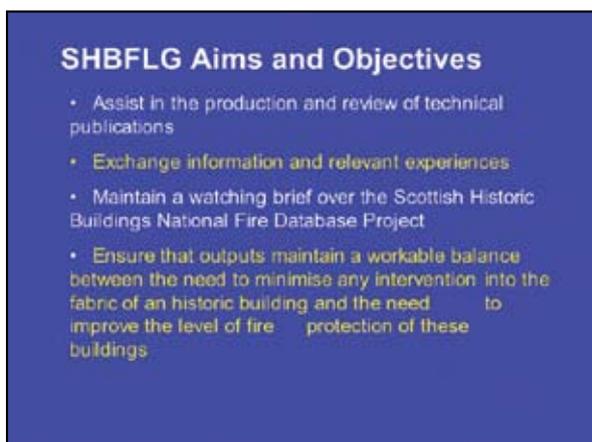
Ingval Maxwell



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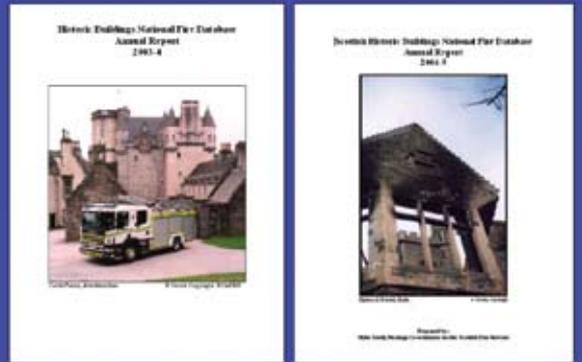
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Membership: Associated interest bodies

- Glasgow City Libraries
- Architectural History Society for Scotland
- Gray, Marshall & Associates
- Alba Conservation Trust



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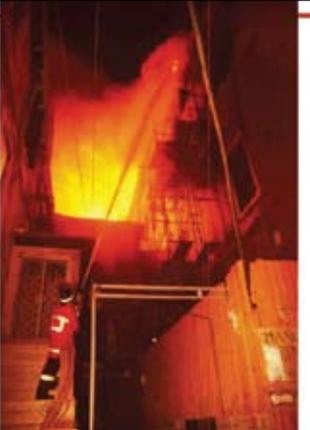
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FIRE SAFETY OF THE BUILT HERITAGE IN ITALY: A JOINT TRAINING PROGRAMME

Stefano Marsella
Luca Nassi

Stefano Marsella - Luca Nassi

Fire safety of the built heritage in Italy: a Joint training programme



Roma ISA, 12/02/2006

1

In Italy:

- the responsibility of built heritage conservation is under the Ministry for cultural heritage



- the responsibility of built heritage fire protection is under the Ministry of internal affairs - National Fire Services Department

Dipartimento dei Vigili del Fuoco, del Soccorso Pubblico e della Difesa Civile
Corpo Nazionale dei Vigili del Fuoco

2

Both Ministries have local offices:

- Superintendents for antique buildings
- Provincial fire safety services Commands

The local bodies are directly responsible for their choices



3

According to different laws, owners of listed buildings has to preserve and protect against the fire them but, as a result of the different responsibilities:

- can work on the buildings only after the approval of the works by the superintendent;
- has to apply fire safety features that, in some cases have to be approved by the local fire services Command

4

some listed buildings

- are "damaged" by unnecessary safety features or
- are not protected in order to avoid damages



Monza, Palazzo dell'Arengario
1 inner stair + 1 external that serves a very small room

Roma, Roman marble statues museum
3 inner + 2 external stairs

5

In general, conservation issues do not match with fire protection criteria (water vs paper conservation, textures vs safety services, structure vs egress stairs etc)

The problem involves superintendents, fire services, owners, architects, engineers

6

7

- A way to mitigate the possible damages (no protection or excessive protection) is improving the knowledge about the *performance based approach*. In fact, it offers the possibility of a better assessment and a wider choice of safety solutions.
- A joint training program of fire officers and fire services officers started in 2005 in order to give a brief information (1 week) concerning:
 - The main aspects of fire protection (to heritage people)
 - The main aspects of heritage conservation (to fire safety people)

8

The Goal

The goal of the program is double:

- To give to superintendents offices the minimum knowledge about fire safety in order to understand if invasive safety provisions can be avoided
- To give Fire Officers a minimum idea of the heritage conservation issue and some basic Knowledge about Performance Based Approach

9

The students

- Engineers and architects of the Fire Services Department, mostly working in the provincial Commands
- Technical employees working in local Superintendent offices and in national archives

10

The program

- The first part of the program is divided:
 - - aspects of fire safety to heritage conservation - lesson and visit*
 - aspects of conservation legislation to fire safety people - lesson and visit**

* Big commercial compounds
** Biblioteca Angelica, Roma

11

The programme



Biblioteca Angelica, Roma

12

The programme

The second and third part of the training is joint:

- Principle of the performance based approach to fire safety
- Application of the approach to the specific problem of built heritage

13

The programme

The fourth part of the training is joint:

Application of the performance based approach to a couple of case studies:

- (Santa Maria della Scala di Siena)
- Biblioteca di Arezzo

14

Final consideration

- The activity is in the early stage (3 courses ended, 36 people)
- A better comprehension of the problems has arisen
- The program is absolutely inadequate in order to give people the skill in using performance based approach

MAP MOBILE ADAPTIVE PROCEDURE: PROJECT PRESENTATION

Stefano Marsella
Luca Nassi

MAP

- ❖ Born in 2002 as a co-funded IST Research Project it became an eTEN project on 2004
- ❖ It comprises a trans-national Consortium composed by Institutions and industrial companies
- ❖ Partner are:

1

What is eTEN ?

- ❖ eTEN is the European Community Programme designed to help the deployment of telecommunication networks based services (e-services) with a trans-European dimension.
- ❖ It focuses strongly on public services, particularly in areas where Europe has a competitive advantage.

2

Highlights

Existing Knowledge In/Out

MAP KB

MAP AREA (Front line assessor)

Citizens

3



4

MAP during an Emergency

Alarm: "Alc. a sinistra! Fiamme in alto! 104411"

Report: "Segno via via la PDA, l'incendio è in via"

Search: "MP: cerca info, ricerca di dati, informazioni, ricerca di dati, informazioni, ricerca di dati"

Presence: "Presenza di MP al posto dell'incendio, il caso del fiamme in via"

Meeting: "Meeting of Fire Brigade Legacy system: Designers, material, city companies, Emergency management procedures, etc."

Retrieval: "Info come back to the PDA and, il caso di gestione esperienza, con il supporto di dati di situazione via '104411'"

5

MAP achievements on Emergency

- Allow runtime retrieval of info coming from different sources relevant for a specific event management while occurring or in the planning phase;
- Fast info retrieval related to a peculiar event with a man-machine interface which allow the operator to ask queries simply using a microphone having results displayed on a dedicated screen;
- Events knowledge base creation able to perform as a decision support system and to store useful shortcut;
- Use of different data sources also non-structured.

6

RISK ANALYSIS IN PRACTICE

Per Rohén

Risk analysis in practice

**Per Rohén
National Property Board
Sweden**





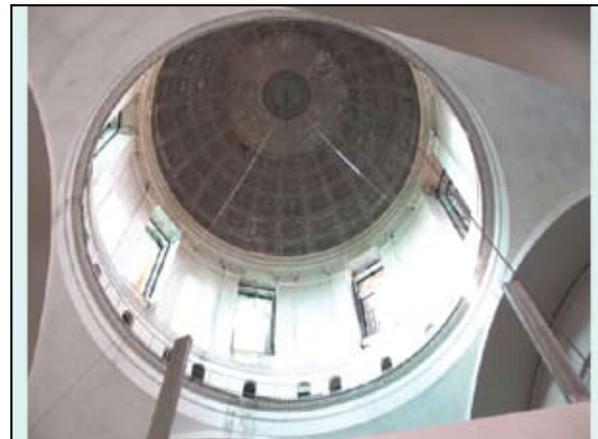
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FIRE PREVENTION DOCUMENTATION	
Description of building and activities	1
Valuation of historical assets in fire prevention work	2
Description of building-related fire prevention	3
Risk inventory, risk and assessment and proposed action	4
SBA ROUTINES	
Schedule of interfaces/Distribution of responsibility between National Swedish Property Board and tenant	5
National Swedish Property Board organisation and responsibilities	6
Training plan and levels of expertise	7
Plan for checking and maintenance	8
Checklists for checking and maintenance	9
Damage and incident reporting	10
Instructions to craftspeople	11
Written account of fire prevention – fire inspection record	12
Fire prevention drawings with fire-related installations	13
Preserving residual values	14
Action planning – rescue service	15

15



16



17



18



19

Risk = Probability x Consequence

20

Probability	Description
x	Cannot happen
1	Highly unlikely
2	Unlikely
3	Probable, 1 time in 100-10000 years
4	High probability, 1 time in 10-100 years

21

Consequence value	General fire damage	Injuries	Building of cultural significance
1 Very small	Area (limited) fire- and smoke damage in the fire compartment	No one is exposed in critical environments*	Damages to building parts of no or low cultural and historical significance
2 Small	Extensive fire damage in fire compartment, minor fire spread (smoke spread) to other fire compartments	Few persons exposed to critical environments*, injuries are considered as minor	Damages on building parts of cultural and historical significance.
3 Large	Complete fire damage in the fire compartment, extensive fire spread (smoke spread) to other fire compartments and minor fire spread.	Several persons are exposed to critical environments*. Several persons receive minor injuries and a few receive serious injuries.	Damages on building parts of high cultural and historical significance.
4 Very large	Complete fire damage in the fire compartment, extensive fire- and fire spread (smoke spread) to other fire compartments	Several persons are exposed to critical environments*. Several persons receive serious injuries. Some deaths.	Damages on building parts of very high historical significance.

* Critical environments relate to smoke, heat, caused by fire that affects the evacuation regularly. The notion is defined in Swedish building code BBR 8:2 §3:161 /JF

22

RISKMATRIX

Assessment		Risk		
4	4	8	12	16
3	3	6	9	12
2	2	4	6	8
1	1	2	3	4
X	1	2	3	4
		Consequence		

23

Risk value	Assesment
12 - 16	Immediate measures should be taken. The effects on the building and activity will be immense
8 - 11	Shall be managed within the near future. The effects on the building and activity will be large
6 - 7	Measures should be considered taken within a near future. . The effects on the building and activity will be of significance
1 - 5	The fire compartment is in acceptable part of the matrix.

24

Table 4: Summarization of risk

No.	Part	Risk source of cause	Risk assessment						
			Probabilty	Risk value	Cultural value		Risk index		
				Fire-dama	Injury	Cultural - value	Fire damag	Injury	Cultural value
11	North	Light fixtures and electric grid	2	2	1	3	4	2	6
12	Midst	Light fixtures and electric grid	2	3	3	3	6	6	6
13		Audio installations	3	3	3	3	9	9	9
14	South	Light fixtures and electric grid	2	2	2	1	4	4	2
15		Frying table, register, kitchen floor	3	2	2	1	6	6	3
21	North	Light fixtures and electric grid	2	2	2	1	4	4	2
22		Electric wiring and other technical parts for sparking	3	2	2	1	6	6	3
23		Trunks in kitchen	3	2	2	1	6	6	3
24	Midst	Light fixtures and electric grid	2	3	3	3	6	6	6
25		Audio installations	3	3	3	3	9	9	9
26	South	Light fixtures and electric grid	2	3	4	4	6	6	6
27		Audio installations	3	3	3	4	9	9	12

25

A	Is not damaged by fire and/or smoke, alternatively ability to be restored
B	Can be partly restored
C	Cannot be restored

26



27



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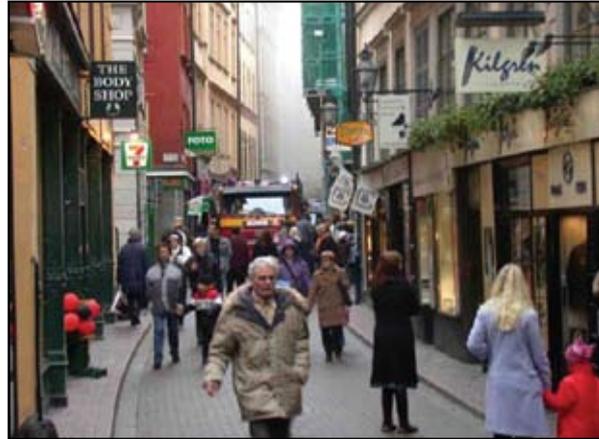
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32

Risk analysis in practice

Until a few years ago we had a system in Sweden in which the rescue service carried out fire inspections, that is to say they came out to the property at particular intervals to inspect it. How often this was done depended on the type of property concerned. If it was an assembly hall or a hospital, the facility was visited once a year, and if it was office premises it might have been once every four or five years.

In most cases it was an experienced fire officer who inspected the premises and left instructions behind. Sometimes there were purely organisational matters that were easy to remedy – if there was a wish to do so – and sometimes there were more serious matters that might affect personal safety, of both an organisational and building-related nature. The focus was on personal safety and nothing else.

If there was economically and culturally valuable property no account was taken of this and the only thing considered was personal safety. No specific assessment of risk was made but if it was an experienced inspector some assessment was made in passing.

In 2002 the legislation was amended and work on fire safety became more specifically a matter for the owner/occupant. The concept of Systematic Fire Safety Work (SBA) was introduced.

The National Swedish Property Board, where I worked, manages national cultural monuments, national museums and theatres, the official residences of county governors and so on. And like most other property owners we relied on inspections by the rescue services and on their assessment of the various properties and rectified any deficiencies that emerged in the, sometimes quite infrequent, inspections made by the rescue services.

Today, with the new legislation, the level of aspiration is far higher, and it is hoped that so too is the level of safety.

What has happened?

Well, practical responsibility for fire safety has been clarified as being held by the owner or whoever has the right to use the property, that is to say as a matter for landlord and tenant.

The whole of SBA work is based on self-monitoring, in which checking routines that have to be followed are created and activities in which are also documented.

The task of the rescue service is to check – supervise – that self-monitoring checks have actually been carried out and that any deficiencies found have been rectified. No actual inspection of the property is made, unfortunately, which means that all the experience gained by the fire brigades is difficult to tap into.

The basic approach of the National Swedish Property Board, the fire prevention description for the property, consists of two parts:

- fire prevention documentation and
- SBA routines, as illustrated –

FIRE PREVENTION DOCUMENTATION	
Description of building and activities	1
Valuation of historical assets in fire prevention work	2
Description of building-related fire prevention	3
Risk inventory, risk and assessment and proposed action	4
SBA Routines	
Schedule of interfaces/Distribution of responsibility between National Swedish Property Board and tenant	5
National Swedish Property Board organisation and responsibilities	6
Training plan and levels of expertise	7
Plan for checking and maintenance	8
Checklists for checking and maintenance	9
Damage and incident reporting	10
Instructions to craftspeople	11
Written account of fire prevention – fire inspection record	12
Fire prevention drawings with fire-related installations	13
Preserving residual values	14
Action planning – rescue service	15
Other	16
<p>With regard to fire-prevention documentation, it is primary inventory-taking work in which the fire status of the property is determined at regular intervals.</p> <p>For the SBA routines part it is a case of creating the necessary conditions for daily work.</p> <p>In the inventory phase the property is to be inspected and an inventory is to be drawn up from the point of view of fire safety, and any deficiencies found are to be appraised from the point of view of risk. This work is equivalent to what the rescue services previously did in their fire inspections.</p> <p>This work can be termed a practical risk analysis, and we have termed it risk inventory-taking and risk assessment. The actual term risk analysis is a little over the top as we do not make any quantitative assessment with theoretical and mathematical assessments and only produce subjective assessments based on practical experience.</p> <p>There is a practical problem here. As mentioned previously, the risk inventory was previously drawn up by a fire officer with all his or her practical experience. It is often difficult to find equivalent experience in one's own organisation.</p> <p>In the case of complex properties it is advisable, at least to start with, to rely on consultants with this practical experience. In the fullness of time the expertise required in one's own organisation will have been built up and one will no longer be completely dependent on external assistance.</p> <p>As mentioned previously, risk analysis work consists of several phases.</p>	

1. Risk inventory-taking, where an attempt is made to find all potential causes of a fire, such as:

- naked flames,
- smoking in the wrong place,
- construction activity involving hot work such as welding, grinding etc.,
- incorrect lighting,
- poor-quality electrical installations
- lightning strike etc.

2. Risk appraisal, where an attempt is made to assess how often an event may occur and what consequences it may have.

Risk appraisal work can be illustrated by a simple and classic picture most of you will be familiar with.

The various parameters can be found in tables one can determine for oneself depending on one's own situation.

These are the values the National Swedish Property Board normally employs:

ProbabilityDescription	
x	Cannot happen
1	Highly unlikely
2	Unlikely
3	Probable, 1 time in 100-10000 years
4	High probability, 1 time in 10-100 years
ProbabilityDescription	
x	Cannot happen
1	Highly unlikely
2	Unlikely
3	Probable, 1 time in 100-10000 years
4	High probability, 1 time in 10-100 years

The values obtained for the various deficiencies are placed in a risk matrix.

RISKMATRIX					
Assessment			Risk		
	4	4	8	12	16
	3	3	6	9	12
	2	2	4	6	8
	1	1	2	3	4
	X	1	2	3	4
		Consequence			

It is important that the result is presented in as practical a way as possible.

When we have made the final presentation for the property, we have made use of various colours, everything from colourless to bright red, where the red colour shows that the risk is unacceptably high and must be dealt with immediately.

Risk value	Assesment
12-16	Immediate measures should be taken. The effects on the building and activity will be immense
8-11	Shall be managed within the near future. The effects on building and activity will be large
6-7	Measures should be considered taken within a near future. The effects on the building and activity will be of significance
1-5	The fire compartment is in acceptable part of the matrix

This is how a presentation may look:

Nr.	Floor	Part	Risk source/ cause	Risk assesment						
				Probabi lity	Risk value			Risk index		
					Fire- dama ge	Injury	Cultura l- value	Fire dama ge	Injury	Cultural value
1.1	1	North	Light fixtures and electric grid	2	2	1	3	4	2	6
1.2		Middle	Light fixtures and electric grid	2	3	3	3	6	6	6
1.3			Audio installations	3	3	3	3	9	9	9
1.4		South	Light fixtures and electric grid	2	2	2	1	4	4	2
1.5			Frying table/hot plates kitchen flue	3	2	2	1	6	6	3
2.1	2	North	Light fixtures and electric grid	2	2	2	1	4	4	2
2.2			Electric welding and other machines prone to sparking	3	2	2	1	6	6	3
2.3			Hotplate in kitchette	3	2	2	1	6	6	3
2.4		Middle	Light fixtures and electric grid	2	3	3	3	6	6	6
2.5			Audio installations	3	3	3	3	9	9	9
2.6		South	Light fixtures and electric grid	2	3	3	4	6	6	8
2.7			Audio installations	3	3	3	4	9	9	12
Table 6 Summarization of risk										

A more detailed description is given in the final report.

It is not sufficient just to identify all the risks, - proposals must be made for action, otherwise it is easy to “forget about” the risk.

This, combined with photographic documentation, means that it is possible for a new member of staff to complete the work if it proves necessary to change personnel.

Experience we have acquired is that it is necessary to take account of the cultural value and restorability of a property. Restorability means the ability to recreate the original milieu with regard to surface finishes and furnishing. There is a great difference between a fire in a basement with brick arches and a stone floor and a state apparent in Stockholm Palace.

This information is very useful for a rescue leader who is directing fire-extinguishing operations, particularly if it is presented on drawings.

By incorporating this information into the action plan it is possible to prioritise the efforts of the fire-extinguishing units so that they attend to the most sensitive parts of the building.

This information can also form the basis for work aimed at preserving residual value after the fire has been put out.

To conclude, it is important that a comprehensive risk inventory of the property is carried out at regular intervals, preferably once a year, but it is at least as important to look out for the “individual” risks in daily work and deal with them immediately.

IMPLEMENTATION OF FIRE RISK ASSESSMENTS

Nick Jordan

1

**COST Action C17: Built Heritage
"Fire Loss to Historic Buildings"**

Implementation of Fire Risk Assessments

Nick Jordan

2

**COST Action C17: Built Heritage
"Fire Loss to Historic Buildings"**

Definitions

Hazard – An event with the potential to cause harm/fire

Risk – the likelihood that harm/fire will occur

3

**COST Action C17: Built Heritage
"Fire Loss to Historic Buildings"**

The Fire Risk Assessment Process

5 Steps Method

4

**COST Action C17: Built Heritage
"Fire Loss to Historic Buildings"**

Identify the Hazards/Sources of Fire

Identify who/what is at Risk

Assess the Risk

Develop Control Measures

Monitor and Review

5

**COST Action C17: Built Heritage
"Fire Loss to Historic Buildings"**

Implementation

Develop Policies and Strategies for:

- Means of Escape
- Structural Protection and controlling the Spread of Fire
- Detecting Fire and Raising the Alarm
- Action to take in an Emergency

6

**COST Action C17: Built Heritage
"Fire Loss to Historic Buildings"**

Implementation

- Develop Policies and Strategies
- Consult Enforcing Authorities
- Appoint Competent Persons
- Training Property Managers

Fire Exits



7

Fire Alarm Systems

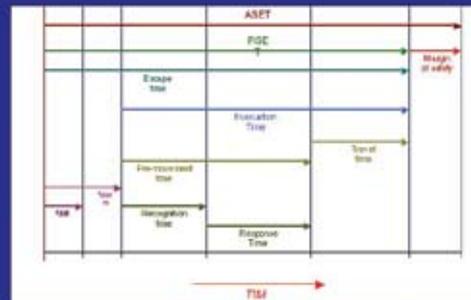
“Effective means for providing an early warning that fire may be present is fundamental to the risk to life and protection of property”

8

Emergency Lighting

“Sufficient Lighting levels are important to ensure that occupants can leave the building safely should a fire occur when natural or borrowed lights are not available”

9



10

COST Action C 17 - BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS CONFERENCE SESSION 4: THE WORK OF WORKING GROUP 4: SUMMARY REPORT

Ingval Maxwell



The Work of Working Group 4: Property Management Strategies: Wolfgang Kippes

In opening the session, Wolfgang Kippes emphasised that the result of Working Group 4 was still dependent upon the results emanating from the other Working Group activities

He listed the following as a range of possible contents for that section of the final report.

- Documentation of premises, collections, know how and organisation (including regulations and control) possible recommendations could include the need for:
- Fire Safety Handbook
- Control of hot building works
- Fire Safety Log Book
- Address location of records/archives to ensure business continuity
- Management Plans:
- Emergency Planning: Information - and Alarm-logistics, opening/closing procedures of the premises, evacuation plan for visitors and staff, artefact evacuation / damage limitation plans, public relations, post alarm reaction plan, key control. Coordination and integration of emergency services response: Best practice results for liaison with emergency rescue services. Building upgrading planning: Publish access to risk analysis in business annual accounts balance sheets and offer advice on how to analyse and release information.
- Training needs
- Evaluation / Audits:
- Risk Assessment on a regular basis

- External audit
- Evaluating the experience
- Decision making tools: Use of statistical data and lessons learnt for managerial needs.
- Loss recovery: Ethics, aspect of value, etc (cf. WG 3) management of loss recovery: priorities, funding, documentation, etc.

Session 4.1 Scottish Historic Buildings Fire Liaison Group: Ingval Maxwell



In offering a possible model for other member countries to follow, Ingval Maxwell described the historic background, terms of reference, and modus operandi of the Scottish Historic Buildings Fire Liaison Group (SHBFLG). Established in 1996 the SHBFLG is a Scottish-wide, pan-interest body which provides a platform to discuss issues related to the fire protection of historic buildings in Scotland, to share good practise and to develop technical guidance to develop strategies for the fire protection, prevention and response to fire incidents in historic properties.

The SHBFLG Aims and Objectives are to:

- assist in the production and review of technical publications
 - exchange information and relevant experiences
 - maintain a watching brief over the Scottish Historic Buildings National Fire Database Project
- ensure that outputs maintain a workable balance between the need to minimise any intervention into the fabric of an historic building and the need to improve the level of fire protection of the buildings.

He explained how important it was for the Group to be involved in the drafting of various technical publications dealing with fire loss matters. This involvement helped determine that the acceptance of the recommendations by building owners, and other interested parties, was assured at the point of publication. He also noted that at the Fire Liaison Group had been involved in reviewing the Technical Advice Note which had been published by Historic Scotland in support of COST Action C 17.

Session 4.2 Joint training Fire services - Board of Heritage: Luca Nassi

Luca Nassi presented a paper on the Italian joint training fire services initiative. In Italy he noted that the responsibility of built heritage conservation was under the Ministry for Cultural heritage and responsibility of built heritage fire protection is under the Ministry of Internal Affairs - National Fire Services Department. According to different laws, owners of listed buildings have to preserve and protect against the fire them but, as a result of the different responsibilities can work on the buildings only after the approval of the works by the superintendent and has to apply fire safety features that, in some cases have to be approved by the local fire services command.

A joint training program of fire officers and fire services officers was started in 2005 in order to give a brief information (1 week) concerning the main aspects of fire protection (to heritage people) and the main aspects of heritage conservation (to fire safety people).

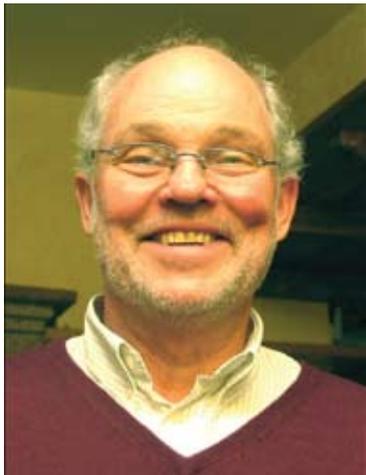
The goal of the program is to give to superintendents offices the minimum knowledge about fire safety in order to understand if invasive safety provisions can be avoided and to give Fire Officers a minimum idea of the heritage conservation issue and some basic knowledge about performance based approach.

The students are mainly engineers and architects of the Fire Services Department, mostly working in the provincial Commands and technical employees working in local Superintendent offices and in national archives. The first part of the program is divided into aspects of fire safety to heritage conservation and aspects of conservation legislation to fire safety people, with both parts involving lectures and visits. The second and third part of the training is joint and deals with the principle of the performance based approach to fire safety and the application of the approach to the specific problem of built heritage.

The fourth part of the training involves the application of the performance based approach to two case studies. So far three courses have been completed and 36 participants have been involved, but experience has shown that some further development work is required.



Session 4.3 Risk assessment loss recovery in practice: Per Rohlen



In reviewing the August 2006 fire consequences at Trinity Cathedral St Petersburg, Russia, Per Rohlen noted that the authorities appeared to have acted in a similar unprepared manner as those concerned with the Anna Amalia library fire in Weimar, Germany, in 2004. The initial reaction of the local population was to collect money to effect the rebuilding of the fire-damaged dome. Press photographs released at the time illustrated a complete lack of preparedness for the disaster. Pictures and contents been removed from the cathedral to be simply laid down in the open on the streets. There seemed to have been little or no disaster planning in place.

He reported that in 2002 the Swedish legislation was amended to make fire safety a responsibility of the building owner. This had a significant impact on bodies which had previously relied upon the fire authorities to provide them with cover. This had required those bodies to develop a new expertise but this has taken time and a considerable commitment to resolve. As a result, however, there has been a better degree of day-to-day management emerging in many places, with a beneficial reduction in the risks, and their likely frequency, arising. This has emerged primarily because, once the owner had become aware of the risks, follow up remedial activities were essential. With the adopted system taking into account cultural value and restorability of the property, this has allowed prioritising of the approach which, in turn, has assisted the Fire and Rescue Services improve on their operational activities should be an incident occur.

Session 4.4 Implementation of Risk assessment Nick Jordan



Nick Jordan considered the differences in legislation and approach in the implementation of risk assessment. He offered five steps that need to be considered:

- Identify the Hazards/Sources of Fire
- Identify who/what is at Risk
- Assess the Risk
- Develop Control Measures
- Monitor and Review

In implementation he noted the need to develop policies and strategies for:

- Means of Escape
- Structural Protection and controlling the Spread of Fire
- Detecting Fire and Raising the Alarm
- Action to take in an Emergency

Session 4.5 Training Staff: Wolfgang Kippes



Wolfgang Kippes discussed the salvage and recovery exercises involving the fire brigade's at Schonbrunn Palace.

In considering the support needs for property managers there was a requirement to devise appropriate management regimes, learning from others in Europe through studying best practice in policy, regulations, planning, organisation, checklists, training, monitoring, hot work permission etc.

In addition the following needed to be addressed

- As support for property managers, provide models for risk analysis of a building, training of the staff, handling of contents in case of fire
- Establish a balance between technical and management contributions to combat the effects of fire
- Consider the management measures that will contribute to the prevention of fire ignition Consider how the complexity of the building may initially dictate search and rescue, and then fire fighting

The training topics that required to be addressed included:

- Risk Awareness
- Management Plans
- Handling of fire fighting units
- Damage Limitation Training
- Refresher Training
- Joint Exercises (internal staff, emergency services, external partners)
- Evacuation Tests and Training
- Special Training units for decision makers

On the Schloss Schönbrunn Model training involved:

- Emergency evacuation plan is trained three times a year (without visitors). The goal of training is to evacuate all people within 3 minutes
- Risk awareness programme – every member of the staff in contact with visitors has to pass basic awareness training module before starting to work
- Risk awareness programme – every member of the staff dealing with facility management has to attend yearly upgrading modules
- Every staff member has to operate first fire fighting units once per year.

He noted that two years after undertaking their training, 95 per cent of the experience was lost to the staff involved. It was therefore essential to maintain a programme of ongoing training. Joint exercises with the Fire and Rescue Services were an essential part of the process. There was a clear need to promote education on this matter to all Heads of Units and to making them responsible to promote training across all their staff interests.

SHORT TERM SCIENTIFIC MISSION: FIRE BRIGADE LIAISON

Mike Coull

Short Term Scientific Mission: Fire Brigade Liaison

Mike Coull
Grampian Fire & Rescue Service

1

Short Term Scientific Mission



2

Short Term Scientific Mission

- Regulation and control of members of Damage Limitation Teams
- Role and Responsibility of Damage Limitation Team
- Safe and Secure evacuation of artefacts
- Co-ordination and integration with fire service
- Training Requirements

3

Regulation and Control of Members of DLT

- Written management instructions
- Control of team members
- Role defined at Hampton Court Palace

4

Role and Responsibility of DLT

- Identified within Management Plan
- Clearly understood by Vienna Fire Brigade

5

Safe and Secure Evacuation of Artefacts

- Integrated into Emergency Plans
- Improved security arrangements

6

Co-ordination and Integration with Fire Service

- Close working relationship in Vienna
- National Trust encourages liaison



7

Training Requirements

- Teams train once per month
- Additional training during renovation work
- Lack of formalised training for professional firefighters



8

Recommendations from STSM

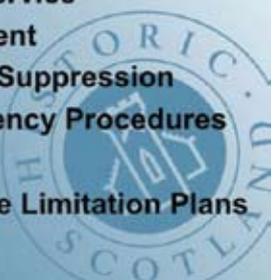
- Guidance to be provided to owners
- Guidance to be provided to Fire Services
- Change terminology to 'Damage Limitation'



9

Short Guide to Owners

- Liaison with Fire Service
- Fire Risk Assessment
- Fire Detection and Suppression
- Developing Emergency Procedures
- Training of Staff
- Developing Damage Limitation Plans



10

Damage Limitation Plan

- Calling the Fire Service
- Evacuating the premises
- Ensuring Security
- Assistance to Fire Service
- Developing a Snatch List



11

Firefighter Development

- Operational Procedures
- Fire Safety
- Training
- Liaison with Owners
- Damage Limitation
- Health & Safety



12

FLAME – RETARDANT TEXTILE MATERIALS LIMITING FIRE HAZARD IN HISTORIC BUILDINGS

Jolanta Muskalska

Flame – retardant textile materials limiting fire hazard in historic buildings

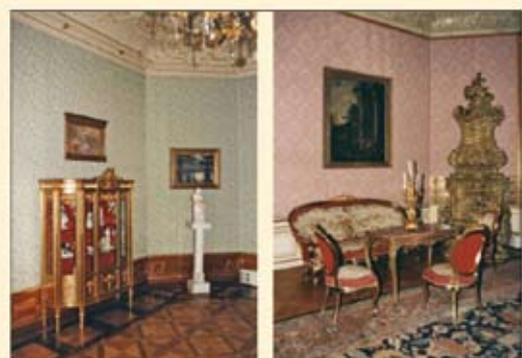
Jolanta Muskalska, Marek Lao, Marjan Ornat



The Institute of Textile Materials Engineering, Lodz, Poland

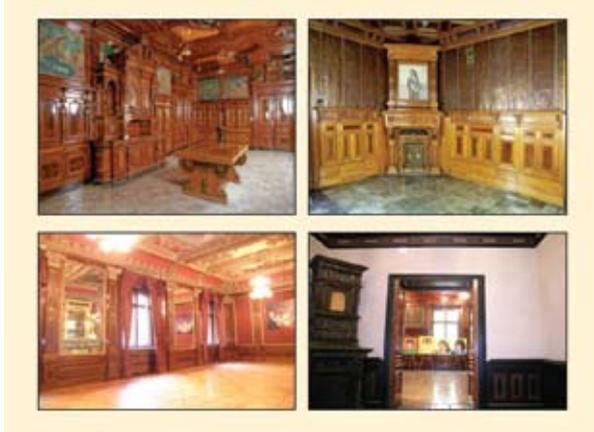
The aims of the project

-] assessment of the extent of fire hazards in historical objects resulting from the use of flammable textiles
-] determination of fire safety requirements for textile equipped interiors in historical objects and others accompanying them like: hotels, restaurants and administrative rooms
-] determination guidelines for technical features required for flame – retardant textiles
-] draw up and pilot production of representative textiles for historical objects to meet assumed requirements
-] development of the system of furnishing historical objects with textiles possessing features that satisfy the fire safety requirements and are reconstructed with respect to color, design, weave and utilitarian properties





7



8

Table 1. Quantitative analysis of interior textiles in historical objects

No.	Room name	Room substants m ²	Interior textiles in rooms	Estimated mass of interior textiles kgm ²
1	The Palace in Mierborow Little dining room (expositie)	208	Carpet Curtains - 2 windows Tapestry	12 27 7
			TOTAL	46
2	The Palace in Mierborow Guest room	338	Carpet Curtains - 3 windows Mats/rugs - 3 windows Sofa Beds - 2 Chairs - 4 Armchairs - 2 Mats/beds Tapestries	284 52 20 10 31 8 8 45 6
			TOTAL	469
3	Herke's Palace Outleat (expositie)	143	Carpet Rugs/rugs - 3 windows Mats/rugs - 2 windows Curtains - 2 Sofas	70 80 31 2 2
			TOTAL	285
4	Herke's Palace Guest room	33	Mats/rugs Beds - 1	20 107
			TOTAL	127
5	Schubler's Palace Library	79	Mats/beds	40
			TOTAL	40

9

Burning behavior of textiles – analyzed parameters

-] limiting oxygen index LOI
-] Ignitability
-] flame spread
-] smoke production
-] toxicity properties of decomposition and combustion products

10

Table 2. LOI indices of various textiles

No.	Material	LOI index (%)
1	Cotton/Linen (50/50)	18,5
2	Cotton/Viscose (50/50)	20,8
3	Cotton/PA (85/15)	18,3
4	Wool	26,8
5	Polyamide 6,6	23
6	Polyacrylonitrile	19,2
7	Polyester	20,6
8	Flame-proof cotton	34,0
9	Flame-proof cotton/viscose (86/14)	34,1
10	Flame-proof viscose	33,5
11	Flame-proof wool	35,4
12	Torlen FR	32
13	Trevira CS	32

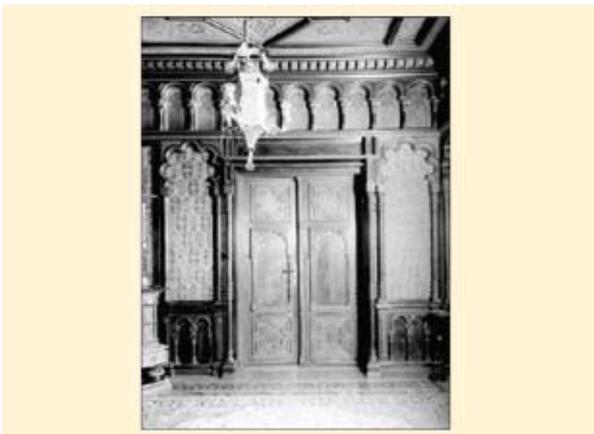
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14



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16



17

Table 3. Characteristics of tested samples

Sample No.	Type of fabric	Surface weight [g/m ²]	Composition of raw materials
1	Wall fabric	314	70% Trevira CS 30% Estelon
2	Wall fabric	196	100% Trevira CS
3	Undercoat wall fabric	265	100% Cotton FR
4	Curtain fabric	199	55% Trevira CS 45% Estelon
5	Curtain fabric	193	100% Trevira CS
6	Curtain fabric	287	100% Trevira CS
7	Lining for curtain fabric	128	100% Trevira CS
8	Net curtain	62	100% Trevira CS

18

Table 4. Definition of classes according to standard PN-EN 13773:2004

Class	Ignitability	Flame spread
1	No ignition according to PN - EN 1101	No breakage of the first control threads"; no burning separate sample fragments according to PN-EN 13772
2	No ignition according to PN - EN 1101	No breakage of the third control threads"; no burning separate sample fragments according to PN-EN 13772
3	No ignition according to PN - EN 1101	Breakage of the third control threads" and/or burning separate fragments according to PN-EN 13772
4	Ignition according to PN-EN 1101	No breakage of the third control threads"; no burning separate sample fragments according to PN-EN 1102
5	Ignition according to PN-EN 1101	Breakage of the third control threads" and/or burning separate sample fragments according to PN-EN 1102

*Control threads - threads placed horizontally in relation to the vertically situated sample within distances from the ignition source specified by the standards; the first control thread is placed nearer the ignition source than the third one.

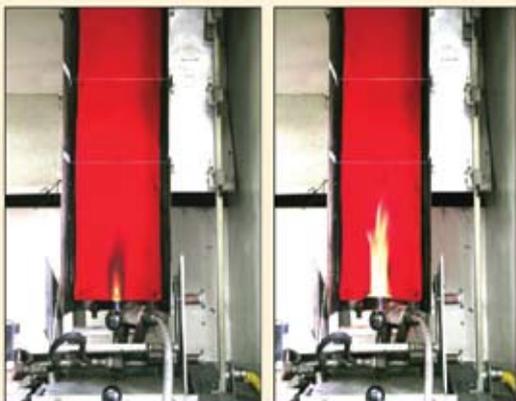
Test methods:
Ignitability PN-EN 1101:1999
Flame spread PN-EN 1102:1999, PN-EN 13772: 2004

19

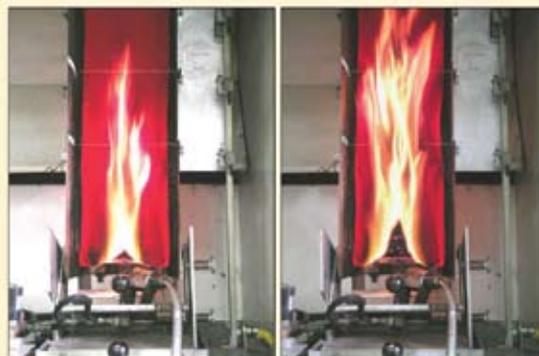
Table 5. Test results of wall fabric, net curtains and curtain fabric.

Sample No.	Ignitability and flame spread			Class
	Sample ignition	Breakage of the first or third control threads	Burning separate sample fragments	
1	No	No	No	1
2	No	No	No	1
3	No	Yes	No	2
4	No	No	No	1
5	No	No	No	1
6	No	No	No	1
7	No	No	No	1
8	No	No	No	1

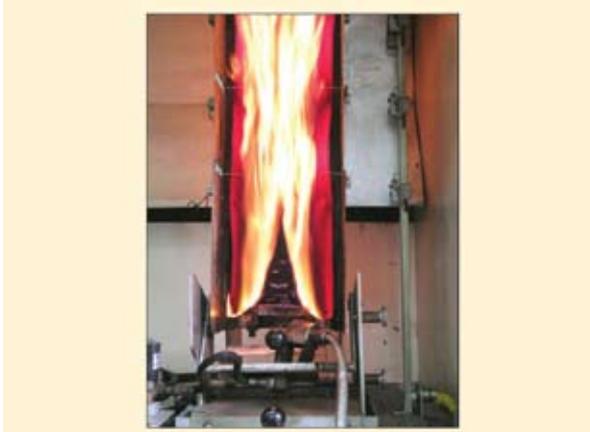
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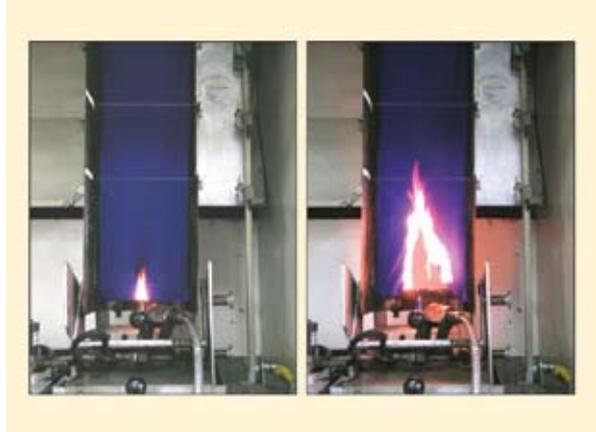
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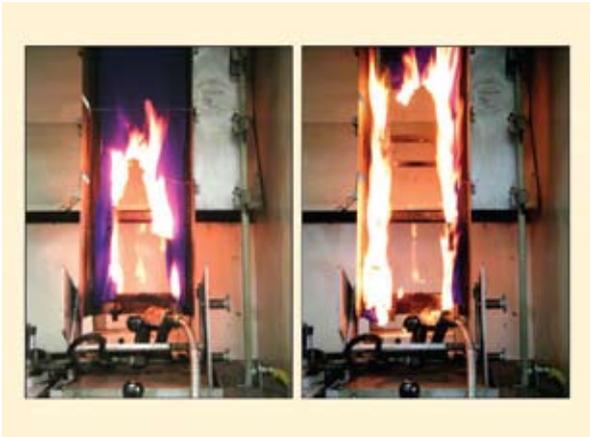
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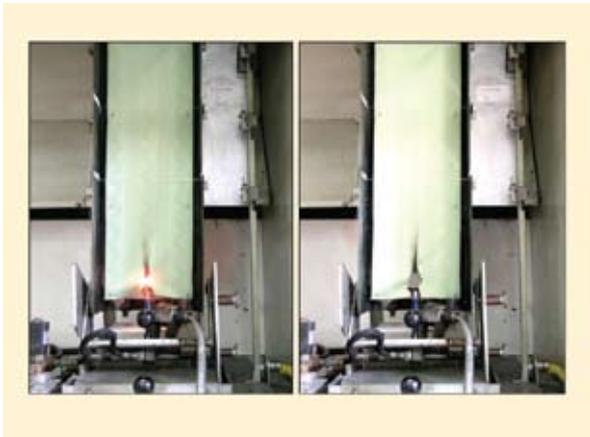
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Summary

-] All of designed and produced fabrics meet the fire safety requirements and can be used in the model historic object.
-] All drawn up fabrics meet requirements on the range of performance properties (i.e. colour fastness to artificial light and to domestic and commercial laundering or to dry cleaning) and safety of usage (i.e. emission of volatile organic compounds, content of extractable heavy metals, presence of arylamines that are not allowed to be split off from colorants under reductive conditions and pentachlorophenol) what was not presented in this study.
-] Currently fabrics are being installed in the Cinematography Museum.
-] During renovation of historical objects it is important to replace furnishings such as net curtains, drapery, carpets etc. made from flammable textile raw materials with flame-retardant fabrics having all required performance and aesthetic features.

30

FLAME – RETARDANT TEXTILE MATERIALS LIMITING FIRE HAZARD IN HISTORIC BUILDINGS:

Jolanta Muskalska

I work for the Institute of Textile Materials Engineering in Lodz in Poland. I would like to present results of our project.

Flame – retardant textile materials limiting fire hazard in historic buildings

During last two years our Institute carried out a research project within the framework of the COST Action C 17.

The aims of the project were as follows:

- assessment of the extent of fire hazards in historical objects resulting from the use of flammable textiles
- determination of fire safety requirements for textile equipped interiors in historical objects and others accompanying them, like: hotels, restaurants and administrative rooms,
- determination guidelines for technical features required for flame – retardant textiles,
- draw up and pilot production of representative textiles for historical objects to meet assumed requirements
- development of a system of furnishing historical objects with textiles possessing features that satisfy the fire safety requirements and are reconstructed with respect to colour, design, weave and utilitarian properties.

Last point was achieved in cooperation with the Research and Scientific Centre for Fire Protection in Poland.

Within the framework of a project, we carried out assessment of the fire hazard in historic buildings resulting from the use of textiles with various decorative and performance purposes.

The assessment was carried out on the basis of qualitative and quantitative analyses of textiles in historical objects. We selected three objects:

- The Palace in Nieborów – Palace survived the Second World War and now there is a museum of seventeenth to nineteenth century interiors.

Nieborów front and interiors

- Herbst's Palace – is a mansion from the turn of nineteenth and twentieth century, it was restored in the end of twentieth century and now there is a museum of interiors,

Herbst front and interiors

- Scheibler's Palace - its mansion built in 1855, after the Second World War there was a music school and now there is The Cinematography Museum.

Scheibler front and interiors

This table shows as an example quantitative analysis for a few rooms in these palaces. We estimated mass of interior textiles in each room in cubic meter.

Qualitative and quantitative analyses of textiles in historical objects shows:

- variety of quantity textile materials in the individual objects of the same usage
- differences among quantity of textiles in interiors having different usage in the same object for example guest rooms and exhibition rooms,
- interior textile elements in tested objects are made of wool, silk, cotton, standard polyester, viscose and polyacrylonitril. All of them are flammable analyzed parameters

To assess the extent of fire hazards in these historical objects we collected and compared flammability properties data of textiles made of standard and flame – retardant fibres. We analyzed following parameters:

- limiting oxygen index LOI
- ignitability
- flame spread
- smoke production
- toxicity properties of decomposition and combustion products

As an example this table shows results of testing limiting oxygen index for various textiles. This index (LOI) is defined as the lowest concentration of oxygen to sustain the burning of the material under testing. From the presented values it follows, that only for flame - retardant textiles limiting oxygen index exceed thirty (30) percent. For other textiles it is significantly less. So we can come to the conclusion that in historical objects due to the presence of flammable old textiles made of silk, cotton and wool higher degree of fire hazard is expected.

Interior textiles have usually no significant and decisive contribution to so-called fire loading of rooms due to their low mass content in a room and low heat amounts emitted during burning in relation to other flammable interior elements. But they are required to be at least flame-retardant, showing a low speed of flame propagation, because of their large surface and possibility of flame spreading to long distances.

The historical object Scheibler's Palace in _ód_ has been chosen due to execution of the aims of the project. The Palace has been successively restored and it was necessary to create decorative fabrics for its interiors. The new fabrics were stylized on the basis of the archival photos of the Palace interiors from the middle of the 20th century and knowledge about interior textiles of the manufacturer's mansions from the end of the 19th century.

There are black – and –white photos of Scheibler's interiors from the middle of twentieth century, which were used to design new fabrics.

Library room with view of the old wall fabric.

Hostess living room. On the wall we can see the old wall fabric.

Moorish room.

Wall fabrics, curtain fabrics and muslin net curtain were designed and produced in our Institute.

This picture shows wall and curtain fabrics designed for library of Scheibler's Palace.

These are wall and curtain fabrics designed for hostess living room.

This is curtain fabric designed for Moorish room.

Table presents characteristics of produced fabrics. Most of fabrics were made of flame-retardant polyester fibres. One of them was made of flame-retardant cotton.

Fabrics were laboratory tested on the range of flammability, performance properties and safety of usage.

The obligatory in Poland classification of textiles designed for curtains and net curtains is based on the assessment of inflammability and flame propagation over vertically situated samples of textiles exposed to flame under controlled conditions. The classification criteria are given in this table.

In accordance with the Polish regulations, in historical architecture such as public utility buildings, one should use products of class 1 and 2. In view of applying wall fabrics in vertical position without gluing to basis the same requirements can be assumed as for curtains and net curtains.

This table presents test results of ignitability and flame spread for designed and produced fabrics.

During testing flame-retardant polyester fabrics melted sample fragments were falling down, but they weren't burning. All samples met requirements of the first class.

Flame-retardant cotton fabric (sample nr 3) is characterised by limited flame spread and after igniting samples flames reached first control thread and samples faded. Cotton fabric met requirements of the second class.

These photos present the behaviour of a standard fabric under conditions of laboratory burning.

This is a second standard fabric.

Following photos show behaviour of flame – retardant fabrics under the same testing conditions.

The comparison of pictures clearly indicates that flame-retardant fabrics possess lower ability to flame spreading.

This photo shows wall fabric installed in the library.

SUMMARY

- All of designed and produced fabrics meet the fire safety requirements and can be used in the model historic object.
- All drawn up fabrics meet requirements on the range of performance properties (i.e. colour fastness to artificial light and to domestic and commercial laundering or to dry cleaning) and safety of usage (i.e. emission of volatile organic compounds, content of extractable heavy metals, presence of arylamines that are not allowed to be split off from colorants under reductive conditions and pentachlorophenol) what was not presented in this study.
- Currently fabrics are being installed in the Cinematography Museum.
- During renovation of historical objects it is important to replace furnishings such as net curtains, drapery, carpets etc. made from/of flammable textile raw materials with flame-retardant fabrics having all required performance and aesthetic features.

COST Action C 17 - BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS FINAL CONFERENCE SESSION 5: SHORT TERM SCIENTIFIC MISSION REPORTS AND POSTER SESSION: SUMMARY REPORT

Ingval Maxwell

Session 5.1 STSM Burnt stone: Miguel Gomez Heraz



Miguel Gomez Heraz reviewed the findings of his STSM and revealed the new development work that had occurred in the area since it was completed. He described oven-based simulation techniques, real fire tests and other IR laser techniques. He concluded that fire generates both physical and chemical changes in the stone as a consequence of fire. He noted the most noticeable short term effect was the discolouration and sooting up of stone, and that tough and compact stones were more sensitive to physical disruption and increase in porosity, whilst granular stones were more prone to mineral changes.

He recommended that it would be advisable to make a survey of the most predominant stone types in the built heritage to help predict behaviour in fire situations. He noted that early extinction of fire, using no or little amounts of chemicals, was important to help avoid thermal shock and the risk of contaminants penetrating the stone's structure. The findings also revealed that in the later stages of fire the wetting of stone can transport contaminants into the stone that will lead to long-term decay processes.

Session 5.2 STSM Fire Brigade Liaison: Mike Coull



Mike Coull reviewed the findings of his STSM and revealed the new development work that had occurred in the area since it was completed. He noted that the Schonbrunn Palace Damage Limitation Team was well integrated into the overall management of the Palace, with the intention of working with, and alongside, the Fire and Rescue Services. He noted a lack of training of fire fighters to increase their awareness of the value of historic properties across Europe, and that the STSM guidelines were also needed to be promoted to owners.

In reflecting that in the United Kingdom the term "salvage" was still being used, his aim was to develop this approach into "damage limitation and proactive responses" by creating procedures through a pre-incident awareness approach. In the immediate future there was an intention to develop the work carried out under the STSM into a Short Guide for

Building Owners. This would offer practical guidance and information on how to liaise with the fire services. In a related activity, he was also aiming to devise a development programme for fire fighters on how to deal with an incident in a historic building. A draft document had been prepared and a final version of it was due to be published in 2007.

Session 5.3 STSM Management Plans: Jan Holmberg



Jan Holmberg offered a comprehensive set of PDF documents in support of his STSM on Management Plans carried out at Maihaugen Open Air museum, Lillehammer, Norway.

Session 5.4 Flame – retardant Textile Materials Limiting Fire Hazards in Historic Buildings: Jolanta Muskalska



Jolanta Muskalska indicated that her Institute had carried out a project on fireproofing textiles in support of COST Action C 17.

The aims of the project were to:

- Assess the extent of fire hazards in historical objects resulting from the use of flammable textiles
 - determine fire safety requirements for textile equipped interiors in historical objects and other situations such as hotels, restaurants and administrative rooms
 - determine guidelines and technical features required for flame – retardant textiles
 - devise and pilot the production of representative textiles for historical objects to meet assumed requirements
- develop systems to furnishing historic objects with textiles possessing features that satisfy the fire safety requirements and are reconstructed with respect to colour, design, weave and utilitarian properties

She referred to a number of palaces in Poland where the results of this work were beneficial and described the flame test work to analyse the burning behaviour and parameters of a variety of textiles. The new fabrics were predominantly flame resistant polyester, with one example of flame resistant cotton having been produced. She concluded that:

- All designed and produced fabrics meet the fire safety requirements and can be used in model historic objects.
- All designed fabrics meet requirements of the range of performance properties (i.e. colour fastness to artificial light, domestic and commercial laundering and dry cleaning) [and safety of use (i.e. emission of volatile organic compounds, content of extractable heavy metals, presence of arylamines that are not allowed to be split off from colorants under reductive conditions and pentachlorophenol) the results of which were not offered in the presentation].
- Currently, fabrics were being installed in the Cinematography Museum.
- During renovation of historical objects it is important to replace furnishings such as net curtains, drapery, carpets etc. made from flammable textile raw materials with flame-retardant fabrics having all the necessary performance and aesthetic features.

THE COLOSSEUM FIRE: 217AD

Enzo Cartapati

Maurizio Cerone

COST ACTION C17: "Built Heritage Fire Loss to Historic Buildings"
Final Management Committee, Working Group Meetings and Associated Conference
Rome, 1-2 December 2006

The Colosseum Fire 217 AD

Enzo CARTAPATI
Maurizio CERONE
Department of Structural and Geotechnical
Engineering
University of Roma - "La Sapienza"



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COST ACTION C17: "Built Heritage Fire Loss to Historic Buildings"
Final Management Committee, Working Group Meetings and Associated Conference
Rome, 1-2 December 2006

The Colosseum fire - 217 AD

- A NUMERIC SIMULATION OF THE 3rd CENTURY AD FIRE
- The combination of the fire of 217 AD with earthquakes and foundation settlements caused serious damages in the Colosseum and required restoration works during the Severian Emperors period.
- The study is a part of a wide research program entrusted by the "Soprintendenza Archeologica di Roma". The aim is to evaluate which contribution and damage level could be caused by the fire to the masonry structure, compared to earthquake and foundation settlements.

COST ACTION C17: "Built Heritage Fire Loss to Historic Buildings"
Final Management Committee, Working Group Meetings and Associated Conference
Rome, 1-2 December 2006

Historic References

- The Fire of 217 (23 august?): The day of the "Vulcanalia" a light primed the fire in the upper gallery (wooden structure).
- An Earthquake in September(?) 217: a strong earthquake of about 5.0 level Richter.
- Various earthquakes in 223: 9, 17 September, 19 October 223.
- Restoration works began in 218 and were carried on during Alexander Severus age from 222 to 235.
- Foundation settlements affected the structure from the 2nd century AD

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Final Management Committee, Working Group Meetings and Associated Conference
Rome, 1-2 December 2006

The numeric simulation of a fire

Mathematical models are required for 3 steps of study:

- The fire is an "action" on the structure. The action is modelled by means of a spatial distribution of a temperature vs. time law of the hot gases due to the fire.
- The thermic fields arising inside the structures, heated at its external surface, must be determined.
- A mechanical model of the structure is required to assess the distribution of stresses and deformations.

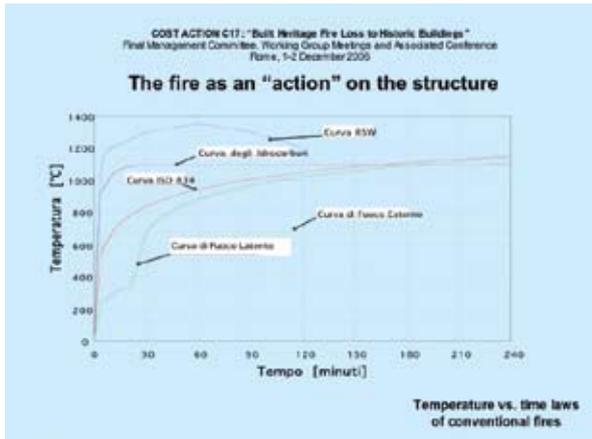
COST ACTION C17: "Built Heritage Fire Loss to Historic Buildings"
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Rome, 1-2 December 2006

The fire as an "action" on the structure

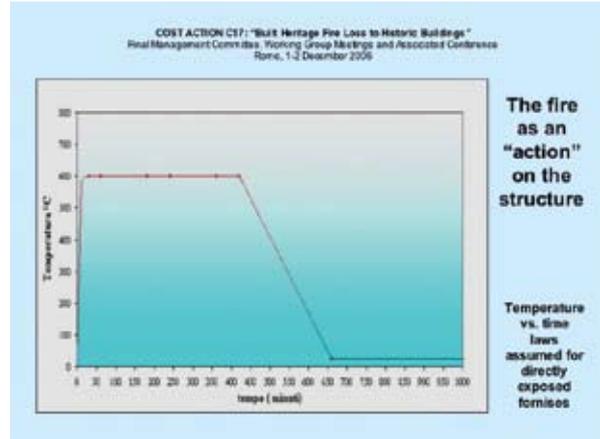
Temperature vs. time laws of real fires

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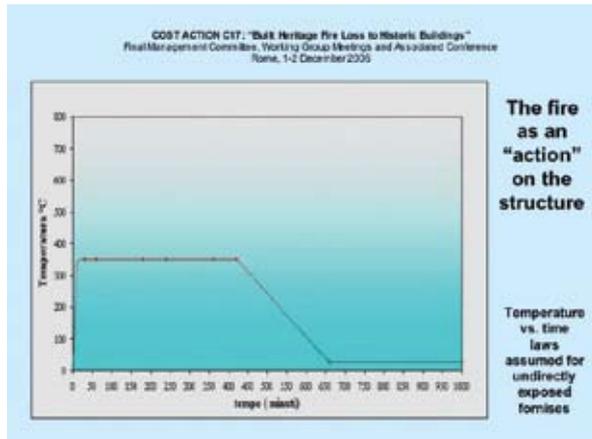
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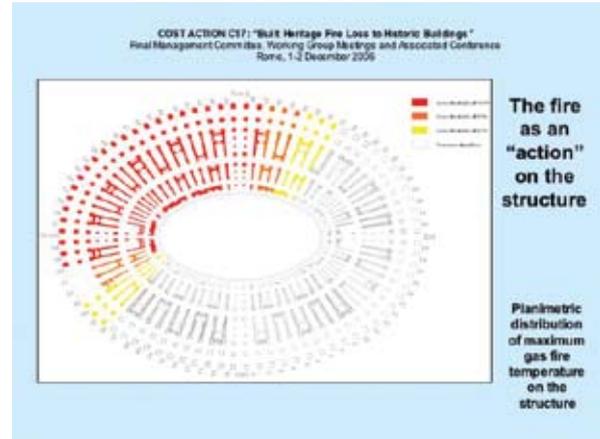
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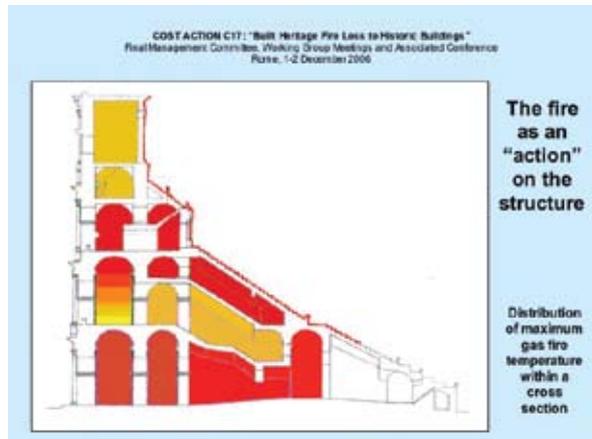
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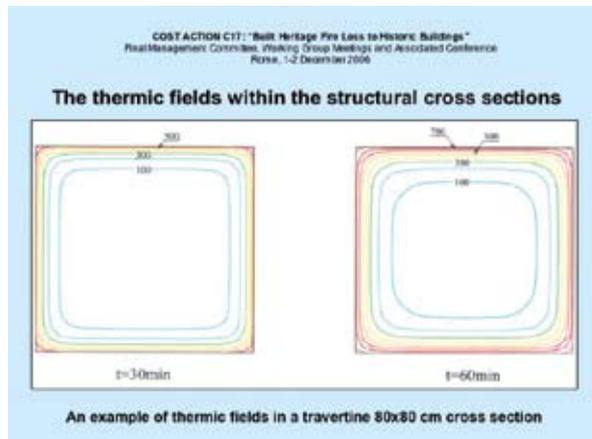
The thermic fields within the structural cross sections

Mathematical models of heat flow

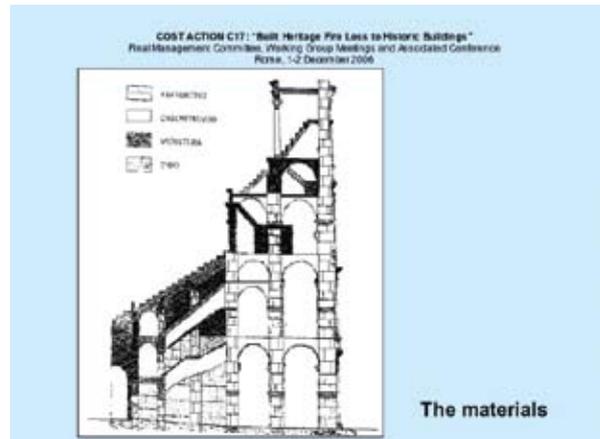
- Within a solid: Fourier differential equation:

$$\frac{\lambda}{\rho c} \left(\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} + \frac{\partial^2 T}{\partial z^2} \right) = \frac{\partial T}{\partial t}$$
- Boundary conditions:
 - Convection: $q = \frac{Q}{t} = h_c A (T_1 - T_2)^n$
 - Radiation: $q = \frac{Q}{t} = \Phi \cdot \sigma_0 (T_1^4 - T_2^4)$

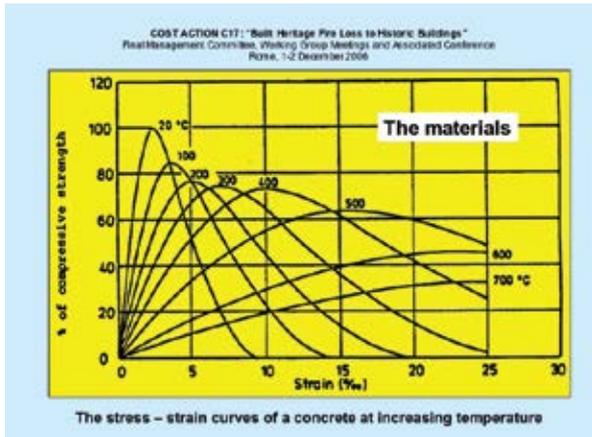
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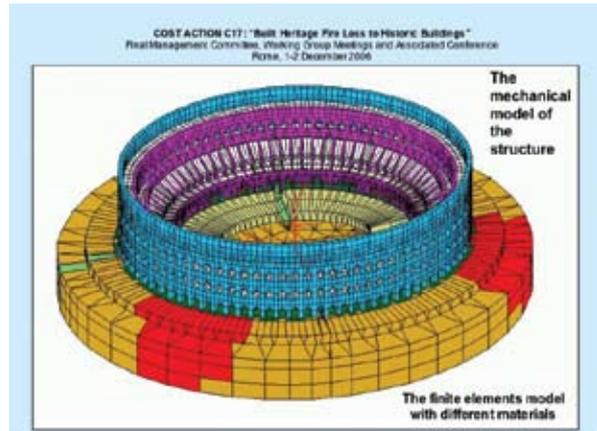
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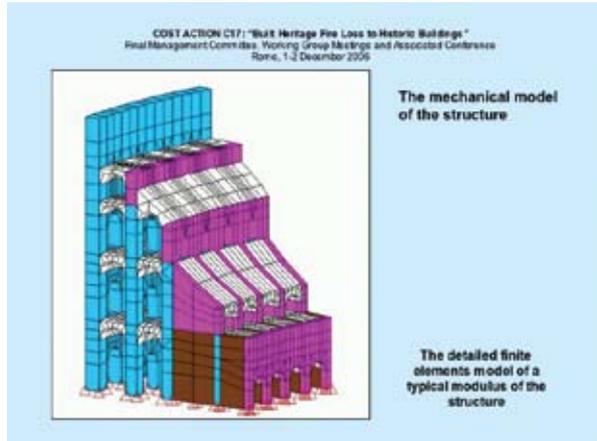
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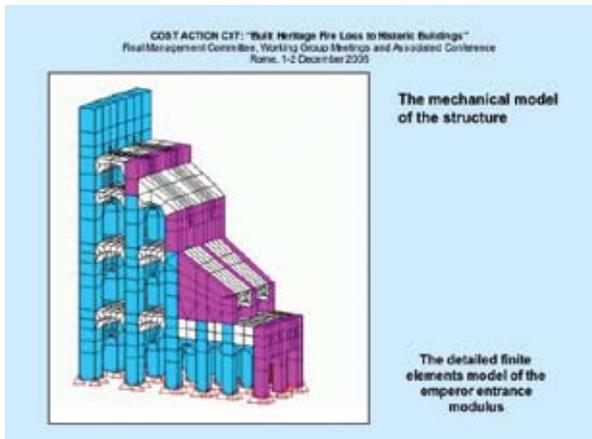
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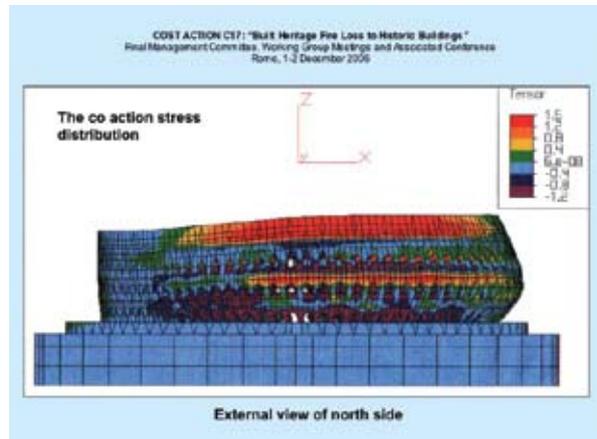
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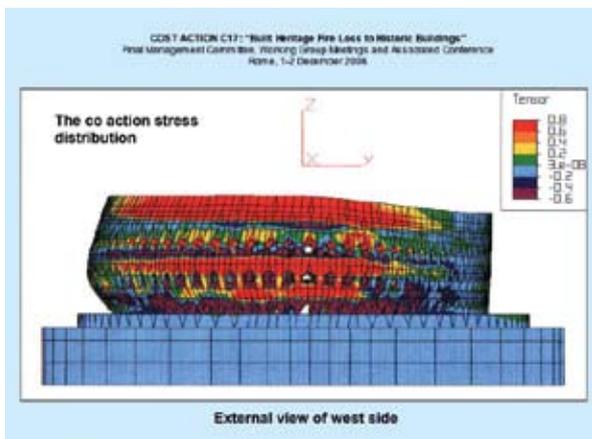
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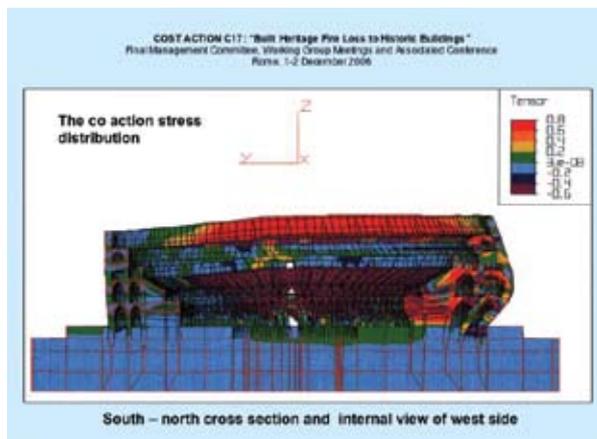
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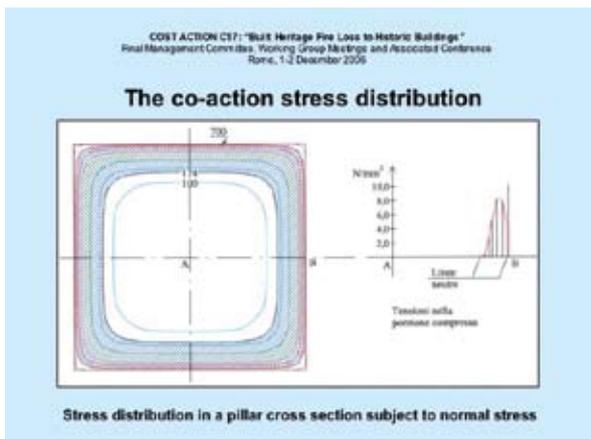
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HIGH PRESSURE WATER MIST FIRE SUPPRESSION SYSTEMS FOR THE PROTECTION OF CHURCH CUPOLAS: FIRE TESTS FOR SYSTEM DEFINITION

Luciano Nigro

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HI-FOG Marioff

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High Pressure Water Mist Fire Suppression Systems for the Protection of Church Cupolas: fire Tests for System Definition

Luciano Nigro - Marioff srl - Milano - Italy

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CHURCH CUPOLA FIRE PROTECTION: A CASE STUDY FOR WATER MIST SYSTEMS

SUMMARY

- the problem presentation as the first step
- A fire started at one of the largest European cupola, the cupola of S. Petersburg Trinity Church, 25th August 2006.
- The problem of protecting the large wooden cupolas from fire is then considered
- The high pressure water mist solution is indicated as one of the most suitable for the scope
- Design parameters are needed
- **Appropriate fire tests are arranged to define completely the system design.**

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THE WOODEN CUPOLA FIRE

- The Trinity Church in Saint Petersburg as it was until 25th August 2006.
- At that time the cupola was having a substantial restoration and a complete scaffolding has been erected.

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THE WOODEN CUPOLA FIRE

A fire started at 5 pm, probably from something on the scaffolding and involved the cupola very soon.

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THE WOODEN CUPOLA FIRE

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THE LOSS OF THE CUPOLA

- In a few minutes the cupola of the Trinity in Saint Petersburg was completely destroyed.
- The church was started in 1828 and completed in 1835.
- The height of the cupola exceeded 80 meters
- The fire was controlled after 4 hours, also using an helicopter to dump water over the dome.

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THE WOODEN CUPOLAS

- Wooden cupolas are quite common in churches.
- They have an inner wooden structure supporting the coverage, that needs to be watertight, and the interior ceiling, often decorated
- Although not likely to occur, a fire can start in the inner part
- The main challenge is due to the difficulties to reach the seat of the fire and to fight it with water.

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THE WOODEN CUPOLAS FIRE HAZARD

- The difficulties in reaching the fire to manually fight it makes the use of a fixed extinguishing system quite important.
- Only a fixed system can successful operate in such cases, because no human intervention is realistically possible
- The system must also be safe to the decoration of the cupola ceiling, often quite remarkable.

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THE AVAILABLE FIRE PROTECTION SYSTEMS

- The lack of tightness of the inner volume of the cupola makes the protection with gaseous systems practically impossible.
- The use of a water sprinkler or deluge system might certainly be adequate for the hazard, but the amount of water discharged in case of system operation can be unaffordable by the structures and especially by the inside decorations
- A water mist system might represent a good compromise between the fire fighting capability and the safe action on the cupola and the decorations.

9

CAN WE USE A WATER MIST SYSTEM IN THIS CASE?

The ideal process to check the feasibility of a water mist system in a specific application is summarized in the diagram:

```

    graph TD
      A[Classify the Hazard] --> B{Is a representative protocol available?}
      B -- YES --> C{Is an approved system available for that hazard?}
      B -- NO --> D{Is any real fire test available?}
      C -- YES --> E[USE THE APPROVED SYSTEM]
      C -- NO --> D
      D -- YES --> F[Use a system as the treated one subject to an engineering judgment]
      D -- NO --> G[ ]
  
```

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THE AVAILABLE TEST PROTOCOLS

Protocols applicable to the hazard proper of the Cultural Resources and that can be considered representative of the fire hazard typical of the wooden cupolas are available as follows.

SPECIFIC PROTOCOLS	DETAILS NON SPECIFIC
<ul style="list-style-type: none"> • Office space protocol, included in prEN14972. • Light Hazard protocol included in FM 5560. 	<ul style="list-style-type: none"> • Sprinkler spacing, such that a fire can be detected and controlled
<p>Leading to:</p> <ul style="list-style-type: none"> • VdS approval LH/OH1 • BRE certification LH/OH1 • FM Approval for LH (NFPA) 	<ul style="list-style-type: none"> • Capability of the system to control the vertical fire spreading that is expected in a cupola situation

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IS A WATER MIST SYSTEM FEASIBLE IN THIS CASE?

We are in an hybrid situation:

- We have a protocol and approved systems are available for the hazard, because the hazard related to the cupola void space is similar to the empty attics areas mentioned by NFPA as Light Hazard Occupancies.
- We have a fire spreading condition that is quite peculiar of the case, because of the vertical development of the fire, that is possible in case the fire starts from the lower part of the space.

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A SOLUTION IN THOSE CASES IS TO ARRANGE A TEST TO PROVE THE PERFORMANCES

- A fire test has been arranged to verify the previously mentioned points:
 - First issue is to check the capability of the system to react very quickly to the fire developing along the vertical wall.
 - Second issue is to check the capability of the system to stop the fire before a significant vertical development take place (more precisely: before the upper line of sprinkler is interested).

BUT FIRST WE NEED A SYSTEM TO TEST

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GPU (Gas-driven pump unit) System

- GPU Systems
 - GPU for light hazard applications (NFPA) - FM approved
 - GPU for OH1 (CEA 4001) applications - VdS approved
- Nitrogen or compressed air driven piston pump
- Single pipe - twin fluid
- Max output 150 l/min
- Self-contained - no external power supply
- External water feed or water tank
- Minimal water usage
 - 4,5 - 12,5 l/min per sprinkler head
 - minimum water flux density 0,5 l/min/m²
- Continuous, declining discharge
 - Pressure at the sprinklers gradually decreases from 90 bar down to zero

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GPU (Gas-driven Pump Unit) System



- It is a closed head system, with sprinkler closed by thermal elements (2 mm glass bulbs in this case) having a very small RTI (they are considered Ultrafast)
- This allow a very high reliability of the system, considering the consequence of an accidental discharge in these cases.

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FM APPROVED VdS

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THE TEST TO BE ARRANGED

- The main problem to solve is the fire behavior in the limit condition of a vertical wooden wall with beams running vertically and horizontally (the actual configuration is quite important for the system definition).
- The main problem to solve is the fire behavior in the limit condition of a vertical wooden wall with beams running vertically and horizontally (the actual configuration is quite important for the system definition).

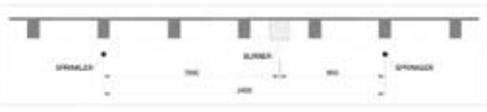


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The Vertical Wall from a Plan View

- A plan view of the vertical wall is illustrated below.
- The position of the sprinkler heads is indicated
- The spacing of the vertical beams is a typical one (0.6 mtrs) as well as the spacing of the horizontal beam that is, for the various cases analyzed, between 3 and 4 meters. A 4 meters spacing is then adopted.



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The TEST PROCEDURE

- A first "free burn" is organized to check the capability of the fire to be self supporting!
- With a 50 Kw burner the fire does not reach a stable condition, and extinguishes by itself as soon as the burner is removed



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THE FREE BURN

- A second "free burn" is organized to check the capability of the fire to be self supporting!
- With a 100 Kw burner the fire is propagating very quickly up to the top of the mock-up wall



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THE EXTINGUISHMENT TEST

- A fire is then started with the appropriate burner, and the system installed in accordance to certain fixed parameters
- The system in this case operated correctly and extinguished the fire as soon as the burner was removed.



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THE TEST IS REPEATED....

- Many tests are normally necessary to verify the operating conditions
- In this specific case some fire simulations were made to work on a "targeted" way.



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THE TEST RESULTS

At the end of the test series, results are collected and conclusions are deducted.

Test ID	Test scenario	Flame	Wood humidity	Spacing meters - # of charred		Sprinkler location in room	Result
				Spoke system	Beam Perpendicular		
MS11	Freeburn	No	10%	-	-	-	-
MS13	Freeburn	No	10%	-	-	-	-
MS10	#5	Yes	10%	2.4m - 4ch	3.9m - 1 and ch	ceiling	Fail
MS11	#4	Yes	10%	2.4m - 4ch	0.9m - 1 and ..	ceiling	Fail
MS12	#5	Yes	10%	3m - 5 ch	1.5m - 2 and ..	ceiling	Fail
MS12	#M bis	Yes	<5%	2.4m - 4ch	0.9m - 1 and ..	ceiling	Fail
MS14	#8	Yes	<5%	2.4m - 4ch equivalent	1.2m - 2ch	ceiling	Fail
MS11	Freeburn	No	<5%	-	-	-	-
MS12	#M bis	Yes	<5%	2.4m - 4ch	0.9m - 1 and ..	ceiling	Fail

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THE PARTIES INVOLVED

- In order to have the necessary validity some requirements of the parties involved need to be satisfied.
- They include at least the following:
 - The test must be conducted in a recognized laboratory, where the record of the data is guaranteed by solid procedures.
 - A third party authority must be involved in following the test and preparing/endorsing the conclusion that are achieved after the test completion.
 - A report of the test must be prepared, indicating the parameters that the test helped in determining and the limit of application.

Aesidiff From COST Action C17 19/07 23

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CONCLUSION

- According to the test results, a design specification for the system can be defined
- It will show the kind of system (The Marioff GPU system in this case), the operating conditions for the system.
- But especially it will give the design parameters of the installation, including:
 - the kind of sprinkler nozzles
 - Their spacing along the wall
 - Their spacing in height (different levels)
 - Their operating pressure

A system can then be installed, based on test results.

Aesidiff From COST Action C17 19/07 24

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SUMMARY OF Action PRESENTATIONS

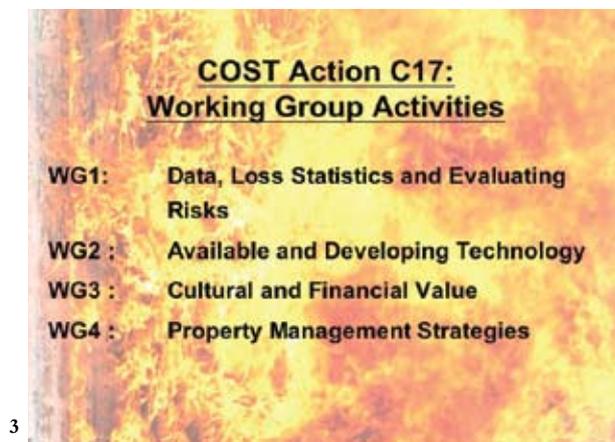
Ingval Maxwell



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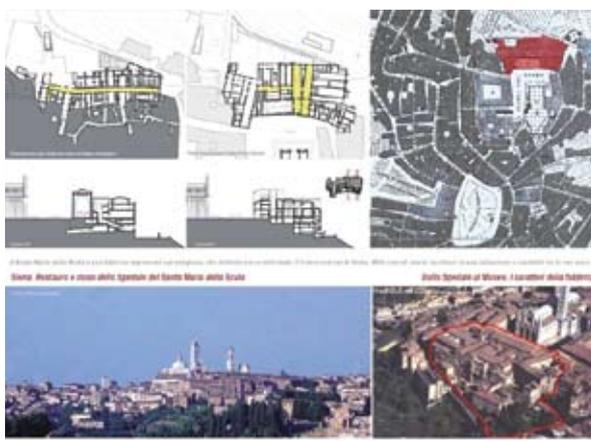
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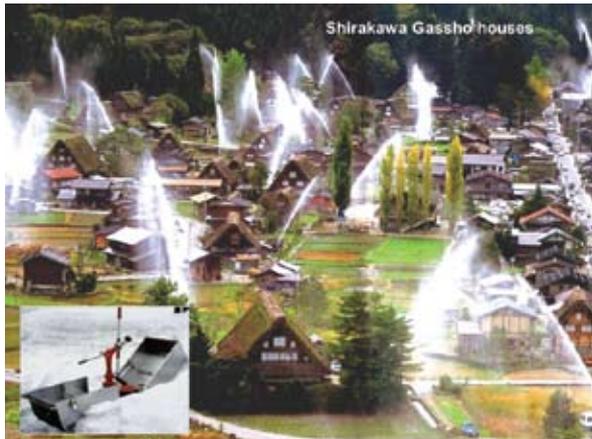
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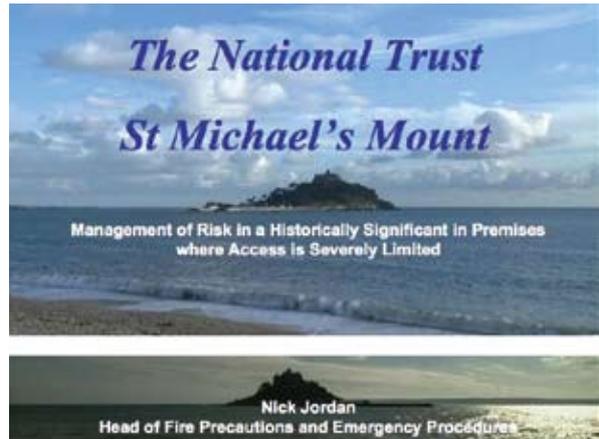
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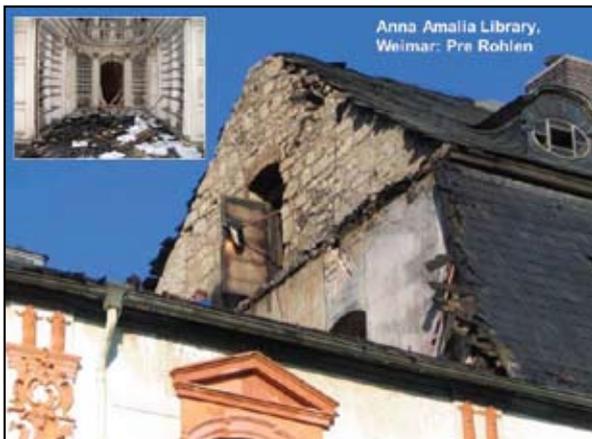
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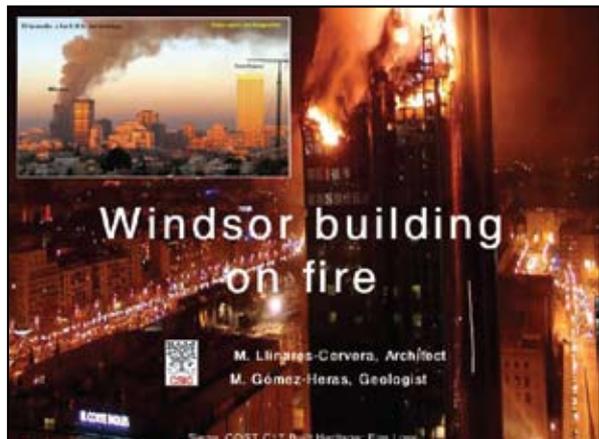
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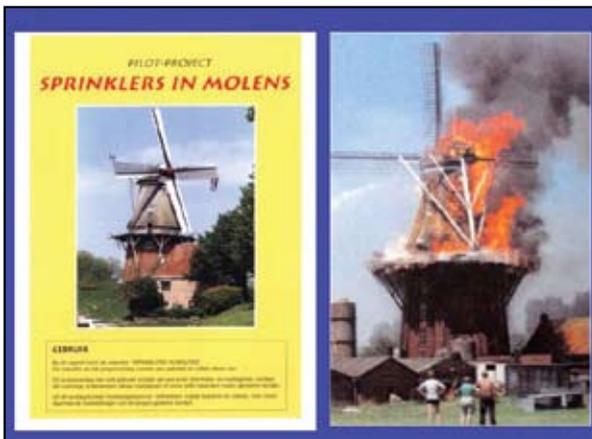
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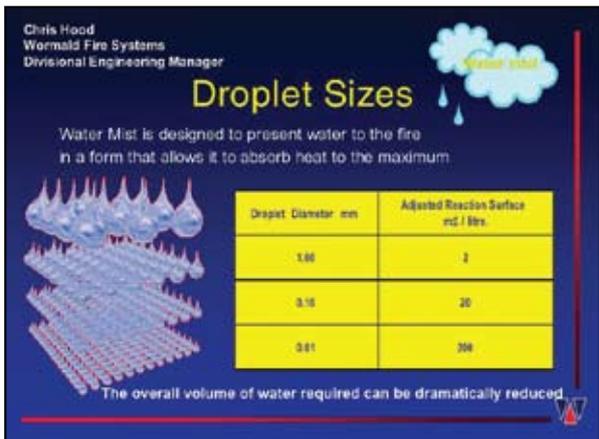
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A SAMPLE : BURSA HISTORICAL COVERED BAZAAR

This place located at the historical site named covered bazaar!
THERE ARE TOTALLY 3200 SHOPS AT 600.000 SQUARE METRE AREA AND ALSO 2000 SHOPS AT 200.000 SQUARE METRE IN THIS AREA.

APPROXIMATELY 15.000 PERSONS ARE WORKING IN THESE SHOPS EVERYDAY, 200.000 PEOPLE VISITS THIS BAZAAR EVERYDAY.

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Hand Held Fire Extinguishing Equipment

For Monuments and Historical Buildings
 COST Action C17 - 16 | October | 16 December 2016 | Torino

Hand Held Fire Extinguishing Equipment for Monuments and Historical Buildings

An evaluation of alternatives for what to extinguish fires of the early stage

1. Handheld extinguishers (water, foam, CO2, dry powder)

2. Fire blankets

3. Fire extinguishers (water, foam, CO2, dry powder)

4. Fire extinguishers (water, foam, CO2, dry powder)

5. Fire extinguishers (water, foam, CO2, dry powder)

6. Fire extinguishers (water, foam, CO2, dry powder)

7. Fire extinguishers (water, foam, CO2, dry powder)

8. Fire extinguishers (water, foam, CO2, dry powder)

9. Fire extinguishers (water, foam, CO2, dry powder)

10. Fire extinguishers (water, foam, CO2, dry powder)

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ITME - 50 years of experience in textile research

The Institute of Textile Materials Engineering is a research and development centre and operates within the whole area of the textile industry, especially:

- manufacturing technology and testing of textile fabrics designed for interior furnishings of both private houses and public utility buildings
- technical textiles for special purposes including
- flame-retardant fabrics for special uses such as interiors of airplanes, railway cars, cinemas, theatres, etc.:

The Institute of Textile Materials Engineering – Lodz, Poland

17

ECCLESIASTICAL INSURANCE – What Do We Do

- Traditional core market is the Anglican Church – 94% market share in the UK (15,500 buildings)

ECCLESIASTICAL
 HERITAGE AND ARTS ASSURANCE

18

CONCLUSIONS

- Above 500 °C in siliceous sandstones or 800 °C in calcareous sandstones fire will lead to irreversible damage of those stony materials [importance of reducing room temperatures: water mist?]
- Laser proved as a very suitable way of testing small samples (historic buildings) stony materials by comparison with furnace-based methods.

FURTHER RESEARCH

- Hard rocks. Fissure limits. Experimental research
- Interaction ashes-water-stone (Water based methods?)

M. GÓMEZ-HERAS

YOU ARE NOW ENTERING LOYALIST SANDY ION HEARTLAND - BOUNDING ULSTER-FIRE

Simulating fire stone

Queens University Belfast

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FIRE-TECH
 Fire Risk Evaluation
 To European Cultural Heritage

November 2016

1. Introduction

2. Objectives

3. Methodology

4. Results

5. Conclusions

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7. Appendix

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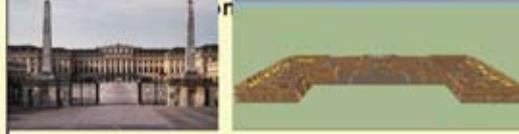
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RISK

Torbjörn Thedéen
Center for Safety Analysis,
KTH
Sweden
Siena, April 2005

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An evacuation study of Schloß Schönbrunn using the building EXODUS



Prof Ed Galea
Director Fire Safety Engineering Group
University of Greenwich
London
<http://www.gre.ac.uk>

BSI
BSI Standards Institution

Schloß Schönbrunn, December 2003

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WOLFGANG KIPPES

THE FORGOTTEN PART OF THE DRILL

Management aspects of fire protection in historic buildings

Case study Schönbrunn Palace in Vienna



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Schloss Schonbrunn
First Damage Limitation Team Exercise

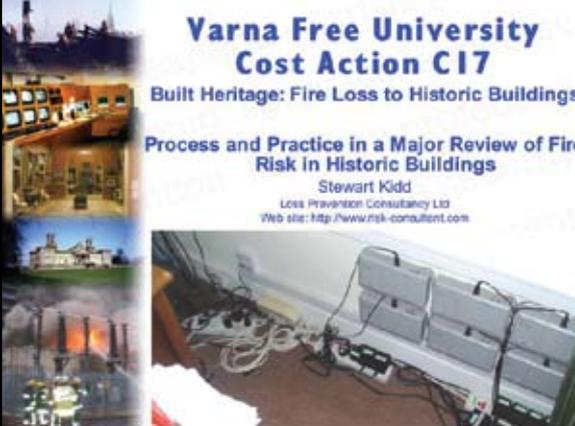
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Varna Free University Cost Action C17

Built Heritage: Fire Loss to Historic Buildings

Process and Practice in a Major Review of Fire Risk in Historic Buildings

Stewart Kidd
Loss Prevention Consultancy Ltd
Web site: <http://www.risk-consultant.com>



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ETH
Eidgenössische Technische Hochschule Zürich
Institute of Fluid Dynamics, Institute of Air Quality and Environment
Institute of Fire Engineering

Case studies in Switzerland

Fire at Bremgarten Church Fire at Rheinau Church Fire at guesthouse Löwen, Oberrohrdorf



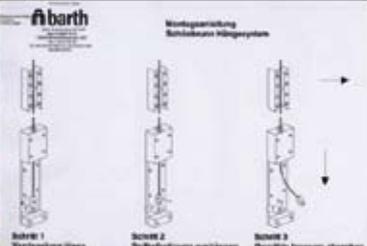
Cost Action C17
Ljubljana,
Slovenia,
May 23 – 25, 2005

Prof. Dr. Alfred Moser, Institute of Fluid Dynamics, ETH Zürich
Prof. Dr. Alfred Moser, Air & Climate, ETH Zürich

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Wolfgang Kippes

Picture Hanging System for Emergency Evacuation

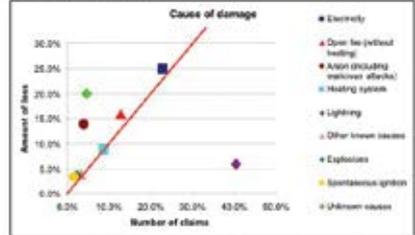
Vienna, Oct 2005

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ETH
Eidgenössische Technische Hochschule Zürich
Institute of Fluid Dynamics, Institute of Air Quality and Environment
Institute of Fire Engineering

Statistics of fires in Switzerland

Cause of damage



Cause of damage	Number of claims (%)	Amount of loss (%)
Electricity	~30.0%	~25.0%
Over fire (without building)	~10.0%	~15.0%
Arson (including malicious attacks)	~10.0%	~10.0%
Heating system	~10.0%	~10.0%
Lightning	~10.0%	~10.0%
Other known causes	~10.0%	~10.0%
Explosions	~10.0%	~10.0%
Spontaneous ignition	~10.0%	~10.0%
Unknown causes	~43.0%	~5.0%

- Arson: High amount of loss, low number of claims
- Lightning: High number of claims but low amount of loss
- Electricity: Highest amount of loss

Helsinki, Finland, October 13 – 15, 2005
Prof. Dr. Alfred Moser, Institute of Fluid Dynamics, ETH Zürich

30

Andrej Rebec, Friderik Knez, Bo_tjan Brank Ljubljana, May 2005

FIRE RESISTANCE OF THE REINFORCED CONCRETE STRUCTURAL ELEMENTS



Figure 1: Secondary beam (construction company 4), the criterion of the permissible vertical displacement was reached after 70 minutes test duration.

Figure 2: Secondary beam (construction company 2), the criterion of permissible vertical displacement velocity was reached after 48 minutes.

31




Managing & Reducing Hazards in Cultural Properties

Deborah L. Freeland, Senior Vice President

Arthur J. Gallagher Risk Management Services

www.ajg.com

32

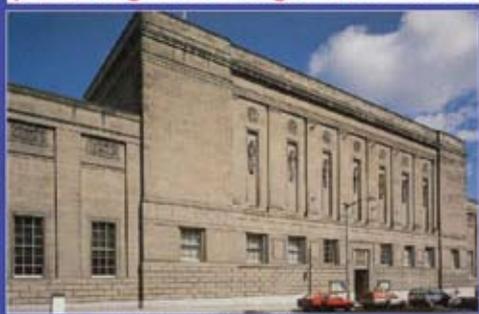
NFPA 909: CODE FOR THE PROTECTION OF CULTURAL RESOURCES - MUSEUMS, LIBRARIES & PLACES OF WORSHIP

NFPA 914
Code for Fire Protection of Historic Structures

Milosh Puchovsky, P.E.
Principal Fire Protection Engineer

33

The National Library of Scotland: protecting our heritage: Bill Jackson



The George IV Bridge Building, Edinburgh

34

Heritage Protection International Ljubljana May 2006 - COST C 17 and NFPA 909/914 Committee

Inert Air Venting for Protection of Heritage

New Report:

Inert (Hypoxic) Air Venting for Protection of Heritage

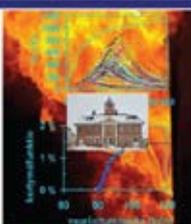


Geir Jensen
COWI AS, Norway

Jan Holmberg
Department of Building Sciences, Royal Institute of Technology, Sweden

COWI

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APPLICATION OF FIRE SAFETY ENGINEERING AND FIRE RISK ANALYSIS TO HERITAGE BUILDINGS

Jukka Hietaniemi, VTT

Ljubljana, Slovenia 24-25 May 2006

VTT

36



Collapsible Spiral Fire Escape Stair

All illustrations by kind permission of Borini Costruzioni S.p.A. - Turin, Italy

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Sprinkler Systems

- Some myths, facts and a few details

Chris Gill
Heritage Protection International
Ljubljana, Slovenia
25 May 2006

Worldwide Fire Protection

38



Water Mist Fire Protection Of Cultural Resources – Experiences with under roof areas in Venice

Luciano Nigro
Mariotti srl
Milano
Italy



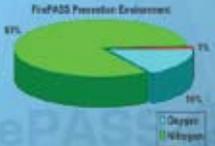

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FirePASS-P [Applications] Archives, Museums Etc.




- Protect priceless historic artifacts and artwork
- Oxygen reduced environments will increase the lifespan of all materials
- Deterioration is due to oxidation that, like fire, can be hindered by hypoxic atmosphere





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**FIRE PREVENTION IN HISTORIC BUILDINGS
LIAISON WITH FIRE BRIGADES**

The "Santa Maria della Scala" complex in Siena Recovery

Luca Nassi
Siena Fire dept.
luca.nassi@vfpvco.it
Ljubljana, 23/05/2006

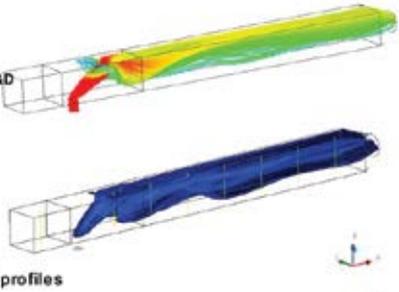


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ETH
Eidgenössische Technische Hochschule Zürich
Labor für Gebäudetechnik und Energie

Preliminary CFD results

- > RANS models, steady-state computation
 - CPU time: ~ 15h on a workstation
 - Models:
 - SST P&D
 - SST
 - k- ω P&D
 - BSL SMC P&D
 - SMC P&D
- > Streamlines
- > Location of 1D profiles

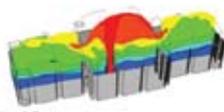


42



COST C17, May 24th 20th 2006, Ljubljana, Slovenia

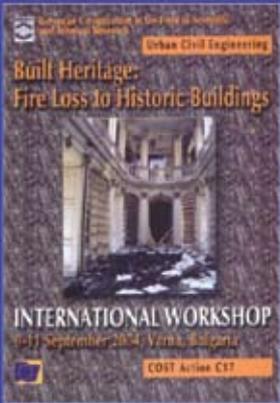
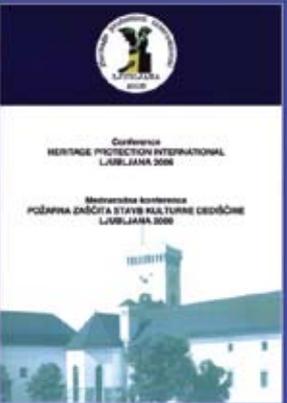
Smoke control and evacuation in historic buildings



Dr. Christian Del Taglia, AFC Air Flow Consulting AG
Dr. Alfred Moser, Air&Climate, ETH Zurich

AFC Air Flow Consulting AG
Waldgasse 72
CH-8008 Zürich
T +41 44 362 35 88
F +41 44 362 35 89
www.afc.ch
info@afc.ch

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**EUROPEAN CONSTRUCTION TECHNOLOGY PLATFORM (ECTP)
Focus Area Cultural Heritage (FACH)**

FACH Matrix

	Education & Training				
	Sustainability				
Assessment Monitoring Diagnosis	Materials	Intervention Techniques	Environment Energy	Management Exploitation Maintenance	City, Territorial Aspects
Directives, Standards, Technical Specifications					
Socio - Economic Aspects					
Disaster prevention & Risk management					

Convegno Nazionale Approfondimento Cultural Heritage (Regolando)
19-20 Maggio 2006, Palazzo San Marco Venezia

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COST Action C 17 - BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS: FINAL CONFERENCE SESSION 6: INVITED PAPERS: SUMMARY REPORT

Ingval Maxwell

Session 6.1 The Colosseo Fire, Rome: 3rdC AD: Professor Cartapati



Professor Cartapati described an analysis of the historic and physical evidence of the fire which occurred in the Coliseum, Rome, in 217 AD. The study was part of a broad research program entrusted by the “Soprintendenza Archeologica di Roma” where the aim was to evaluate what contribution and damage level to the masonry structure could be attributed to the fire, compared to earthquakes and foundation settlement that followed shortly afterwards.

Historically the sequence of event included:

- The fire of 217 AD (23 August?): The day of the “Vulcanalia” a lightning strike started the fire in the upper gallery (wooden structure).
- An Earthquake in September (?) 217 AD: a strong earthquake of c 5.0 level on the Richter scale.
- Various earthquakes in 223 AD: 9, 17 September, 19 October 223.

- Restoration works began in 218 AD and were carried on during the Alexander Severus period from 222 to 235 AD.
- Foundation settlements affected the structure from the 2^o century AD

He explained that in the 217 AD incident, fire-flow was driven by a wind from the South West. As a result one side of the Coliseum was more affected by thermal damage than the other. He explained the General Theory of the effects of temperature variations on the different materials that the Coliseum was constructed from, and offered a detailed analysis of how this had affected the structure.

Mathematical modelind had been undertaken on three stages of the study. This considered:

- The fire as an “action” on the structure, modelled by means of a spatial distribution of temperature vs. time and the effects of the hot gases from the fire.
- The thermic fields created inside the structures, to determine how the external surface were heated.
- A mechanical model of the structure to assess the distribution of stresses and resulting deformations.

Through the results of this computer modelling and simulation he illustrated the distribution of stresses in the structure, and the levels of expansion in the masonry. This was due to the thermal properties of the fire and its transmission into the stone work. With project work still in progress, the aim was to continue work to establish the historic development and influences of the range of disasters which had occurred.



The Coliseum, Rome: Photo Ingval Maxwell

Session 6.2 High Pressure Water Mist Fire Suppression Systems for the Protection of Church Cupolas: fire Tests for System Definition: Luciano Nigro



Luciano Nigro, Marioff Ltd, offered a presentation on water mist suppression systems for church domes. Using the fire incident at Trinity Cathedral St Petersburg for reference, he described how water mist systems could be appropriate, but these needed to be specifically designed and developed to accommodate the specific construction of the domes and their timber substructures. Recognising that the Russian authorities had to employ the use of a helicopter to “dump” water on top of the burning dome to help extinguish the fire, it was clear that it was impossible to carry out any human fire-fighting intervention whilst the fire was active.

Consequently, the case revealed that a fixed extinguishing system was revealed as the only realistic approach to control a fire in such circumstances. From subsequent fire tests, cupolas were shown to consist of hybrid structures. As it was designed to do, the external weatherproof dome protects the underlying dome in such away as to prevent any external fire-fighting water from penetrating into the intervening space. In effect it creates a vertical wall over the underlying dome. But, as the wall is also curved, a complex fires spread situation emerges.

As a result, he noted that the main problem to be solve is the fire behavior in the limit condition of a vertical wooden wall with beams running vertically and horizontally as the actual configuration is quite important to assist in defining the system. He described the adopted test scenarios and the emerging results, concluding that:

- a design specification for dome system could be defined
- they show the kind of system the site conditions required.
- Can offer design parameters for an installation, including:
- the kind of sprinkler nozzles
- their spacing along the wall
- their spacing in height (different levels)
- their operating pressure

Session 6.3 Summary of Action Presentations: Ingval Maxwell

In moving to conclude the Action, and to stimulate views during the General discussion period, Ingval Maxwell reminded members of the wide range of other presentations that had been offered at the various Seminars and Conferences arranged in support of the Action during the previous 3_ years. In listing the Action outcomes to date he noted the following publications has resulted as a direct result of C 17 activities:

- COST C17 International Workshop Conference Proceedings, 9-11 September 2004 Varna, Bugaria
- Heritage Protection Conference Abstracts and CD ROM, 23-25 May 2006: Ljubljana, Slovenia

He also outlined the emerging arrangements being created under the European Construction Technology Platform (ECTP) Focus Area Cultural Heritage (FACH) with specific reference to the Horizontal Issue (HI 5) “Disaster prevention and Risk assessment”. He intimated that this could well prove the vehicle for furthering the Action’s activities.

COST Action C 17 - BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS FINAL CONFERENCE SESSION 7 OPEN FORUM: SUMMARY REPORT

Ingval Maxwell

General Discussion on WG's + STSM Reports + Poster Session

Steve Emery reported that the UK government was interested in creating a Virtual Fire Academy which should be freely accessible through the internet. He proposed that all of the Action's material should be eventually put into the Academy for ease of reference by others.

Wolfgang Kippes encouraged members to react to the current C 17 web-based home page, hosted by Schloss Schonbrunn. He also encouraged members to offer links to their individual institutes' home pages and to create a chat room facility. He reiterated his original offer to continue to host the C 17 website for one year after the Action had concluded. This required all members to confirm that they were content that their material and reports were properly located on the site. After the host year was up at the end of 2007, the option was open to transfer the site to another location.

Christian del Taglia inquired what needed to be done after the Action was completed to inform the authorities about the results, and how this should be affected. Ingval Maxwell reflected on the presentation he had given on the creation, terms of reference and working methodology of the Scottish Historic Buildings fire Liaison Group and suggested that this model could be used to assist in the development of similar groups in each of the member countries. If this were possible, then it should be a relatively simple matter to use the group to promote the Actions findings and to develop the future needs of each member's country. Kirsten Westerlund Bjurström noted that a Swedish group had already been established during the work of the Action, and this was being used to considerable advantage.

Ivar Clausen emphasised the necessity to interface with the insurance world, and suggested the need to promote the Actions findings on insurance matters to each country's heritage board so as to stress the importance of the issues which had been addressed. Jacques Akerboom intimated that the European Heads of Cultural Heritage departments were meeting in Prague during the spring of 2007 and attempts should be made to use that platform to promote the Action's findings and results.

Vincenzo Nuzzolese endorsed the view that each country should form its own interest group, and that these groups should be encouraged to work to progress all the issues dealt with by the Action.

General discussion followed on the need to ensure that the Action's work was printed and made available for members' for their future use. It was agreed that each member should receive a minimum of 10 copies of the Final Report but, if circumstances permitted, 25 copies would be better so that the results could be promoted more effectively. There was also case made for a Summary Brochure of the Actions findings to be prepared. Suggestions were offered that this brochure should be between 2 and 20 pages in length and that each country should arrange to have it translated into their own language.

Marcus Zenis, Scientific Secretary, suggested that the COST Office would also require between 5 and 10 copies and that there were three possible options of obtaining some COST Office funding to help satisfy the members' requirements-

- Produce conference proceedings of the final Rome conference
- Produce a Final Scientific Report (this was mandatory)
- Produce a Summary Leaflet or Brochure of the Action's key findings

He emphasised the need to negotiate with the publishers the intention of putting a PDF copy on the Actions home page using the standard template produced by the COST Office.

SELF EVALUATION RESPONSES BY MEMBERS ON COST Action C17: ANALYSIS OF VIEWS SUBMITTED FROM 18 MEMBERS OUT OF A POSSIBLE 60 RETURNS BY ULLA PRIHA: 1 NOVEMBER 2006

Ingval Maxwell

Self Evaluation Responses by Members on COST Action C17:
Analysis of views submitted from 18 members out of a possible 60 returns by Ulla Priha, Helsinki: 1 November 2006

COST C17 Final Conference
Istituto Superiore Anticendi, Rome
1-3 December 2006
Ingval Maxwell
OBE DADun RIBA FRIAS AABC FSAScot

1

COST Action C17: Response by Country

Members from the following 11 countries submitted self evaluation returns and their views were included in the analysis:

- Belgium
- Bulgaria
- Finland
- Italy
- Netherlands
- Norway
- Poland
- Spain
- Sweden
- Switzerland
- UK

2

1. Results versus objectives

Do you think that COST Action C 17 achieved the general goal of COST, namely increasing European co-operation and interaction and improve European synergy in the field?

Results versus general objectives: 4.4

Do you think that COST Action C 17 achieved its main MoU objectives to date

Results versus specific objectives: 3.9

(1-5: Bad, Poor, Fairly good, Good, Excellent)

3

2. Outcome and achievements

Could you please describe the main outcome and the main achievements of the COST Action C 17 and the significance of these?

Outcome and achievements: 4.1

(1-5: Bad, Poor, Fairly good, Good, Excellent)

4

3. Impact of COST Action C 17

Could you please describe the importance and benefits of COST Action C 17 for research and technology in your own country?

Impact of COST Action C17: 3.8

External "visibility": 3.7

(1-5: Bad, Poor, Fairly good, Good, Excellent)

5

4. European added-value

Could you please describe how the scientific research in the domain of COST Action C 17 in your institution has been improved by the COST co-operation?

Could you please identify what synergies and added value came out of the COST framework?

National projects set up or running: 3.3

International projects set up or running: 3.2

Other added-value aspects: 3.9

(1-5: Bad, Poor, Fairly good, Good, Excellent)

6

5. Coordination and management

Could you please describe the effectiveness of coordination and management of COST Action C 17?

Overall management of Action: **4.6**

Organisation of meetings: **4.0**

Distribution of documents: **4.4**

Usefulness of the COST homepage: **3.5**

Internal self assessment of progress: **3.8**

(1-5: Bad, Poor, Fairly good, Good, Excellent)

7

6. Dissemination and results

Could you please describe briefly the effectiveness of dissemination?

Publications from meetings: **4.0**

Accessibility of documents: **3.7**

National + International publicity and marketing: **3.3**

(1-5: Bad, Poor, Fairly good, Good, Excellent)

8

7. Organisation

Do you think within COST C17 there should/could have been made more:

Research	Case studies	Common projects	Seminars Conferences	Working Group Meetings
10	8	7	6	8

Do you think your workload was generally:

Far too heavy	Too heavy	OK	Small
0	2	16	0

9

7. Organisation

Do you find it beneficial the meetings being held in partner's (or other) cities?

Very much	Fairly	Not so much	Better in Bruxelles
16	2	0	0

Do you think that the interactions among the 4 working groups was:

Excellent	Good	Sufficient	Not enough
3	11	3	4

10

8. Participation

Could you please describe briefly the effectiveness of the participation of your Institution to the Action?

European wide: **3.8**

Nationally / regionally: **3.8**

Within your organization: **4.0**

Short-term scientific missions: **3.6**

(1-5: Bad, Poor, Fairly good, Good, Excellent)

11

9. Economic aspects

(Based on 12 returns out of a possible 60 responses from members)

Could you roughly estimate the total manpower in person-days dedicated by yourself and by your Institution's personnel to the activities of the action each year and for the entire duration of the COST Action C 17, including attendance of meetings?

(150 days average) 1,800 person days total

Could you estimate the total financial resources mobilised by your Institution each year and for the entire duration of the Action for the scientific research co-ordinated by the COST C 17 Action, excluding the cost of above mentioned person days?

(€ 31,294 average) € 375,528 total

Cost (time and money spent) of Action in relation to participation and added value: **4.3**

(1-5: Bad, Poor, Fairly good, Good, Excellent)

12

10. Overall Comments and Recommendations

- Overall, excellent and remained true to the intent of the Memorandum of Understanding
- *Limited production of scientific documents could have been better organized*
- Lack of a useful website hampered efficient progress

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10. Overall Comments and Recommendations

- *Exchange, and benefit of, information at conferences, meetings etc has been very good*
- The chairman, management and various hosts has been excellent
- *Working Group Convenors were sometimes less prepared at meetings*

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10. Overall Comments and Recommendations

The Action should progress in three ways:

- 1 The final report should be used in each country to encourage the formation of National Working / Consultation Groups to continue the :
 - work of the Action
 - collection and collation of data relating to fire loss
 - development of fire protection strategies and protocols for comparison across the EU
- 2 These National groups should continue to meet to carry on the process of collaboration and exchange of information.

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10. Overall Comments and Recommendations

- 3 Specific outcomes of the Action should be carried forward to further develop the level of knowledge and co-operation in the protection of built heritage
 - Consider a new Action concerning problems related to the safety and security of the built heritage against natural and man-made disasters
 - The next programme should cover a smaller field so it's possible to come closer to the issues and just not list what's already done
 - There is still a lot of work to do regarding the fire safety of monuments, to spread the message and to follow what is new in the field

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EUROPEAN CONSTRUCTION TECHNOLOGY PLATFORM (ECTP): FOCUS AREA CULTURAL HERITAGE (FACH): DISASTER PREVENTION AND RISK MANAGEMENT: HORIZONTAL ISSUE 5 (HI5)

Ingval Maxwell

European Construction Technology Platform (ECTP): Focus Area Cultural Heritage (FACH)

Disaster Prevention and Risk Management Horizontal Issue 5 (HI 5)

COST C17 Final Conference
Istituto Superiore Anticendi, Rome
1-3 December 2006
Ingval Maxwell
OBE DADun RIBA FRIAS AABC FSAScot
Chairman COST Action C17

1

European Construction Technology Platform

FACH Vision



Integral management of Cultural Heritage and its sustainable interaction with the territory



2

European Construction Technology Platform

Sustainable development and heritage

- The concepts of Sustainable Development must be translated in a specific way when dealing with Cultural Heritage. **There is a need to develop a knowledge-based and interdisciplinary approach for the sustainable protection of cultural heritage. It must ensure safety, authenticity and compatibility, access for all, and apply minimal interventions. A living Cultural Heritage should be considered as an added value element for cities and territories.**

3

European Construction Technology Platform

FACH Evolution from October 2004 to October 2006

STRATEGIC RESEARCH AGENDA

BROKERAGE EVENT

VISION 2010/2030



4

European Construction Technology Platform

The 2007 Topics

- Innovative added-value construction product-services**
- Resource Efficient and Clean Buildings**
- Protection, conservation and enhancement of cultural heritage**
 - Damage assesment, diagnosis and monitoring for the preventive conservation and maintenances of the cultural heritage
 - ERA NET for the preservation of the tangible cultural heritage
 - Consolidation and dissemination of results related to cultural heritage

5

European Construction Technology Platform

ERA-NET Scheme

The objective of the ERA-NET scheme is to step up the cooperation and coordination of research activities carried out at national or regional level in the Member States and Associated States through: the networking of research activities conducted at national or regional level, and the mutual opening of national and regional research programmes.

The scheme will contribute to making a reality of the European Research Area by improving the coherence and coordination across Europe of such research programmes. The scheme will also enable national systems to take on tasks collectively that they would not have been able to tackle independently.

Both networking and mutual opening require a progressive approach. The ERA-NET scheme therefore has a long-term perspective that must also allow for the different way that research is organised in different Member States and Associated States.

6

European Construction Technology Platform

Indicative topics for later years

- Vulnerability assesment of buildings, lifelines systems and network related to earthquakes
- **Technologies and tools for the assesment and monitoring of environmental impacts on cultural heritage materials**
- "EU Cultural Heritage Identity Card" (immovable/movable)
 - Development of strategy and tools for tracking of changes of cultural heritage building and monuments, including deterioration processes and interventions
 - Traceability and security of movable cultural assets
- **Disaster prevention of heritage building and monuments**

7

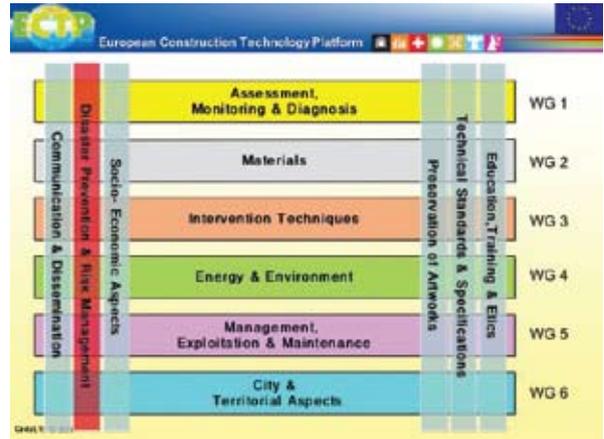
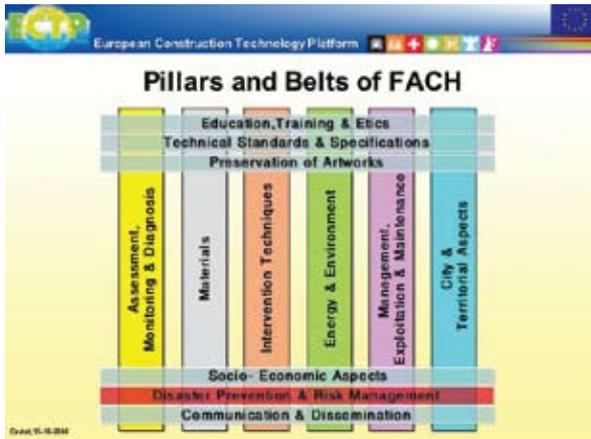
European Construction Technology Platform

Indicative topics for later years

Coordination and Support Action(s)

- **Framework conditions to enhance most promising prototypes resulting from previous FP5 & FP6 projects requiring further concertation or networking for effective applicability development**
- **Strategy for furthering recommendations, guidelines and best practice for accepted methodologies, thresholds and standards in cultural heritage in support to CEN work, and benefiting all end-users**

8



EUROPEAN CONSTRUCTION TECHNOLOGY PLATFORM

Focus Area Cultural Heritage

WG 1: Assessment, Monitoring & Diagnosis: Priorities

- **Priority 1:** **Damage free renovation of the existing building stock preserving authentic materials and structures with emphasis on environmental influences.**
- **Priority 2:** **Prediction of physical, chemical and mechanical aging and damaging processes of Cultural Heritage buildings based on experience and innovative technology considering databases and past and future environmental influences as well as natural hazards (pollution, earthquake, flood, landslide, traffic, climatic changes etc.).**

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EUROPEAN CONSTRUCTION TECHNOLOGY PLATFORM

Focus Area Cultural Heritage

WG 1: Assessment, Monitoring & Diagnosis: Priorities

- **Priority 6:** **Development of models for evaluating and predicting the behaviour of historic materials and structures considering material properties and environmental influences for disaster prevention, risk management and for understanding of mechanisms of degradation and deterioration.**
- **Priority 7:** **Setting up databases, standard protocols and criteria for an integral structural assessment of Cultural heritage, including seismically-active and flood plane areas. Integration of this database into an efficient management and maintenance system for Cultural Heritage building.**

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EUROPEAN CONSTRUCTION TECHNOLOGY PLATFORM

Focus Area Cultural Heritage

WG 2: Materials: General Strategy

2010: Development of enhanced diagnosis systems, development of standards and guidelines

2020: Regular application of diagnosis and monitoring systems, application to new materials, development of management systems, safety of buildings

2030: Integration of building diagnosis in management systems, operation, impact on quality of life in the cities

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EUROPEAN CONSTRUCTION TECHNOLOGY PLATFORM

Focus Area Cultural Heritage

WG 3: Intervention Techniques: Priorities

Priority 1
To develop databases of different structural elements and structural typologies defined at different geographical level, and a validated catalogue of intervention techniques with respect to their effectiveness, their compatibility - removability - retreatability.

Priority 2
To develop effective and reliable traditional and innovative "smooth" interventions techniques that alter at the minimum level the historic structure's character. To optimise the single or combined techniques for application and propose integrated intervention systems.

Priority 3
To improve analytical tools for structural assessment and simulation of interventions.

Priority 4
To identify "strategies" for the design of the interventions, by defining "target" structural behaviour of single components and of the overall structure which are compatible with available and "admissible" intervention techniques.

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EUROPEAN CONSTRUCTION TECHNOLOGY PLATFORM
Focus Area Cultural Heritage

WG 3: Intervention Techniques: Priorities

Priority 5
To select enhanced and intelligent systems, such as smart systems for monitoring the intervention and real time modification of the working conditions ("early warning systems"), and select a number of pilot sites for case studies application and validation of the system; after the validation, on the long term, larger scale application of integrated interventions making use of smart technologies, with enhancement of durability and removability

Priority 7
Optimisation of all obtained results from financial and efficiency points of view (reduction of cost and duration of interventions); development of structural protocols, development and update guidelines: standardization of techniques and procedures

Priority 8
Setting up of cultural and technological programmes for disseminating and exporting technologies and knowledge to third and in particular developing countries

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EUROPEAN CONSTRUCTION TECHNOLOGY PLATFORM
Focus Area Cultural Heritage

WG 4: Energy and Environment: Priorities

Priority 1
To develop our understanding of the nature of movable and immovable CH environments through the... development of risk management methodologies, models and tools.

Priority 2
To study the micro-environments and the interface between environment and surfaces that create stresses on movable and immovable CH. Development of understanding of physical changes in CH and citizens' through advanced and non-destructive techniques for damage diagnosis

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EUROPEAN CONSTRUCTION TECHNOLOGY PLATFORM
Focus Area Cultural Heritage

WG 4: Energy and Environment: Priorities

Priority 3
To identify the optimum management and use of old and new buildings also in terms of energy saving to avoid damage to movable and immovable CH To identify sustainable solutions in terms of conservation of the movable and immovable CH, use of non-renewable energy sources and cost-effectiveness in the design, ... and maintenance of museum.....etc.

Priority 6
To apply new and satellite technologies (including SAR microwave and radar monitor) and multi-spectral scanners to assess damage to movable and immovable cultural heritage (structural, bio-deterioration, blackening, etc) due to the action of the environment

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EUROPEAN CONSTRUCTION TECHNOLOGY PLATFORM
Focus Area Cultural Heritage

WG 5: Management, Exploitation + Maintenance: Strategy

MAINTENANCE
Development of methodologies and establishment of appropriate criteria to elaborate sustainable and reliable maintenance plans of monuments and historical districts, traditional architecture (2010)

Development of methodologies and tools and establishment of appropriate criteria to elaborate sustainable and reliable predictive maintenance strategies (2020)

Development of tools and systems to prevent service life of ancient and new materials and structures (2030)

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EUROPEAN CONSTRUCTION TECHNOLOGY PLATFORM
Focus Area Cultural Heritage

WG 6: City + Territorial Aspects: Strategy

Research, development and implementation of standardised modular tools, technologies and systems for survey, documentation, evaluation, sustainable management, public participation, communication and networking of units with cultural and natural heritage territorial values.

Monitoring and early warning systems for critical deterioration of historic environment.

Safeguarding and consolidation of cultural heritage values in risk in territories should be improved by 40% between 2010 and 2030

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COST Action C 17 - BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS FINAL CONFERENCE: SESSION 8: PLANNING AHEAD AND NEXT STEPS: SUMMARY REPORT

Ingval Maxwell

Session 8.1 COST Action C 26: Frantisek Wald



Frantisek Wald was invited to address the Action. In doing so he outlined the background and results of COST Action C 26 - Urban Habitat Constructions under Catastrophic Events - which was initiated on 26 June 2006. There were four working groups:

- WG1 – Fire resistance (F Wald)
- WG2 – Earthquake resistance (D. Dubina)
- WG3 – Impact and explosion resistance (M. Byfield)
- WG4 – Resistance to infrequent actions (M. Faber)

Of interest to Action C17, WG 1 would address:

- Structural Integrity Robustness of elements and joints
- Subjects included fire model; connection modelling; member behaviour; material simulation; fire after earthquake and global analyse

The fire testing programme has already commenced and the work programme was due to last four years. He invited members to check the website for their interest at <www.civ.uth.gr/cost-c26>

Session 8.2 Proposed Action on the Consequences of Using Chemical Extinguishing Materials: Professor Jiri Zelinger



Professor Jiri Zelinger, Chairman of the Ministry of Culture of the Czech Republic “Technology of fire protection of cultural heritage” project, was invited to address the Action. The goal of this project is to develop fire protection strategy for cultural heritage in the Czech Republic, and the intention to write a methodical notebook similar to Historic Scotland’s Technical Advice Notes. It is also intended to establish a Consulting Centrum for Fire Protection of Cultural Heritage in the frame of Methodical Centrum for Conservation, which is attached to the Technical Museum in Brno.

The Consulting Centrum for Fire Protection of Cultural Heritage would be able to advice to management, conservators and other persons involved how to solve problems of fire protection at the institution in their responsibility.

As a chemist, he explained the problems of the influence of extinguishing materials and their degradation products on works of art. He indicated that he was convinced there was a problem regarding the use of chemical fire extinguishing materials, and indicated that his concern focused on thermal degradation as a result of by-products produced by the chemical systems and extinguishing

powders used for fire-fighting and how these could significantly damage the objects. Given the nature of some of the chemicals it was inevitable that post-fire decay processes would result from their use (assuming they were also effective in controlling the fire). From the archivists point of view it is important to understand the influence of degradation products of halon alternatives on iron gallotannate inks and, for conservators of musical instruments, the influence of degradation products on the metallic parts of these instruments. He also noted that over heated water steam (as a result of water based fire-fighting techniques) can influence the protective varnish on the easel paintings and canvases. In recognising that COST Action C 17 was concerned mainly with the structural aspect of buildings he argued that the contents of buildings were inevitably related to that problem. In noting that there were numerous papers on the damaging effect of fire on objects of art and books, the fundamental point was to try to make appropriate decisions before an incident occurred. He therefore invited members of the Action to consider the development of a proposal on how the use of chemical technology in fire-fighting can influence the future well-being of art objects.

Session 8.3 Self Evaluation Responses by Members on COST Action C17 Analysis by Ulla Priha: Ingal Maxwell



Ingal Maxwell presented a report on the Self Evaluation Responses by members on COST Action C17. This was an analysis of views submitted from 18 members (out of a possible 60 returns) by Ulla Priha, Helsinki on 1 November 2006. Responses had been received from Belgium, Bulgaria, Finland, Italy, Netherlands, Norway, Poland, Spain, Sweden, Switzerland and the UK.

Using a score of 1-5 (1-5: Bad, Poor, Fairly good, Good, Excellent) the key findings were:

1. Results versus objectives

Do you think that COST Action C 17 achieved the general goal of COST, namely increasing European co-operation and interaction and improve European synergy in the field?

- Results versus general objectives: 4.4

Do you think that COST Action C 17 achieved its main MoU objectives to date

- Results versus specific objectives: 3.9

2. Outcome and achievements

Could you please describe the main outcome and the main achievements of the COST Action C 17 and the significance of these?

- Outcome and achievements: 4.1

3. Impact of COST Action C 17

Could you please describe the importance and benefits of COST Action C 17 for research and technology in your own country?

- Impact of COST Action C17: 3.8
- External “visibility”: 3.7

4. European added-value

Could you please describe how the scientific research in the domain of COST Action C 17 in your institution has been improved by the COST co-operation?

Could you please identify what synergies and added value came out of the COST framework?

- National projects set up or running: 3.3
- International projects set up or running: 3.2
- Other added-value aspects: 3.9

5. Coordination and management

Could you please describe the effectiveness of coordination and management of COST Action C 17?

- Overall management of Action: 4.6
- Organisation of meetings: 4.0
- Distribution of documents: 4.4
- Usefulness of the COST homepage: 3.5
- Internal self assessment of progress: 3.8

6. Dissemination and results

Could you please describe briefly the effectiveness of dissemination?

- Publications from meetings: 4.0
- Accessibility of documents: 3.7
- National + International publicity and marketing: 3.3

7. Organisation

Do you think within COST C17 there should/could have been made more:

Research	Case studies	Common projects	Seminars Conferences	Working Group Meetings
10	8	7	6	8

Do you think your workload was generally:

Far too heavy	Too heavy	OK	Small
0	2	16	0

Do you find it beneficial the meetings being held in partner’s (or other) cities?

Very much	Fairly	Not so much	Better in Bruxelles
16	2	0	0

Do you think that the interactions among the 4 working groups was:

Excellent	Good	Sufficient	Not enough
3	11	3	4

8. Participation

Could you please describe briefly the effectiveness of the participation of your Institution to the Action?

- European wide: 3.8
- Nationally / regionally: 3.8
- Within your organization: 4.0
- Short-term scientific missions: 3.6

9. Economic aspects

(Based on 12 returns out of a possible 60 responses from members)

Could you roughly estimate the total manpower in person-days dedicated by yourself and by your Institution's personnel to the activities of the action each year and for the entire duration of the COST Action C 17, including attendance of meetings?

- (150 days average) 1,800 person days total

Could you estimate the total financial resources mobilised by your Institution each year and for the entire duration of the Action for the scientific research co-ordinated by the COST C 17 Action, excluding the cost of above mentioned person days?

- (31,294 average) 375,528 total
- Cost (time and money spent) of Action in relation to participation and added value: 4.3

10. Overall Comments and Recommendations

- Overall, excellent and remained true to the intent of the Memorandum of Understanding
- Limited production of scientific documents could have been better organized
- Lack of a useful website hampered efficient progress
- Exchange, and benefit of, information at conferences, meetings etc has been very good
- The chairman, management and various hosts has been excellent
- Working Group Convenors were sometimes less prepared at meetings

Recommendations:

The Action should progress in three ways:

1: The final report should be used in each country to encourage the formation of National Working / Consultation Groups to continue the :

- work of the Action
- collection and collation of data relating to fire loss
- development of fire protection strategies and protocols for comparison across the EU

2: These National groups should continue to meet to carry on the process of collaboration and exchange of information.

3: Specific outcomes of the Action should be carried forward to further develop the level of knowledge and co-operation in the protection of built heritage

- Consider a new Action concerning problems related to the safety and security of the built heritage against natural and man-made disasters

- The next programme should cover a smaller field so it's possible to come closer to the issues and just not list what's already done
- There is still a lot of work to do regarding the fire safety of monuments, to spread the message and to follow what is new in the field

Summary of Self Evaluation Opinions

With an average score of 3.86 the returned opinions of 18 members considered the work of the Action to be verging on being Good overall (Score range 1-5: Bad, Poor, Fairly good, Good, Excellent).

With 12 members considering that they spent, on average, 150 days working on Action activities an extrapolation of that statistic would suggest that some 9000 working person days had been aggregated over the Action period.

Similarly, with an average additional financial resource of €31,294 being committed for each of the 12 responding members during the Action period, a total additional financial resource of €1.87 million can be suggested. This sum is in addition to the financial support received from the COST Office over the 4-year period.

Session 8.4 European Construction Technology Platform: Focus Area Cultural Heritage (ECTP FACH): Disaster Planning and Risk Management: Horizontal Issue 5:

Ingval Maxwell

Ingval Maxwell reporting on meetings held in Prague, Czech Republic, in June and Cavtat, Croatia, in October 2006, and in concluding the work of COST Action C17, reflected on developments which could emerging under the European Construction Technology Platform (ECTP), Focus Area Cultural Heritage (FACH). He had undertaken a preliminary assessment of where the future aspirations of COST Action C 17 could fit into each of the six Working Group activities operating under the Focus Area. In looking specifically at the strategic objectives of the Groups he noted the following FACH intentions that could be relevant:

WG 1: Assessment, Monitoring & Diagnosis: Priorities

Priority 1:

- Damage free renovation of the existing building stock preserving authentic materials and structures with emphasis on environmental influences.

Priority 2:

- Prediction of physical, chemical and mechanical aging and damaging processes of Cultural Heritage buildings based on experience and innovative technology considering databases and past and future environmental influences as well as natural hazards (pollution, earthquake, flood, landslide, traffic, climatic changes etc.).

Priority 6:

- Development of models for evaluating and predicting the behaviour of historic materials and structures considering material properties and environmental influences for disaster prevention, risk management and for understanding of mechanisms of degradation and deterioration.

Priority 7:

- Setting up databases, standard protocols and criteria for an integral structural assessment of Cultural heritage, including seismically-active and flood plane areas. Integration of this database into an efficient management and maintenance system for Cultural Heritage building.

WG 2: Materials: General Strategy

- 2010: Development of enhanced diagnosis systems, development of standards and guidelines
- 2020: Regular application of diagnosis and monitoring systems, application to new materials, development of management systems, safety of buildings
- 2030: Integration of building diagnosis in management systems, operation, impact on quality of life in the cities

WG 3: Intervention Techniques: Priorities**Priority 1**

- To develop databases of different structural elements and structural typologies defined at different geographical level, and a validated catalogue of intervention techniques with respect to their effectiveness, their compatibility – removability – retreatability.

Priority 2

- To develop effective and reliable traditional and innovative “smooth” interventions techniques that alter at the minimum level the historic structure’s character. To optimise the single or combined techniques for application and propose integrated intervention systems.

Priority 3

- To improve analytical tools for structural assessment and simulation of interventions.

Priority 4

- To identify “strategies” for the design of the interventions, by defining “target” structural behaviour of single components and of the overall structure which are compatible with available and “admissible” intervention techniques.
- He encouraged members to check the ECTP web site and to take advantage of the opportunities which FACH might present to them to further their interests in partnership with others.

Priority 5

- To select enhanced and intelligent systems, such as smart systems for monitoring the intervention and real time modification of the working conditions (“early warning systems”) , and select a number of pilot sites for case studies application and validation of the system; after the validation, on the long term, larger scale application of integrated interventions making use of smart technologies, with enhancement of durability and removability

Priority 7

- Optimisation of all obtained results from financial and efficiency points of view (reduction of cost and duration of interventions); development of structural protocols, development and update guidelines; standardization of techniques and procedures

Priority 8

- Setting up of cultural and technological programmes for disseminating and exporting technologies and knowledge to third and in particular developing countries

WG 4: Energy and Environment: Priorities**Priority 1**

- To develop our understanding of the nature of movable and immovable CH environments through the... development of risk management methodologies, models and tools.

Priority 2

- To study the micro-environments and the interface between environment and surfaces that create stresses on movable and immovable CH. Development of understanding of physical changes in CH and citizens’ through advanced and non-destructive techniques for damage diagnosis

Priority 3

- To identify the optimum management and use of old and new buildings also in terms of energy saving to avoid damage to movable and immovable CH To identify sustainable solutions in terms of conservation of the movable and immovable CH, use of non-renewable energy sources and cost-effectiveness in the design, ... and maintenance of museum.....etc.

Priority 6

- To apply new and satellite technologies (including SAR microwave and radar monitor) and multi-spectral scanners to assess damage to movable and immovable cultural heritage (structural, bio-deterioration, blackening, etc) due to the action of the environment

WG 5: Management, Exploitation + Maintenance: Strategy

Maintenance

- Development of methodologies and establishment of appropriate criteria to elaborate sustainable and reliable maintenance plans of monuments and historical districts, traditional architecture (2010)
- Development of methodologies and tools and establishment of appropriate criteria to elaborate sustainable and reliable predictive maintenance strategies (2020)
- Development of tools and systems to prevent service life of ancient and new materials and structures (2030)

WG 6: City + Territorial Aspects: Strategy

- Research, development and implementation of standardised modular tools, technologies and systems for survey, documentation, evaluation, sustainable management, public participation, communication and networking of units with cultural and natural heritage territorial values.
- Monitoring and early warning systems for critical deterioration of historic environment.
- Safeguarding and consolidation of cultural heritage values in risk in territories should be improved by 40% between 2010 and 2030

Termination of COST Action C17

Following an expression of thanks and appreciation to all participating members of COST Action C17, and a particular thanks to all involved in setting up the Fional conference, as there was no further business COST Action C 17 terminated, as planned, at midday on Sunday 3 December 2006.

SECTION 13

COST Action C17: “BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS”

Working Group 1

Short Term Scientific Missions

SECTION 13: Contents



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COST Action C17: 'BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS' WORKING GROUP 1 SHORT TERM SCIENTIFIC MISSION: 'COMPARISON OF DATA CATEGORISATION OF EUROPEAN COUNTRIES FIRE REPORTING STATISTICS'

Kalle Reivila

1. Introduction

This report summarises The Short Term Scientific Mission carried out for COST Action C17 "Fire Loss to Historic Buildings" Working Group 1 (Data, Loss Statistics and Evaluating Risks) by Kalle Reivilä from Finland's National Board of Antiquities during the period 5-13th of October 2004. The mission was performed at Historic Scotland's premises in Edinburgh, Scotland complemented by two scientific visits, one to Grampian Fire and Rescue Service in Aberdeen and the other to the UK Government Office of the Deputy Prime Minister's (ODPM) Fire Statistics & Research Division in London.

2. Purpose of the visit

The aim of the Short Term Scientific Mission was to set common criteria for facilitating direct comparison of data categorisation from each COST Action C17 participating country's fire statistics.

Reporting to the Action Working Group 1, The Mission was to address the hypothesis that identifying and setting up eight levels of fire causes would be sufficient for European historic building managers to gain useful information.

By comparing the detail from each country's reporting pro forma system, the STSM was also to address:

- How to include historic buildings data in the fire reporting processes
- How to ensure more effective links between the historic building authorities and those compiling fire statistics
- How to make data on historic buildings more accessible
- The possibility of agreeing a common format of categorising and analysing historic buildings data that could be included in the reporting pro-forma procedure

2. Work carried out during the visit

To support the actual data analysis and comparison, two scientific visits were made. These enabled idea exchange and demonstration of fire reporting systems and databases in the UK and Finland as well as collection of available data for the primary purpose of the visit; comparison of fire report statistics.

The Scottish Historic Buildings National Fire Database demonstrated to Kalle Reivila at Grampian Fire and Rescue Service in Aberdeen is a good example of collaboration between cultural heritage professionals and rescue authorities. The outcome of this project, used together with relevant statistics on actual fires, presents a very effective means of increasing fire safety in historic buildings in the future.

The visit to ODPM's Statistics & Social Research Branch's Fire Statistics & Research Division in London was to enable demonstration of the Finnish electronic recording systems of accidents to officials responsible for developing the UK equivalent - as well as to collect UK data for the data comparison exercise. During the visit it was acknowledged that, whilst it would be possible to collect relevant UK fire statistics to enable analysis of fires from the historic building viewpoint, such specific information is unfortunately not readily available as it would be too difficult and burdensome to source from old paper based archive data. This emphasised the need for an up-to-date electronic system for recording fires. The general fire statistics obtained during the visit were however helpful for the comparison exercise.

Data categorisation of fire causes in European Countries fire reporting systems

In advance of the mission it was agreed that WG1 members from each country would e-mail details to Kalle Reivila of how their system currently determines different causes of fire. Categorisation details were received from Finland, Sweden, Bulgaria and the UK:

Table 1: Causes of fire in different European countries fire report pro formas	
Finland (33 categories)	
Unknown	Other
Short circuit	Overheated equipment
Insufficient distance to burning object	Spark from duct or stove
Cigarette etc.	Other electrical reason
Welding	Hot object or ash
Overheated process	Smutfire*
Lightning	Candle etc.
Crack in duct or stove	Spark from outlet or device
Campfire or other open fire	Mechanical spark
Friction	Loose wire (electric)
Trash burning	Heat from chemical reaction
Re-ignition	Controlled agricultural burning
Fireworks	Other energy
Installation fault in electric device	Sun
Explosion	Other natural cause
* or 'soot fire' i.e. soot in chimney flue	

Sweden (17 categories)	
Intentional	Children's games
Smoking	Technical fault
Smutfire*	Self Ignition
Hot works	Forgotten fireplace
Explosion	Spark
Friction	Candle
Transfer of heat	Re-ignition
Lightning	Unknown
Other (please specify)	
* or 'soot fire' i.e. soot in chimney flue	

Bulgaria (14 categories)	
Short circuit	Misuse of electrical heaters
Misuse of electrical appliances	Carelessness in handling open fire
Technical failure	Faulty technology
Natural phenomena	Arson
Unknown	Other
Construction failure	Hot works
Self-ignition	Children's games
<i>UK – most common main categories*</i>	
Smokers' materials	Matches
Cooking appliances	Space heating appliances
Central and water heating appliances	Blowlamps, welding and cutting equipment
Electrical distribution	Other electrical appliances
Candles	Other
Unspecified	
* In UK fire causes are recorded in over one hundred different categories. Causes listed here represent the most common main categories from ODPM's data 'Accidental fires in dwellings and other buildings by cause, 1992-2002'.	

It is evident that lack of information from other European countries makes reliable comparison difficult. Discrepancy between available categories is also a complicating factor.

For example, in the Bulgarian fire report form, 'arson' is included as a cause. In other countries deliberate and accidental fires are recorded separately, i.e. there is a different section in their pro forma indicating whether the fire was accidental or deliberate. The cause 'unknown' which is present in every available country's list, also most likely refers to arson. The unfortunate fact that the cause cannot be established in such a large proportion of recorded fires is a complicating factor for preventive measures.

In accidental fires, the source of ignition can be considered to be the actual cause of fire. However, in some of the pro formas the actual cause (which can be accidental or intentional) and source of ignition can be mixed into the same classification.

Although arson is and should be considered as a serious threat to historic buildings, accidental and deliberate fires should be registered separately. The reason for this is that the means of preventing fires in each of these two categories can be quite different. Best results for preventing arson fires are usually achieved by increased security measures whilst for accidental fires prevention involves eliminating the actual cause or source of ignition by a variety of means.

The number of categories used in these four countries varies from 14 to 33. The UK categories (11) represent the most common causes in accidental fires. To actually know what these most common causes are, and whether the aggregated information would be useful from the historical building point of view, the actual available data on fire causes should first be analysed.

Data available to test the hypothesis

During the Action's WG1 meeting on 16 – 17 July 2004 in Vienna, it was recognised that, in terms of management decision making, it would be difficult to plan investments without knowing what the main causes of fires in historic buildings are. It was therefore decided that the STSM would address the hypothesis that identifying and setting eight levels of fire causes would be sufficient for European historic building managers to gain useful information. By combining different categories into more general causes, it was thought possible to create a template setting out the eight most common causes for historic building fires. **In this exercise it was assumed that covering 80% of all causes would be sufficient to gain useful information.**

In advance, and during the STSM, Kalle Reivila gathered data on actual fire causes from the United States, the UK and Finland. Collated data, relevant to test the hypothesis, is presented below:

Table 2: U.S.A.			
Data from the National Fire Protection Association (NFPA)			
Libraries	Number of fires		
	average per year	Causes	%
	146	intentional	36,
		electrical distribution	17,40
		other equipment	11,10
		open flame, ember or torch	9,00
		heating equipment	7,00
		Total:	80,80
Statistical data from 1994 - 1998			
Museums and Art Galleries	Number of fires		
	average per year	Causes	%
	61	electrical distribution	30,40
		other equipment	16,00
		cooking equipment	10,90
		heating equipment	9,00
		open flame, ember or torch	8,60
		Total:	74,90
Statistical data from 1994 - 1998			
Historic Buildings	Number of fires		
	average per year	Causes	%
	35	intentional	29,70
		electrical distribution	16,60
		heating equipment	11,60
		other equipment	8,60
		natural causes	8,40
		Total:	74,90
Statistical data from 1994 - 1998			
Places of Worship	Number of fires		
	average per year	Causes	%
	1735	intentional	20,40
		electrical distribution	19,80
		open flame, ember or torch	14,70
		heating equipment	11,10
		cooking equipment	10,60
		Total:	76,60
Statistical data from 1994 - 1998			

Table 3: Finland			
All recorded alarms in buildings from 1999-2003 (Total number of events: 15886). Data from PRONTO			
All Events			
Cause	Frequency	%	Cumulative%
Unknown	2403	15,77 %	15,77 %
Other known	1739	11,41 %	27,18 %
Short circuit	1346	8,83 %	36,02 %
Match etc	1335	8,76 %	44,78 %
Overheat. equipment	938	6,16 %	50,94 %
Insufficient distance to burning object	838	5,50 %	56,43 %
Cigarette etc	776	5,09 %	61,53 %
Spark from duct or stove	688	4,52 %	66,04 %
Lightning	650	4,27 %	70,31 %
Other electric	595	3,90 %	74,21 %
Hot object or ash	572	3,75 %	77,97 %
soot in chimney flue	503	3,30 %	81,27 %
Alarms in 'Pre 1940 Built Buildings'			
Unknown	297	20,05 %	20,05 %
Match etc	178	12,02 %	32,07 %
Other known	156	10,53 %	42,61 %
Short circuit	107	7,22 %	49,83 %
Cigarette	90	6,08 %	55,91 %
Lightning	87	5,87 %	61,78 %
Smutfire	66	4,46 %	66,24 %
Spark from duct or stove	61	4,12 %	70,36 %
Other electric	51	3,44 %	73,80 %
Insufficient distance to burning object	49	3,31 %	77,11 %
Crack in duct or stove	48	3,24 %	80,35 %
Alarms in 'Pre 1920 Built Buildings'			
Unknown	83	17,66 %	17,66 %
Match etc	64	13,62 %	31,28 %
Other known	49	10,43 %	41,70 %
Shortcircuit	34	7,23 %	48,94 %
Smutfire	24	5,11 %	54,04 %
Insufficient distance to burning object	23	4,89 %	58,94 %
crack in duct or stove	21	4,47 %	63,40 %
Other electric	21	4,47 %	67,87 %
Spark from duct or stove	20	4,26 %	72,13 %
Lightning	19	4,04 %	76,17 %
Cigarette etc	18	3,83 %	80,00 %

Table 4: UK			
Accidental fires in dwellings and other buildings by source of ignition, 1992-2002			
Cause:	Fires (thousands)	%	Cumulative %
Cooking appliances	386,2	43,59	43,59
Other electrical appliances	138,8	15,1	58,69
Smokers' materials	88,7	10,01	68,70
Other	74,1	8,36	77,0
Electrical distribution	54,2	6,12	83,18
Space heating appliances	41,2	4,65	87,83
Blowlamps, welding and cutting equipment	23,5	2,65	90,48
Matches	22,6	2,55	93,03
Central and water heating appliances	22,1	2,49	95,52
Unspecified	20,9	2,36	97,88
Candles	19	2,14	100,02

Analysis of the data

Table 2 presents the NFPA USA data from the period 1994-1998 by building type. Presented types are restricted to the categories relevant from a historical point of view. The categories for the causes of fire are a mixture of source of ignition and deliberate fires, as the class 'intentional' is not a source of ignition. With each type of building, the five available categories cover about 75% of all fires (80% in libraries). However, the broad categorisation used in this data set could cause loss of valuable information. For example, it is unclear whether 'hot works' or equivalent is included in any of these categories.

Data extracted from the Finnish rescue service system PRONTO is listed in Table 3. Data includes all events (including near misses and minor fires) during the period 1999 – 2003. Analysis of the 3 Finnish data sets ('all events', 'pre 1940 built buildings and 'pre 1920 built buildings) shows that the 11 most common (12 in 'all events' group) categories cover about 80% of all events. However, the 'other' and 'unknown' classifications add up to about a third of all events, a fact that is not very useful for preventative purposes. 'Unknown' most probably refers to arson. In comparison with the NFPA USA data, the categorisation of Finnish data might be somewhat too detailed, since 12 causes cover about 80% of all events, and the remaining 21 causes only about 20%. This suggests that setting up definitions or categories for eight levels of causes (as mooted at the Action's WG1 meeting in Vienna) would be sufficient, and probably close to the optimum balance between 'too-detailed', versus 'loss of information.'

When the Finnish data is analysed by building date the most common causes of fire in all three data sets are almost the same. This suggests that causes of fire in old buildings do not differ radically from those in the broader datasets. This assumption will be used when addressing the hypothesis, as old buildings are more likely to be historic buildings.

The results from analysis of UK fires (Table 4) are similar to the Finnish data, although the categories are broader and not directly comparable to other countries' data sets. In total the first five causes add up to about 80% of all fires.

There are several factors that make direct comparison of the available data from the three countries difficult. Firstly, the Finnish data includes all events, including automatic alarms and 'false alarms' and is not restricted to fires that cause damage. Secondly, categorisation across different data sets is not uniform. Thirdly, it is unclear whether the circumstances for the ignition of fires are similar. In Finland, for example, the most common room for a fire to start in is the sauna, which is unlikely to be the case in UK. Conversely, gas is used more in UK than it is in Finland, and this might explain the high percentage of cooking fires that occur in the UK.

Conclusions

From the limited available data it is considered that establishing eight levels of fire causes would be sufficient for European historic building managers to gain useful information. However, due to insufficient and inconsistent common national data it is not possible to specify exactly what those eight levels would be without first reaching a broader agreement in each country as to the appropriate categories. This would involve further detailed discussion to determine the relevant required data on historic building fires at a pan-European level.

However despite this shortcoming, from the available data, the most common causes of fire in historic buildings could be summarised as follows:

1. Arson
2. Electrical fault
3. Match
4. Smoking Materials
5. Candle
6. Heating equipment
7. Natural causes (lightning)
8. Hot works

In presenting this list it should be considered as the result of an initial explorative analysis made possible by the STSM. From a statistical point of view the empirical data is insufficient to be able to verify the figures and conclusions.

What the STSM did make clear is that pursuing the development of electronic fire reporting systems in European countries is the way to raise the monitoring of historic building fires to an adequate level. As the visit to the UK ODPM demonstrated, a view is held that acquiring relevant empirical data on fires which have occurred is probably too burdensome a task to undertake.

Moreover, with today's computer network technologies, every modern country should be able to assemble a national database of fire incidents using standardised coding. This could either involve creating full data sets or a statistically valid sample. Insurance sources and other vital records can also be useful, but the public fire brigades in each country tend to be the primary suppliers of information and facts about the major fires experienced by each country.

Initial experiences with comprehensive electronic fire reporting systems (the Finnish PRONTO being a pioneer in this), and the extraction of statistical data from them, illustrates that any system is only as good as the information input into it. For preventative and managerial purposes, having a first class statistical tool is of little use if the input does not represent the reality. To help overcome this issue, training and development of any electronic systems should be effected through cooperation with fire brigades and cultural heritage professionals.

Date: 3rd November 2004

Kalle Reivila

Annex 1

PRONTO: Finnish Accident Reporting Software System

The Finnish accident reporting software system “PRONTO (Version 3.0)” can be summarised as:

- Web-based system for recording accidents and rescue resources
- Maintained by Ministry of Interior
- Newest generation launched in 2000
- It records all incidents, including fires and accidents.
- Events from 1996 onwards are included
- All material is readily available online
- Reports, statistics, user enquiries and sampling, time series & GIS information

(Buildings Register)

Reports

A large range of attributes are available to choose from in preparing User Defined Reports and constant, parametric, reports are also possible. These include the physical characteristics, and an appraisal of the fire incident. All emergency calls are reported on the Internet through the PRONTO system within 30 minutes of being accepted. Electronic feedback is immediately available on the incident, offering full details; the approach adopted, and the level of assistance given. This includes a considerable amount of data and information on the level of participation by all emergency services. The system also includes data on all false alarms.

Different information can be logged in different ways in the Building Report. All attributes can be interrogated through a multiple enquiries approach. Interrogation is available through the WWW to any enquirer possessing privileges to access the system. Reports can be exported to Html, Excel, Mapinfo and CSV text files. However, although it is a very sophisticated system, the quality of the available data is to a great extent dependent upon the competence and willingness of the individual inputting information to complete all the fields in appropriate detail in the first instance. Therefore, although it is a very sophisticated system, much depends upon the attitude and approach of the individual completing the electronic pro-forma.

The pro forma exists in three parts:

- Alarm report
- Accident report
- Building report

PRONTO and Historic Buildings

At present use of the system in this area is just explorative in use. Linking Historic Buildings Information to the PRONTO system would be useful as a monitoring and research tool.

PRONTO is under constant development - involving the Federation of Insurance Companies and the National Board of Antiquities. Although National inventories in Finland are slowly improving it would be highly useful for monitoring / research if an appropriate list existed.

Annex 2

The Scottish Historic Buildings National Fire Database – Background Information

Inaugurated in August 2002, the overall aims of the Scottish Historic Buildings National Fire Database project which is an on-going partnership between Historic Scotland and the eight Scottish Fire Brigades covering Category ‘A’ Listed Buildings, are as follow:

- To improve the effectiveness of fire-fighting operations at historic buildings by making available relevant information in a format suitable for use by fire crews attending an incident at these properties.
- To facilitate the improved reporting and gathering of statistics on fires in Scottish historic buildings.
- To inform future Historic Scotland Technical, Conservation, Research and Education Division (TCRE) research programmes.

The database has been developed as a ‘living document’ that provides an exchange of information between Historic Scotland, the National Monuments Record of Scotland (held at the Royal Commission on the Ancient and Historical Monuments of Scotland) and the eight Scottish Fire Brigades. The output from the database is an amalgamation of information gathered from the NMRS and other archives by a historic buildings researcher which is then verified and expanded by seconded Fire officers following site visits to each of the circa 3500 Category ‘A’ listed properties in Scotland. The type of information incorporated in the database includes architectural descriptions, photographs, plans, access routes and details of water supplies. In addition, priority areas within a property that are of highest historic significance are identified, as are ways in which a building’s structure may adversely affect fire-fighting operations.

An immediate benefit of the database is the improved awareness of the location, significance and importance of historic buildings within the Scottish Fire Brigades’ areas. The longer-term benefit of the project will be in helping to mitigate the devastating effects that fire can and does have on Scotland’s built heritage.

COST Action C17: 'BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS' WORKING GROUP 2 SHORT TERM SCIENTIFIC MISSION: 'REVIEW OF RESEARCH ON BURNT STONES IN BUILT HERITAGE'

Miguel Gómez-Heras

Host Institution: Budapest University of Technology and Economics.

This Short Term Scientific Mission was framed within the activities of the Working Group 2 (Available and Developing Technology) of the COST action C17 (Built Heritage: Fire Loss to Heritage Buildings) and it was carried out from January 29th to February 5th 2006.

Aims:

The aims of this Short Term Scientific Mission as stated in the work plan were:

1. Completion of a comprehensive evaluation of the state of art of research on burnt stones to issue a review paper that could take part of the final report of the action.
2. To make use of the host institution equipment to carry out a comparative research of the results of traditional and innovative techniques for testing the effect of fire in building stones.
3. Strengthening the liaison of two out of the few European research groups that have expertise on this subject.

Description of carried out work:

Related to the first aim, an overview of papers dealing with fire decay of stones was accomplished. As a result, a database of papers related to fire decay is presented. From this base, it is intended to present a review paper, which will take part of the final report of the action.

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Regarding the experimental work, three Spanish stones types were selected to be artificially heated in an oven. These stones types were:

- *Villamayor* sub-arkose
- *Uncastillo* calcareous lithoarenite.
- *Bateig* biomicritic calcarenite.

The applicant had hitherto carried out burning tests with laser-based techniques over the first two types of stones. *Bateig* biomicrite had not been previously tested in any way.

A minimum of 14 cylinders, with diameter 13 cm, were obtained from the samples to carry out the heating tests. Besides the initial characterization, which had been previously carried out by the applicant, some selected physical properties were carried out during the STSM to establish a comparison of specimens before and after burning. These properties were: Ultrasound velocity of P-waves (V_p), which was measured over the cylinders with a PUNDIT portable equipment, Rebound hardness, measured with a *Duroskop* “micro-Schmidt” hammer and indirect tensile strength method.

300, 500, 700, and 900 °C were the temperatures selected for simulated heating on the oven. During the STSM the burning experiments were developed and it is pending the analyses and discussion of the results on the basis of the comparison between the physical and mineralogical properties before and after heating. Figure 1 displays some of the equipment employed during the STSM and the result of burning at 300 and 500 °C of the selected samples.

In what refers to the discussion of future strategies to maintain and strength the liaison between working groups, the application for a EFS – Exploratory Workshop in a next call was discussed. This exploratory workshop would gather the research groups in Europe working on fire decay of stone, namely Budapest University of Economics and Technology (Hungary), Institute of Economic Geology (CSIC-UCM) (Spain), School of Geography in Queen’s University of Belfast (UK), IST Lisbon (Portugal), IMP University of Innsbruck (Austria), plus any other group which would be contacted with in the future.

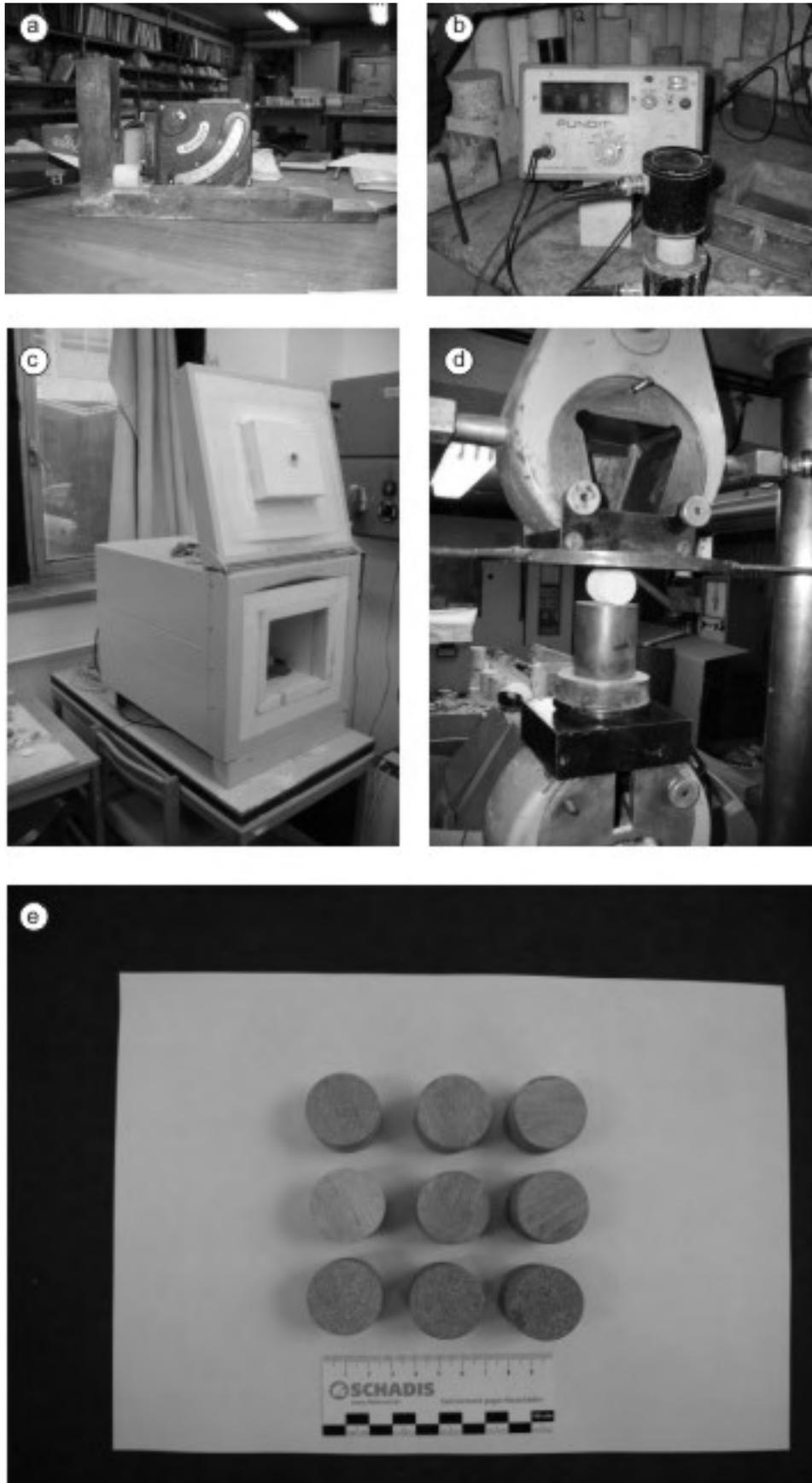


Figure 1: Durosokop hardness measurer (a), PUNDIT ultrasound velocity tester (b), oven where heating was carried out (c), press for indirect tensile strength characterization (d) and studied samples without heating and after heating at 300 °C and 500 °C

Results:

In short the results of this STSM have been:

- Gathering of information to establish an accurate state of the art on the subject of fire decay of stone.
- Carrying out of oven-based heating tests aiming to compare these results with the laser-based burning tests previously carried out by the applicant.
- Establishment of future strategies for collaboration with especial emphasis to the creation of a possible network between research groups working in this subject.

Future collaborations with the host institution:

Besides the forthcoming COST meetings until the completion of the action, this collaboration will follow within the frame of Hungarian-Spanish intergovernmental grants (HU: E-39/04; E: HH2004-0036) and of the Madrid Regional government's program MATERNAS.

Planned publications:

Two papers were already finished during this STSM, with mention in the acknowledgements of the support of the STSM:

Gómez-Heras, M., Alvarez de Buergo, M., Hajpál, M., Török, A., Fort, R., Varas, M.J. Evolution of the porosity in burnt Hungarian building stones. To be included in: Fort, R., Álvarez de Buergo, M., Gómez-Heras, M., Vázquez-Calvo, C. (Editors), Proceedings of the International Conference Heritage Weathering and Conservation – Madrid 2006. Balkema, Rotterdam.

Alvarez de Buergo, M., Gómez-Heras, M., Török, A., Hajpál, M., Fort, R., Varas, M.J. The effect of fire on an earthen building. To be included in: Fort, R., Álvarez de Buergo, M., Gómez-Heras, M., Vázquez-Calvo, C. (Editors), Proceedings of the International Conference Heritage Weathering and Conservation – Madrid 2006. Balkema, Rotterdam.

Other planned publications as outcomes of this visit are:

Hajpál, M. Török, A., Gómez-Heras, M. State of the art on fire decay of stone. To be presented in a forthcoming meeting of COST C17 Ljubljana

Gómez-Heras, M., Hajpál, M. Török, A., Fort, R. Comparative study of oven-based techniques and laser burning for the study of stones damaged by fires.

Signed:

Miguel Gómez-Heras
 Research Fellow
 Instituto de Geología Económica
 (CSIC-UCM)
 28040 Madrid, Spain.
 e-mail:mgh@geo.ucm.es

COST Action C17: 'BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS' WORKING GROUP 4
SHORT TERM SCIENTIFIC MISSION: 'SECURITY MANAGEMENT AND SECURITY SYSTEMS IN OPERATION AT MAIHAUGEN OPEN AIR MUSEUM IN LILLEHAMMER, NORWAY'

Jan Holmberg

Introduction

The COST 17 project gives opportunities to bilateral cooperation in the field of protection of our European Cultural Heritage. Fire Loss to Historic Buildings is the title of the COST 17 cooperation between 20 countries in Europe.

This Short Term Scientific Mission, STSM, was initiated by Mr Sjur Helseth at the Norwegian Directorate for Cultural Heritage and supported by the COST 17 Chairman Mr Ingval Maxwell OBE and the WG 4 Chairman Dr Wolfgang Kippes. The report is considered to be part of the WG 4 final documentation.

The host for the STSM has been Mr Torger Korpberget, Operations Manager at Maihaugen, and I am indebted to him and his staff as well as to the Head of the Maihaugen museum, Director Aagot Gammersvik for the excellent support and cooperation I have met during the mission.

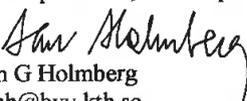
I am also indebted to the Science Officer Mr Jan Spousta and to the Administrative Officer Ms Isabel Silva Ballesteros at the COST office in Brussels for their kind support.

For me it has been an adventure to work at an Open Air Museum where some of the old buildings now standing and protected at Maihaugen were built and used by generations of Norwegians before Sr Don Christobal Columbus set off for India 1492!

My general impression was that the security work at Maihaugen is implemented with a very strong understanding that systematic and well planned work, followed up with documentation of results are the key to success. Discipline is in force at Maihaugen.

This mission was carried out 2006, February 26 to March 4 in Lillehammer, the final report was written March 5 to 7.

The aim of this STSM is to report to COST C 17 about the security management and the security systems in operation at Maihaugen. A skilled security officer will never tell us about all his problems, Mr Korpberget was sometimes silent during my mission.


Jan G Holmberg
janh@byv.kth.se
Royal Institute of Technology
Department of Building Sciences
10044 Stockholm, Sweden

Stockholm 2006-03-07

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A. The museum

The old part of the museum, the Open Air Museum, is the creation of Dr Anders Sandvig (1862-1950). He arrived at Lillehammer 1885 and started his dentist practice. In those days the dentist sometimes travelled to his clients. On his trips through Gudbrandsdalen valley he found a society undergoing quick changes. Old lifestyles and modes of behaviour were threatened by new ideas and trends. The traditional farm culture was losing its grip. The years around the turn of the century 18-1900 was a time of strong nationalistic currents in the kingdom of Norway and Sweden. In year 1905 the two countries separated peacefully.

It was important to emphasize Norwegian independence. Farm culture was high-lighted and to save it for the future was seen as an important task. It was in this context that Dr Anders Sandvig started to collect old farm buildings.

Gradually Dr Sandvig came to the understanding that items and buildings out of context would not tell complete stories. He settled then for entire farm complexes with the buildings for the farming family and all the outhouses they used as well as their farming tools.

The same nationalistic currents could be observed in Sweden, Denmark and Finland. Today we will find several open air museums in Scandinavia.

The museum has continued growing after Dr Sandvig had passed away. The first phase of the main museum building was built in 1959 and contains exhibition areas for the collection of craftsmen's workshop as well as for temporary exhibitions and offices. The largest extension took place in 1993 (In 1994 Lillehammer hosted the Olympic Winter Games). The Maihaugen concert hall, seating 750, and three new exhibition halls were added.

Maihaugen of today is a large organisation with several functions. The last addition is the Norwegian Postal Service Historic Collections, presented through exhibitions both in the main building and in a town building. The Maihaugen collection comprehends more than 50 000 registered objects and the open air museum with 190 buildings is among the largest in Europe. The main museum building is about 14 000 m². The museum had 170 000 visitors and a budget of 65 million NOK last year.

See enclosure 1 for map over the museum and enclosure 2 for information of living conditions in Gudbrandsdalen valley during the 19th century.

B. Management of security

B.1 Organisation

The museum is organized with three departments:

- # DOCUMENTATION dealing with research, collection, conservation, library, archive, photo and storage of objects.
- # EXHIBITION dealing with exhibitions, marketing, public relation, school service, sponsoring, museum shop, ticket office, restaurant and a concert hall.
- # OPERATIONS dealing with security and alarm systems, buildings and building services systems, workshops, cleaning staff, technical personal and craftsmen, guards and fault reporting.

See enclosure 3 for Organisation Chart.

The operations department will be presented in this short report. The management strategies will be described but the technical security systems will only be dealt with down to a level where unauthorized people will not be able to understand the complete lay out.

The management of the security at Maihaugen is based on the conviction that present and well trained staff is to be preferred before technical systems, yet the museum has very advanced technical systems in operation. They will be described under the heading:
C Technical systems for security.

The Operations department is headed by an Operations Manager. It is interesting to observe that he is located next door to the head of the museum, the Managing Director.

Across the corridor in the office we will find the security central with the new Siemens MM 8000 installed (2005). Training of staff is ongoing. In the same central is the BMS system type METASYS from Johnson Controls (1992) installed with printer for fault statistics as well as the CCTV-system SISTORE MX Pro from Siemens (2005) and the access control system SOLICARD 6300 from ASSA-ABLOY (2000).

The principle for safety work at Maihaugen is according to the Operations Manager:

- # simplicity
- # simplicity
- # simplicity

“Routines can’t simply be simple enough!”

B.2 Training of staff

The Operations Manager has three security staff in the museum, fully trained to understand and to operate technical systems. They are on duty in shift year around from 7 a.m. to 10 p.m. daily. The night watchman (a crew of three) with dog is on duty from 10 p.m. to 7 a.m. When the concert hall is used for an evening performance, one security staff is present the whole evening.

The pay roll for the Operations department has 33 names, 17 of them involved in the daily operation of the museum, 11 of them involved in care-taking of collections, 2 of them responsible for the technique in the concert hall, 2 of them architects working with "buildings history" and 1 craftsman in the cabinet-maker's workshop.

All staff in the museum are trained in fire fighting and in first aid on a yearly basis. Last year for example they were trained at three stations:

- # 1 "Garmo stave church. Visitor reports smell of smoke. Find the source of smoke. Take action. Use fire extinguisher. Take care of confused visitor."
- # 2 "Fire alarm in Oygarden farmhouse. Fire in waste paper box. Take action, put out with blanket. Take care of lifeless visitor found in the nearby pond."
- # 3 "Fire alarm in the Post museum, smoke on two floors, evacuate visitors. Take care of a visitor found on the floor during evacuation. Find source of smoke. Put out."

It is compulsory to attend this daylong exercise and in the Operations Manager's office you will find the attendance checklist, se enclosure 5.

B.3 Fire compartment philosophy

The main museum building has up-to-date fire compartments according to Norwegian Building Codes with approved fire doors class EI 60. Store-rooms for museum objects have class EI 120 walls, roof and floor.

All old wooden-buildings are a problem. It is today not possible to separate them why some of them have water sprinkler systems, façade deluge systems or dry pipe systems. In some cases the roofs are protected outside by dry pipe systems.

Building services systems like ventilation ducts or cable trays penetrating a fire cell are professionally sealed according to the Building codes in Scandinavian countries

B.4 Fire alarm systems

All fire alarm systems in operation have automatic connection to the fire brigade. The brigade does not expect confirmation from Maihaugen at alarm, they will drive with an engine and four fighters with smoke diving equipment. The engine carries its own water. Driving time is about 3 minutes. The fire alarm is at the same time sent via mobiles to museum staff on duty. In case of false alarm (several cases every year) the brigade will not invoice Maihaugen, they take the action as training. See enclosure 6 for a general layout of the fire alarm system.

The most important old buildings at Maihaugen are protected as follows.

Garmo stave: Siemens central Algo Rex with reset panel
 church Location not known
 Number of detectors 33
 Number of alarm bells 3
 Number of manual alarm points 3

The church is protected by outdoor and indoor detection systems as well as by sprinkler systems

Bjornstadunet: Siemens central Algo Rex H67 with reset panel
 Location not known
 Number of interactive optical detectors 240
 Number of alarm bells 5
 Number of manual alarm points 3

All 20 buildings are protected by outdoor and indoor detection systems as well as by sprinkler systems. The weather in the valley is some times very humid which gives false alarms. All older detectors are today replaced. The system operates today in a mode where the sprinkler-system will be activated manually in the winter and by two detectors per building in the summer. The insurance-company has approved today's situation.

Skjaktunet: Siemens central Algo Rex CI 1140
 Location not known
 Number of interactive detectors 58
 Number of alarm bells 2
 Number of manual alarm points 2

All buildings at Skjaktunet are protected by outdoor and indoor detection systems.

Jorstad and the: Siemens central Algo Rex CI 1140
 Maihaugen Location not known
 restaurant Number of ione detectors 36
 Number of interactive detectors 80
 Number of alarm bells 5
 Number of manual alarm points 5

The buildings are protected by outdoor and indoor detection systems. The north building is frequently used by the royal family. The restaurant has today an open fireplace why the alarm system has a timer for turning off the system temporarily.

Fiskerkapellet: Siemens central CBA 1000
 Location not known
 Number of ion detectors 7
 Number of optical detectors 1
 Number of alarm bells 1
 Number of manual alarm points 1

The charming little church is protected by outdoor and indoor detection systems as well as by sprinkler systems. The adjacent pump house is protected as well.

Oygarden: Siemens central Algo Rex H67G with reset panel
 Location not known
 Number of interactive detectors 139
 Number of alarm bells 3
 Number of manual alarm points 4

All 25 buildings at Oygarden and adjacent Knutslykkja with Meviken and Per Gynt are protected outdoors and indoors.

Bysamlingen: Siemens central Algo Rex H 8002 with reset panel.
 Location not known
 Number of ion detectors 117
 Number of alarm bells 7
 Number of manual alarm points 7

All 16 buildings at Bysamlingen and the two carriages are protected by indoor detection systems. Two buildings have outdoor detection as well. One of the buildings, Kirkestuen, has an open fire place and consequently a timer for turning off the system temporarily.

1900-talssamlingen: Siemens central Algo Rex H67
 and the warehouse Location not known
 Number of interactive detectors 52
 Number of thermo detectors 2
 Number of alarm bells 2
 Number of manual alarm points 2

The warehouse is protected indoor and outdoor. The other 9 buildings are protected indoors.

B.5 Sprinkler systems

The following buildings are protected by water sprinkler systems:

Garmo stave church has a dry-pipe system indoor with thermo-heads and a deluge system outdoor. Due to earlier false alarms the outdoor sprinkler system is today not connected to the central, it has to be activated manually.

Bjornstadtunet has dry-pipe systems outdoor (including roofs) with open heads and magnetic valves and manual valves for water.

Fiskerkapellet has dry-pipe system outdoor and indoor with thermo-heads.

In the main museum building the stage is protected by a traditional wet-pipe system.

All sprinkler systems are fed from the city water system.

B.6 Fire water systems

There are 6 fire hydrants at the open air museum. The main museum building has fire-hoses distributed around the building according to national regulations. All hoses are tested once a year with water on and protocol delivered to the Operating Manager.

As can be seen on the map over the open air museum there are several water-ponds available to the fire brigade.

B.7 Hand held extinguishers

The main building has 108 extinguishers placed at strategic points and the open air museum has 198 extinguishers. All the equipment is inspected yearly. As can be seen on enclosure 7, every extinguisher is identified by number, brand, type and weight, by room number and by a description where it is placed in the room

B.8 Access control systems

All 59 doors in the main museum building are controlled by an ASSA-ABLOY access system type SOLICARD 6300 with RiTA software. See enclosure 9. Cards are issued by the Operations Manager. The system gives for example information about which door was opened by whom and at what time.

B.9 Escape routes

The main museum building has escape routes with illuminated signs according to national building codes. The open air museum old buildings are not equipped with escape signs; The Operations Manager has to trust that the guides will evacuate visitors in danger.

B.10 Burglary alarm systems

The main museum building has an up-to-date burglary alarm system with a central unit type Siemens CZ 4. The zones are operated with keys. Alarm from the main building is transmitted to museum staff and night-time to the night guard via mobile phones.

Alarm from Jorstad (the building for the royal family) is transmitted direct to the police. Robbery alarms are as well transmitted direct to the police.

The Operations Manager is not fully pleased with today's situation. The multipurpose main building with daily visitors to exhibitions and to the restaurant and to concerts night-time requests a more flexible system.

Another 11 buildings at the open air museum have burglary alarm systems installed, all of them connected to the main central in the main building.

Exhibitions in the main building are poorly protected; the museum has to rely on guards circulating on the premises. Some showcases have wireless detectors connected to the main central.

B.11 CCTV systems

Maihugen has commissioned a Siemens SISTORE MX Pro system to protect the Garmo stave church built around year 1200. Four cameras are in constant operation and the files are kept for seven days.

For COST members I have to explain that this type of church, built in wood during the middle-age, are built in the stave construction, which consists of a timber framework of corner posts filled with planks. The corner posts are called staves. There were no windows in a stave church, except for round peepholes high up on the wall. Many of the churches are become dilapidated and a serious accident took place in 1993 when Satanists started to burn down stave churches in Norway. Very few, less than 30, of the originally more than 900 churches are still standing.

During my week-long stay at Maihugen we could only observe deer and foxes passing close to the church on the screen.

In the main building there are cameras outside the finance office and at the entrance. The Operations Manager wants to see several more cameras installed.

B.12 Building Management Systems

The building services systems are of age and reflect the security thinking of the time. As example, the ventilation systems are not linked to the new fire alarm system yet. That means that the ventilation systems will run even when fire alarm is on. The fire brigade has no means to control the ventilation plants; they need assistance by security staff and the BMS system to stop fans.

B.13 Electrical systems

Electrical systems in the main museum building are of age. As example a large part of all fluorescent lamps have old glimmers without safety function. There is no redundancy power system installed.

B.14 Lightning systems

The main museum building and the stave church have lightning protection systems. Both systems are resistance measured regularly with protocol in the Operations Manager's office.

B.15 IT-systems

Not included in the Operations Managers responsibilities.

B.16 Communication systems

Daily communication is based on mobile phones. The museum has its own radio system with base-station and 14 units distributed among most important staff.

B.17 UPS system

Today there is no uninterrupted power supply system installed but the Operations Manager has that issue high up on his budget list.

B.18 Fences and illumination

The museum area is fenced in. Gates are locked from 10 p.m. to 7 a.m. A fire line is kept around the fence. The open air museum is illuminated night-time.

C. In House control

C.1 Technical systems

Most technical systems in and around the museum are checked and controlled on a regular basis with documents of the result collected in the Operations Director office. Today (February 2006) you will find the following documentation regarding fire safety systems:

- # Fire alarm, list of necessary improvements of detecting system. This list is mainly covering change of heat detector to smoke detector but recommends even new detectors
- # Signed test protocol from Siemens Division Building Technologies that system 19037, 19521, 32004, 1465 and 2321 are functioning OK.
- # Sprinkler test protocol from Sprinklerspesialisten AS that the Garmo stave church has a deluge system in function with nozzles indoors and outdoors and smoke-detector.
- # Sprinkler test protocol from the same firm that all 20 buildings at Bjornstadtunet have outdoor deluge systems with smoke-detectors in function for protection of facades and roofs.
- # Sprinkler test protocol from the same firm that Fiskarkapellet (small church built 1459) has a dry-pipe system indoors and outdoors with smoke-detectors in function.
- # Detector test protocol from Siemens that systems 19038, 2322, 19521, 1465, 30002, 2321, 32004 and 19037 are in function. The inspector complains about humid environment for several detectors. The test protocols for all these systems can be traced back to 1995 in the same file.

C.2 Instructions to staff

The Operations Manager has given a number of important instructions to staff in writing. These instructions are signed by the Operations Manager and the Head of the museum, the Managing Director, to make clear the importance of the message.

Instructions are based on the desire that all staff shall be observant, alert and trained to take correct actions.

Among instructions in force are for example:

- # What to do when fire alarm sounds in the museum
 - close doors and windows
 - evacuate visitors
 - inform visitors over speakers in four languages
 - go to your assembly point
 - do not try to save personal belongings
- # What to do when fire alarm sounds in the concert hall

Instructions for night watch guards

Instructions for receptionists to send over speakers:

-Vi har en mulig brannsituasjon. Forlat bygningen gjennom utganger og nodutganger. Folg for ovrig personalets anvisningar.

-We have a possible fire emergency situation. Please leave the building through the doors or emergency exits. Follow instructions given by the museum personnel.

-Achtung, Achtung! Eine Brandsituation konnte vorliegen. Bitte verlassen Sie das Gebaude durch Ausgange und Notausgange. Befolgen Sie ubringens die Anweisungen des Personals.

-Attention s'il vous plait! Nous avons unc alerte incendie. Veuillez quitter les lieux en empruntant les portes de sortie et les sorties d'urgence. Suivez les consignes donnees par le personnel.

Instructions for the museums local fire fighting detachment

- go to the assembly point
- turn off alarm bells outside the main building (press A)
- switch over to channel 2 on your radio
- open the main gate for the brigade
- make sure that all visitors are evacuated
- start local fire fighting if possible

Instructions in case of robbery-attempt

Instructions in case of terrorist attack

This is really interesting, the staff has a check-list to follow in the case a terrorist calls on the phone (which they sometimes do), see enclosure 8. *Ikke bryt forbindelsen* means hold the line and then call the police on 112 from another phone. The staff is encouraged to identify the threat and the person behind.

Instructions about the key-and locking systems

Routines for handling out keys to craftsmen, guides etc.

Instructions for locking (morning/evening) all the old buildings at the open air museum.

Cleaning instructions regarding exhibitions

Routines for security-training of new personal

Checklists for all sprinkler-systems

Instructions for visitors staying at the guesthouse

Routines for using the Internet on computers connected to the museum network

Routines for photo and film work at the museum

Daily checklist for guards

Information of First Aid stations in the museum

Information to wedding-parties using the Garmo stave church

C.3 Special events

The royal family uses some buildings at Maihaugen several times every year which necessarily imposes special instructions from the court and the police.

D. Relation with authorities

D.1 Relation with the fire brigade

The relation with the fire brigade is very good and based on mutual respect. The Operations Manager puts a lot of effort in following all rules and regulation regarding security matters. Local use of gas as Propane or LPG has to be reported. Storage and handling of Cellulose Nitrate motion picture film has to be reported and NFPA 40 should be followed. All chemicals which are used and stored in the conservation department are reported yearly. It is considerable risky fluids, the report for 2006 includes:

- Acetone about 5 kg
- Lynol about 5 kg
- Ethanol about 15 kg
- White Spirit about 1000 kg (outside the photo studio)
- Petrol about 1 kg
- Turpentine about 5 kg
- Isopropanol about 10 kg
- Methanol about 3 kg
- Xylen about 5 kg
- Toluene about 5 kg
- Petroleum spirit about 3 kg
- Paraffin about 2 kg

All these dangerous fluids will be stored in a separate fire safe room with continuous ventilation.

During winter the narrow roads around the open air museum and all the snow are an obstacle, why the fire brigade are training all four crew at the First Engine by driving on the icy roads in the open air museum.

My impression was that a blocked escape route at Maihaugen is just impossible

D.2 Relation with the police

The relation with the police is very close. The museum is considered to be a Norwegian “national temple” and the presence by the royal family at Maihaugen from time to time gives a solid base for the police forces interest to be present.

D.3 Relation with the insurance company

The museum is insured by a private company. Safety issues are discussed at yearly meetings.

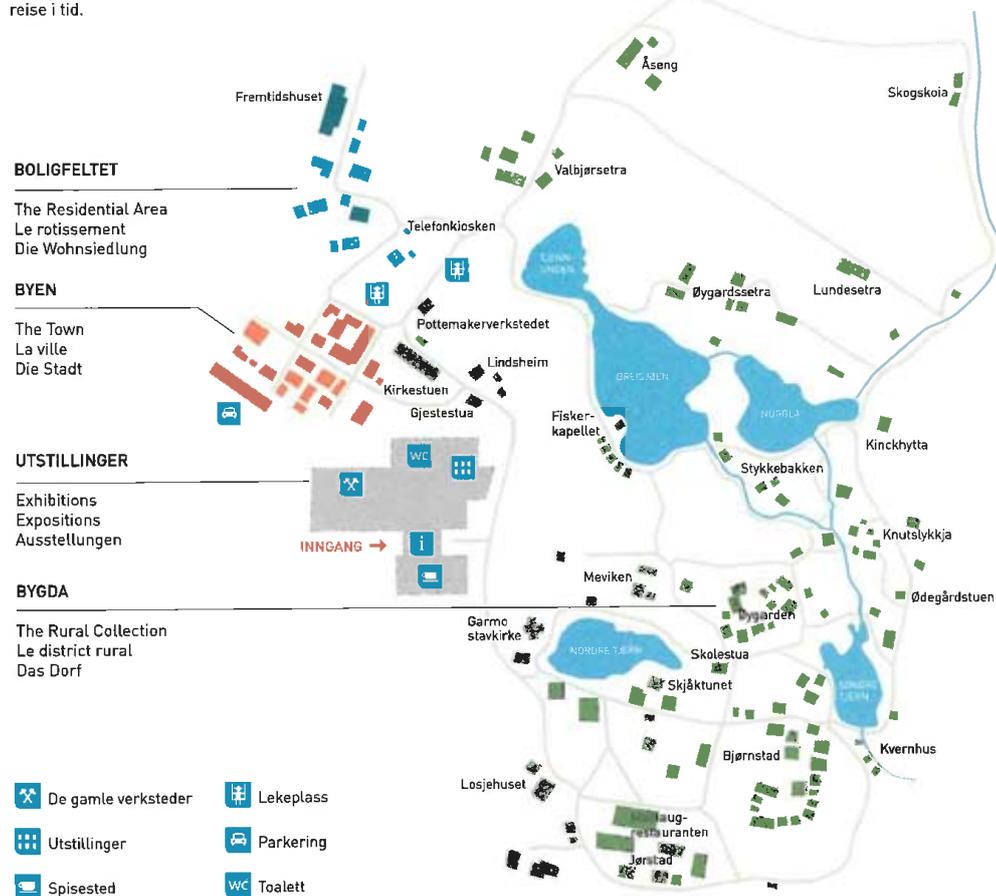
D.4 Relation with the city of Lillehammer

The museum is the largest tourist attraction in the city.

FRILUFTSMUSEET

forteller om liv og arbeid i Norge gjennom 500 år. Landskap, hus, innredninger og mennesker danner rammen som gjør et besøk på Maihaugen til en reise i tid.

Enclosure 1 Map over the museum



→ BYGDA viser Gudbrandsdalen som et samlet hele. Her finner du storgård og husmannsplass, stavkirke og prestegård, bureisingsbruk, seterrend og fiskerbuer.

THE RURAL COLLECTION shows the Gudbrandsdalen valley as a whole. Here you will find a grand farm house and a cotter's home, stave church and vicarage, a settler's farm and a summer farm, as well as small fishing shacks.

LE DISTRICT RURAL couvre la vallée de Gudbrand en tant que tout cohérent. Vous y trouverez des grandes fermes et des cabanes de paysan, une église en bois debout et des presbytères, des hameaux de montagne et des baraques de pêcheurs.

DAS DORF zeigt das Tal Gudbrandsdalen als Ganzes. Hier finden Sie Gutshof und Häuserkate, Stabkirche und Pfarrhof, Almweller und Fischerschuppen.

→ BYEN representerer en innlandsby fra tidlig 1900. Langs Storgata står bygårder fra Lillehammer, apotek, frisør, bakeri, butikker, postkontor, leiligheter og intime bakgårdsrom.

THE TOWN represents an inland town. Along high street, Storgata, there are town houses from Lillehammer; the pharmacy, the hairdresser, the bakery, shops, the post office, flats, and backyards.

LA VILLE représente une ville à l'intérieur des terres au début 1900. Le long de la grand-rue se dressent des maisons de Lillehammer, la pharmacie, la boutique du coiffeur, la boulangerie, des magasins, le bureau de poste, des appartements et d'étroites chambres d'arrière-cour.

DIE STADT repräsentiert eine Binnenlandsstadt anfangs 1900. Entlang der Hauptstraße (Storgata) stehen Stadthäuser aus Lillehammer, Apotheke, Friseur, Bäckerei, Geschäfte, Postamt, Wohnungen und enge Hinterhofräume.

→ BOLIGFELTET består av eneboliger fra 1900-tallet. Her danner hus og gjenstander fra vår nære fortid komplett innredede hjem.

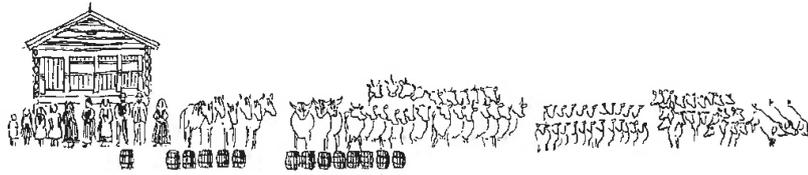
THE RESIDENTIAL AREA consists of detached houses from the 20th century. Here are houses and objects from our recent past, displayed in completely furnished homes.

LE LOTISSEMENT est constitué par des maisons individuelles datant du XIXème siècle. Vous y trouverez des maisons et des objets provenant de notre proche passé, avec des logements entièrement aménagés.

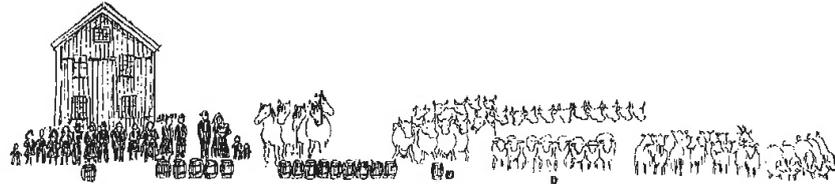
DIE WOHNIEDLUNG besteht aus Einfamilienhäuser des 20. Jahrhunderts. Hier finden Sie Häuser sowie Gegenstände in komplett eingerichteten Heimom aus unserer jüngsten Vergangenheit.

Enclosure 2 Extract from the museum catalogue

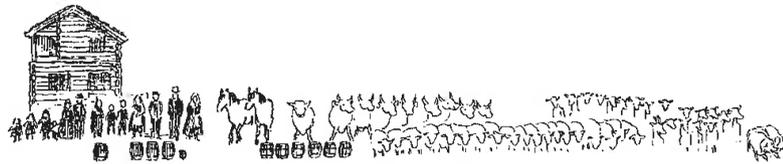
Bjørnstad



Jørstad



Øygarden



Knutslykkja



Stykkebakken



Population, farm animals and seed in 1875.

EMIGRATION

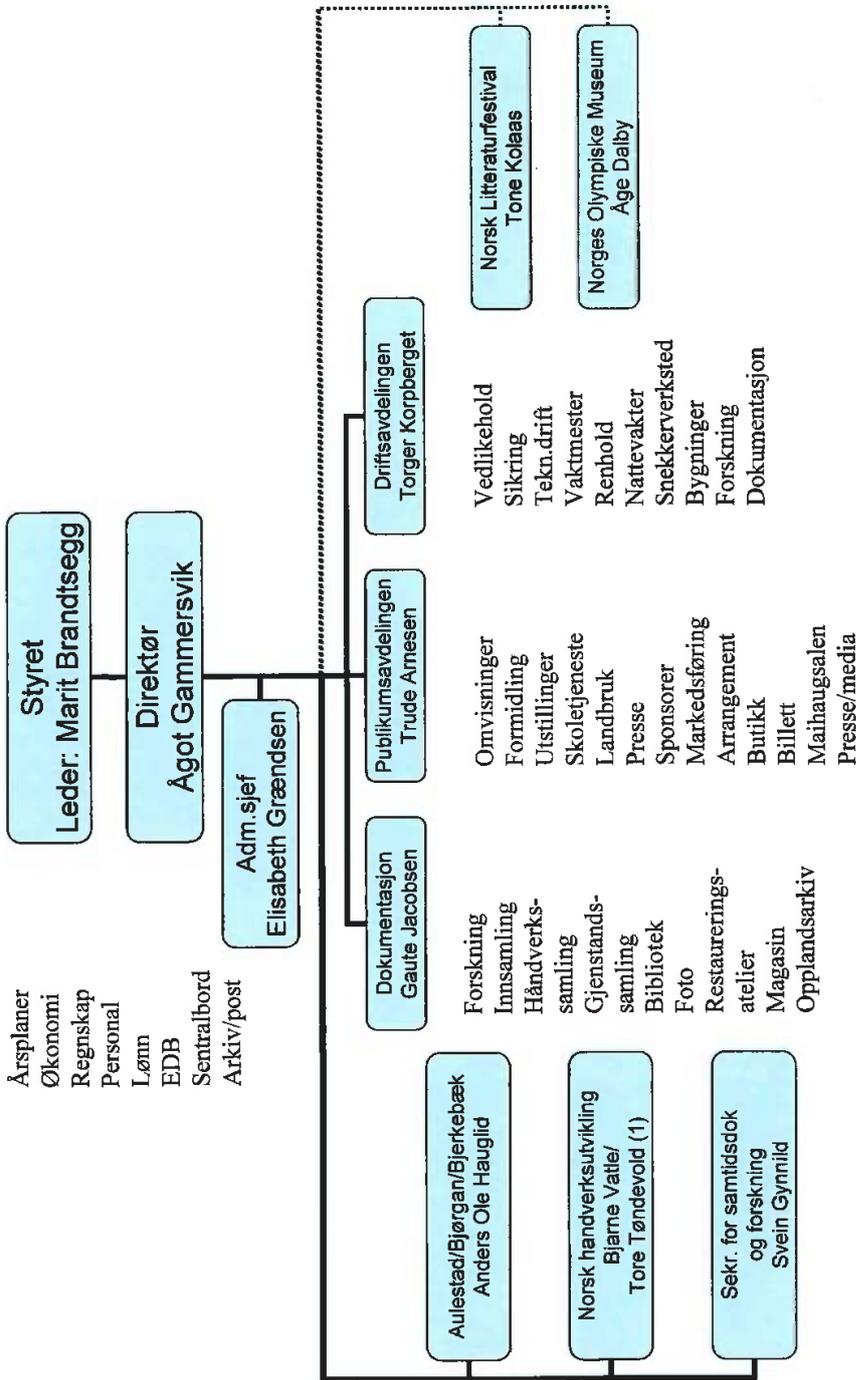
In 1825 the population of Gudbrandsdalen was nearly 27000, whereas 30 years later it had risen to 49000. From 1836 to 1840 the area suffered from bad crops four years running. As a result, food was scarce and there were no seeds to plant for new crops. Some people moved to larger towns and cities, and many emigrated to America.

The first person to emigrate from Gudbrandsdalen was Jehans Nordbu in 1832. He was 64 years old, married with four children. The family settled down in Texas. America was a long way off. The chances of seeing one's family and friends again were slim. The long journey had to be carefully planned. It cost a lot of money, and many people sold everything they owned to pay for the ticket. The voyage lasted for weeks, and they had to bring their own food for the crossing. Most people from this part of Norway sailed from the capital Christiania. Many arrived there on foot or horse, but from 1854 it was possible to go by train from Eidsvoll.

The voyage could take from seven to twelve weeks if all went well. After landing in America, it was still a long way for many to go before they settled down, very often in areas which were flat and suitable for farming. The fact that many people emigrated improved the conditions for those who were left behind, since they could more easily get jobs and become tenants.

Enclosure 3 Organisation chart

**Maihaugen, De Sandvigske Samlinger
Organisasjonskart pr. 2004**



•Norsk Litteraturfestival - Sigrud Undset dagene og Norges Olympiske Museum er ikke underlagt Maihaugens styre
 (1) Inkluderer Håndverksregisteret og Sekretariatet for små og verneverdige fag

Enclosure 4, photo 1, detectors can be seen under the roof construction



Enclosure 4, photo 2 and 3, detectors in the stable at Jorstad farm



**Enclosure 4, photo 4, detector, alarm bell and alarm point outside the restaurant
(the brown building is used by the royal family)**



Enclosure 4, photo 5 and 6, no smoking signs all over Maihaugen



Enclosure 4, photo 7, entrance to the church with detector, sprinkler head and fire extinguisher



Enclosure 4, photo 8 and 9, different ways to hide detectors



Enclosure 4, photo 10, all fire fighting equipment well visible regardless the architects opinion

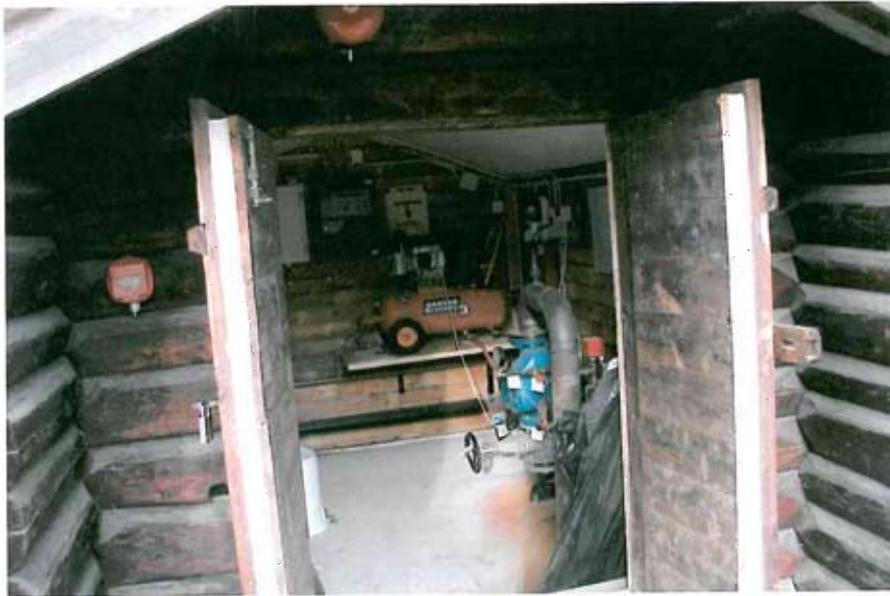


Enclosure 4, photo 11, 12 and 13, the Fishermen's chapel





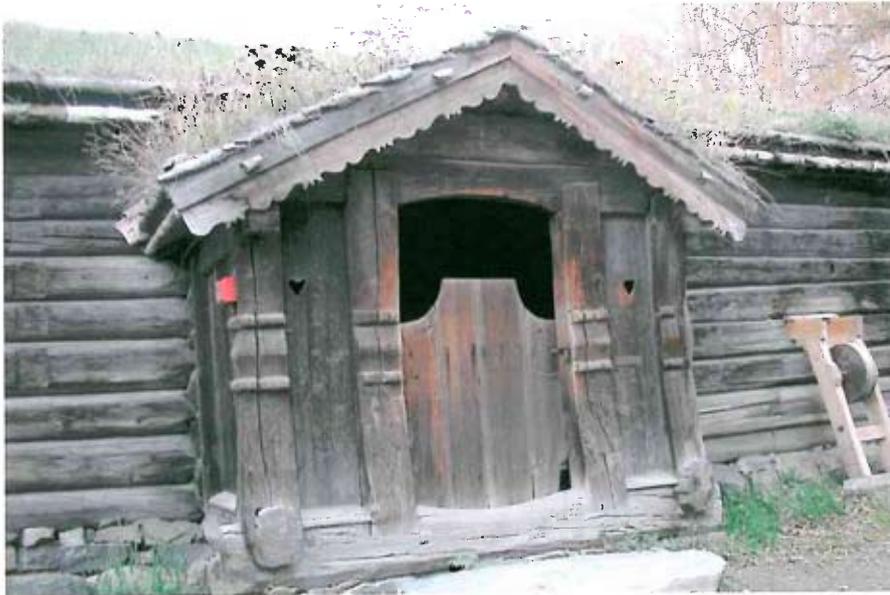
Enclosure 4, photo 14, sprinkler central for the Fishermen's chapel



Enclosure 4, photo 15 and 16, detector and dry sprinkler pipe, alarm point



Enclosure 4, photo 17, 18, 19 and 20, fire safety systems hardly visible





Enclosure 5 Check-list from fire training day

De Sandvigske Samlinge
Maihaugen 20.06.05

Gjennomført brannøvelse – ansatte pr. 11. juni 2004

x = Gjennomført brannøvelse. BV = brannvernet A/B = Aulestad/Bjerkebæk

		2002	2003	Brann/førstehjelp 2004	Brann/førstehjelp 2005
Andersen	Frank	BV	BV X	BV	BVX
Arnesen	Trude	X		X	X
Bakkom	Liv			X	
Bogren	Bente	x	X	X	X
Bogfjelldal	Erik			X	X
Bollviken	Per	x	X		X
Braut	Else	x	X		
Buen	Dagmar	x	X		
Damgård	Camilla				X
Egge	Anne	Perm.	X	X	X
Fauskerud	Richard				
Flaten	Guri	BV	BV	BV	
Flaten	Olav		X	X	X
Foldal	Marte E.				X
Forberg	Bente				
Gammersvik	Ågot	BV	BV X	BVX	
Gjeldbakken	Arne		X	X	
Granseth	Per Morten	BV x	BVX	BVX	
Granum	Siri			X	X
Grindaker	Hans	BV	BV X	BV	
Grændsen	Elisabeth	BV	BV X	BVX	BVX
Gundersen	Per Martin	BV	BV X	BV	X
Gynnild	Svein		X	X	BVX
Halden	Kari Eva	BV	BVX	BVX	
Hauglid	Anders Ole		X		
Herstad	Einar	BV	BVX	BVX	BVX
Holmbakken	Berit	Syk			
Holter	Trine	x	X	X	
Horn	Anna		X	X	
Horneman	Ebbe	Perm.	BVX	BVX	BVX
Hosar	Marit	BV	BV X	BV	
Hosar	Kåre	BV	BVX	BVX	
Hovde	Morten			X	
Huse	Ole Marcus				X
Iversen	Trine Grønn			X	X
Jacobsen	Gaute		BV? X	BVX	BVX
Jeistad	Anne-Lise	Syk	X	X	
Jensen	Stein Erik	BV x	BV	BVX	Sykmeldt
Johnsen	Trond		X	X	
Jaastad	Birgit		X	X	X

De Sandvigske Samlinge
Maihaugen 20.06.05

		2002	2003	Brann/førstehjelp 2004	Brann/førstehjelp 2005
Kampen	Bjørn Erik	BVx	BV	BV	BVX
Khuong	Tuoi Dinh			BVX	X
Kloppen	Birger	Syk	Syk	Syk	
Kopperud	Arnold				
Korpberget	Torger	BV	BV	BVX	
Krekling	Kirsti	x	X		X
Kristensen	Morten			X	
Larsen	Frank Atle S				BVX
Madsen	Niels J.	x		X	
Mathisen	Kjell Marius			X	X
Moen	Ingrid	x	X	X	
Moen	Kjersti		X		X
Myhre	Terje				X
Mølmen	Bjørn	A/B	A/B	X	
Negaard	Harry	BV	BV	BV	BVX
Nordby	Lewi				
Nørsterud	Stein Gunnar	x	X	X	
Obel	Peter		X	BVX	BVX
Odden	Helge		X	X	X
Olstad	Kristoffer				X
Prøven	Rune				X
Riise	Per M.			BV	
Riisøen	Nils Gunnar	BV	BV	BVX	
Rime	Ole-Roald			X	
Sand	Hillbjørg	x	X	?	X
Sandvold	Morten				X
Sektan	Jan Erik	BV	BVX	BVX	BVX
Smedsrud	Inger	x	X	X	
Sognli	Helge		X		X
Strand	Kari		X	X	
Strand	Åse Kari	x	X		
Strand	Truls		X	X	
Strand	Tove W.	BV	BVX	BV	
Svegarden	Reidar	BV	BVX	BV	BVX
Syversen	Brede			X	Sykmeldt
Søreng	Ann Kristin		X	X	
Taskerud	Olav	BVx	BVX	BVX	BVX
Thorstad	Kåre D.	x	Syk		
Torgersen	Roar	BV	BV	Sluttet	
Trondsen	Kirsi L.		X	Tilk.	
Tøndevold	Tore		X	X	
Ulven	Jørn				X
Vatle	Bjarne		X	X	Sykmeldt
Velure	Guri		X	X	
Volden	Rune			X	X

Enclosure 7 Inventory list over hand held extinguishers

Ark2

HOVEDBYGGNING

ROMN STED	TYPE	VEKT	PLASSERING:	KONTRL:	Arstall
DGV1 DGV(Teppesalen)	NOHA ABE H	6	Henger til h. når du kommer opp rampen	16.02.99	97
108 Billett	NOHA ABE H	6	Henger til høyre bak billetten	16.02.99	92
DGV4 Bruksklær	NOHA 2KA	5,74	Hengertil venstre rett innenfor døren	16.02.99	96
DGV5 DGV (dreier)	NOHA ABE H	6	Henger på sydvegg i pasage	16.02.99	96
DGV1 DGV (rom 1)	Bav. PG6T H	6	Hengertil høyre rett innenfor døren	16.02.99	90
DGV2 DGV Boktrykker	NOHA ABE H	6	Hengertil venstre rett innenfor åpningen	16.02.99	96
DGV3 DGV gang tannl.kon.	NOHA ABE H	6	Henger til venstre ved døren til folkekunsts.	16.02.99	97
DGV1 DGV Gravør	NOHA ABE H	6	Hengertil venstre rett innenfor åpningen	16.02.99	96
DGV3 DGV Haufsalen	NOHA ABE H	6	Hengertil venstre rett innenfor døren	16.02.99	96
DGV2 DGV Knivrummet	NOHA ABE H	6	Henger til venstre inne i rummet	16.02.99	96
DGV1 DGV Tonje	NOHA ABE H	6	Henger på grovbenken	16.02.99	96
DGV3 DGV Trapp	NOHA ABE H	6	Henger i hjørnet nederst i trappa	16.02.99	97
DGV1 DGV(Maler)	NOHA ABE H	6	Henger på norvegg i pasage	16.02.99	96
DGV4 Folkekunsts sal	NOHA BEco2	16,12	Henger til venstre ved døren til tekstilmag.	16.02.99	96
U22 Fyr rom	NOHA CO2	16,08	Hengertil høyre rett innenfor døren	18.02.99	m 96
U22 Fyr rom	SUNDE ABE	6	Hengertil høyre rett innenfor døren	19.02.99	m 85
Gamle sv.verksted	Skuteng12/sv	1.51p	Hengertil venstre rett innenfor døren	05.02.99	76
301 Gang m. n.hist og Ka.	Tempus 12 LG	19,72	Henger til høyre når du går inn til Kampen	05.02.99	75
? Gang v.lysdempers.	NOHA 6k-a	16,15	Henger til venstre inne i rummet	16.02.99	96
U10 Gang Åse Kari	NOHA ABE H	6	Henger v. sittegr.til Åse Kari	18.02.99	92
U45 Gml.arkiv ved AK.	NOHA ABE H	6	Ståt på gulvet til høyre innenfor døren	18.02.99	m 96
U21 Hovedtavle	Gloria ks 6	16,5	Hengertil høyre rett innenfor døren	18.02.99	m 89
Jernversted	Bavaria PG6T	6	Henger på sudstveggen ved smia	14.02.99	87
Jernversted	Gloria P6GD	6	Henger på vestveggen ca.midt i rummet	14.02.99	86
103 Kjøkken	NOHA 2KA	5,81	Hengertil venstre rett innenfor døren	18.02.99	92
143 Kulvert l.først.rum	NOHA K-A	16,12	Henger til venstre inerst i kulvert	24.02.99	m 96
? Lysdemper sentral	NOHA 2KA	5,72	Henger til venstre inne i rummet	16.02.99	91
Magasin B Hovedt.	NOHA T6W	15,18	Står åp gulvet til venstre innenfor døren	24.02.99	m 92?
Magasin B m.gang	NOHA T6W	16,10	Henger til høyre i passagen	16.02.99	96
Magasin B v.rum.	NOHA ABE H	6	Henger til høyre mot magasinet	16.02.99	97
Magasin B v.tr.rum	Tknisk kompani	11,74	Står på gulvet til venstre etter døren	16.02.99	69
Magasin B vent.rum	Tknisk kompani	11,92	Henger til venstre utenfor døren til v.rum	16.02.99	74
? Magasin A plan 1	PRESTO AK2	6,6	Hengertil v.rett innef.døren fra snekkerv.	16.02.99	91
? Magasin A plan 1	Gloria pi 12e	18,79	Heger til venstre rett innenfor trappegang	16.02.99	79
? Malerverksted Truls	NOHA ABE H	6	Henger til v. inne iførste rummet	16.02.99	m 94
300 Norgeshist B.muren	NOHA ABE H	6	Henger vest på berlinermuren	18.02.99	96
200 Norgeshist istid	NOHA ABE H	6	Henger til høyre bak isveggen	18.02.99	97
200 Norgeshist. viking	NOHA ABE H	6	Henger til høyre på vikingebuset	øvelse	
300 Norgeshist.1905	NOHA ABE H	6	Henger rett ovrer for Tyssedal	18.02.99	96
201 Norgeshist.Lofoten	NOHA ABE H	6	Henger bak dokka på nordveggen	18.02.99	96
200 Norgeshist.svarted.	NOHA ABE H	6	Henger under ljåen	18.02.99	96
K50 Orkestergrav	Bavaria PG6T	6	Heger til venstre rett innenfor trappegang	24.02.99	93
Restureringsatlje	Skuteng12/sv	1,49p	Hengertil venstre rett inn.f. døren fra tr.r.	05.02.99	77
Restureringsatlje RA	NOHA ABE H	6	Hengertil høyre rett innenfor døren	18.02.99	97
U60 Sal 1	SUNDE ABE	6	Hengertil venstre rett innenfor døren	18.02.99	84
304 Sal Lydkontroll	NOHA 2KA	5,68	Henger midt i rummet mot sal på stolpen	16.02.99	92
304 Sal Lyskontroll	NOHA 2KA	5,77	Henger midt i rummet mot sal på stolpen	16.02.99	92
U55 Sene	Skuteng CO2	18,83	Står vekselvis fremme på senegolvet	24.02.99	98
U53 Sidesene	Bavaria PG6T	6	Henger til høyre når du går inn fra trappen	24.02.99	93
U53 Sidesene	Skuteng CO2	13,8	Henger på østre veggen nærmest senen	24.02.99	98
? Snekkerv. nord	Gloria pi 12e	18,88	Henger til venstre i mellemgangen	16.02.99	79
? Snekkerv. vest	Gloria pi 12e	18,67	Henger til høyre rett innenfor døren	16.02.99	79
? Snekkerv.vent.rom	Sne-Trygg 6	16,52	Står på gulvet til venstre før du går inn	16.02.99	74
K20 Varemottak	Nu Swift 1815	18,71	Hengertil venstre rett innenfor døren	18.02.99	87
DGV4 Vaskerum tekstil	Tempus CO2	18,09	Henger ved vasken inne i rummet	16.02.99	74
U63 Vent sal 1	NOHA CO2	16,1	Hengertil høyre rett innenfor døren	16.02.99	m 95
U63 Vent sal 1	NOHA ABE H	6	Hengertil høyre rett innenfor døren	16.02.99	m 95
U20 Vent.rum	NOHA ABE H	6	Hengertil venstre rett innenfor døren	18.02.99	m 96
U20 Vent.rum	Tempus CO2	18,08	Hengertil venstre rett innenfor døren	18.02.99	m 74
400 Vent.tak	SUNDE ABE	6	Hengertil venstre rett innenfor døren	14.02.99	M 85
400 Vent.tak	NOHA CO2	16,07	Hengertil venstre rett innenfor døren	10.03.99	m 96

Ark2

112 Vestibyle	SUNDE ABE	6 Henger syd ved butikk/trapp	18.02.99	84
Øvre kont.f. nord	Bavaria PG6T	6 Henger på vestveggen nord i gangen	14.02.99	87
Øvre kont.f. syd	NOHA ABE H	6 henger til venstre når du kommer innfra syd	24.02.99	97
Øvre kont.f.sik.tavle	NOHA 2KA	5,-70 Henger på sydvest veggen i tavlerummet	24.02.99	92

Brannslukkere

HUS. NAVN	ANLEGGET		VEKT	PLASSERING	KONTR.	Mo
	TYPE					
U10	Andersengården	Bavaria PG6T	6	Henger til v. inne i gangen	26.01.99	87
U9	Bakeriet	Sunde ABE	6	Henger til høyre innfor døren i bakeriet	26.01.99	m 86
U 15	Bakgårdsbygning 61					
U 16	Bakgårdsbygning 61					
O9	Barhusetra	Bavaria PG6T H	6	Hengertil venstre rett innenfor døren	26.01.99	m 87
K2	Bjørnstad Andersstua	NOHA ABE H	6	Henger til venstre i forrgangen på trappa	03.02.99	m 97
K	Bjørnstad Uttun	NOHA ABE	6	Henger til venstre i passagen	07.01.99	m 93
R4	Blikkensl.verksted	Tempus 6 VG H	6	Henger rett frem innenfor døren	26.01.99	m 84
?	Bloc Watne	NOHA ABE	6	Henger ute til v.for døren	26.01.99	m 97
U6	Bondestua					?
U2	Busterud (kjeller)	NOHA ABE	6	Henger til høyre innfor døren	26.01.99	m 97
U2	Busterud 1 etg.	Sunde ABE	6	Henger til v. inne i gangen	26.01.99	m 84
K20	Eldhuset (melbye loftet)	Tempus 6 VG	6	Henger til h. inne i første rummet (vest)	17.12.98	m 96
R1	Farveriet	Bavaria PG6T	6	Henger ute på syd-østre hjørnet	12.01.99	m 91
P1	Fiskekapp.	NOHA ABE	6	Henger til h.på ytteriv i.forrgang	6.1198	m 95
J 08	Fjes N. Jørstad	NOHA ABE H	15,74	Henger til venstre innenfor døren	25.11.97	96
J 08	Fjes N. Jørstad	NOHA ABE	6	Henger til venstre innenfor døren	05.02.99	97
T7	Gaml.rest i hybelavd.	Gloria ABE pat.	18,68	Henger til v. i forrg. rett innenf. døren	11.02.99	m 79
T7	Gaml.rest v. h. inng.	NOHA ABE	6	Henger til v. inne i gangen	15.12.98	m 94
T7	Gamle rest vest Reidar	Gloria PI 12 G	19,07	Hengertil venstre rett innenfor døren	11.02.99	m 79
J 1	Garbrukerstua Jørstad	NOHA ABE H	6	Henger til høyre inne i gangen	05.02.99	97
H11	Garmo stavkirke	NOHA ABE	6	Henger til venstre i forrgangen på trappa	16.12.98	m 97
T6	Gjestestugu	Bavaria PG6T	6	Henger til høyre innfor døren	29.01.99	m 88
R3	Gjørtler verksted	Sunde ABE	6	Henger til v. inne iførste rummet	05.01.99	m 96
U 17	Gundersen gården	NOHA ABE	6	Henger på en stolpe for. huset	26.01.99	m 96
U14	Halmrastgården					
?	Hauglivilla	Sunde ABE	6	Henger ute til v.for døren	7.0199	m 85
?	Hetland (Inne)	NOHA ABE H	6	Henger rett frem etter trappa	28.01.99	m 95
?	Hetland (ute)	NOHA ABE	6	Henger ute til h.for døren	øvelse	m 97
H14	Isum (prstestue)	Sunde ABE	6	Henger ute til h.for døren	05.01.99	m 85
U4	Julingården 1 etg.	Bavaria PG6T	6	Henger til venstre rett innenfor døren	26.01.99	m 88
U4	Julingården 2 etg.	Bavaria PG6T H	6	Henger rett frem når du kommer opp tr.	26.01.99	m 93
P9	Kinck hytta	NOHA ABE H	6	Henger ute på sydsiden mot Olemic T.	26.01.99	m 96
T4	Kirkestuen 2etg	Gloria Abe PG6GD	6	Henger til venstre opp trappen	29.01.99	m 96
T4	Kirkestuen gang vest	Gloria PI 12 G	18,89	Står på gulvet ved døren til kjøkkenet	11.02.99	79
T4	Kirkestuen gang øst	Gloria PI 12 G	18,63	Henger til v. inne i gangen	11.02.99	m 79
T4	Kirkestuen kjøkken	Gloria KS 2 CO2	6,36	Henger ved utslagsvasken på kjøkkenet	25.02.99	m 80
J 2	Kongebolig 1 etg.	Gloria PG 6D	6	Henger ved vedovn på kjøkkenet	15.12.98	m 93
J2	Kongebolig 2 etg.	Gloria PG 6D	6	Henger til høyre når du kommer opp tr.	15.12.98	m 93
J2	Kongebolig 3 etg.	Bavaria PG6T	6	Henger til høyre når du kommer opp tr.	15.12.98	m 88
H27	Kormagasinet	NOHA ABE H	6	Henger ute til v.for døren	26.01.99	m 96
O4	Korpbergsetra	NOHA ABE H	6	Hengertil venstre rett innenfor døren	26.01.99	m 96
	Lagerhallen	NOHA ABE	6	Henger til venstre rett innenfor døren	27.01.99	97
	Lagerhallen	NOHA ABE	6	Henger til venstre opp trappen	27.01.99	97
	Lagerhallen(Stål)	Sunde ABE	6	Henger til høyre innfor døren	27.01.99	m 85
H16	Lensmannsgården	NOHA ABE	6	Henger til v. inne i gangen	14.12.98	m 96
T1	Lindsheim	Bavaria PG6T	6	Henger til v. inne iførste rummet	29.01.99	m 88
H21	Losjehuset	NOHA T6W ABE	6	Står til høyre for døren inne i kroken	16.12.98	m 95
O3	Lundesetra	Sunde ABE	6	Henger til v. inne iførste rummet	26.01.99	m 85
J 08	Låve N.Jørsad nord	Gloria PI 12 G	18,69	Henger til venstre innenfor døren	11.02.99	m 79
J 08	Låve N.Jørsad øst	Gloria Abe PG6GD	6	Henger til v.på låvebrua innenfor døren	29.01.99	93

Brannslukkere

H17	Meviken	Sunde ABE		6	Henger til høyre innfor døren	05.02.99	m 85
?	Moeiven huset	Sunde ABE		6	Henger ute til v.for døren	05.01.99	m 85
H2	Myttingstua	Gloria P1 12 G		18,61	Henger til h.på ytteriv i.forgang	11.02.99	m 79
U 13	Narvesenkjosken						
?	Nattvakt gml. bill	Sunde ABE		6	Henger til h. inne i rummet	14.12.98	m 86
U8	Nordstrand	NOHA ABE		6	Henger ute på veggen sydøstre hjørnet	26.01.99	m 97
P10	Oljebrenneriet	NOHA ABE	H	6	Henger på sydsiden mot elven	26.01.99	97
U19	Olsengården						?
U11	Pakkboden						?
U12	Pakkhuset fra Brøttum						
R5	Pottemakeriet	NOHA ABE	H	6	Henger til h. inne i første rummet	29.01.99	m 96
H3	Prestegården	NOHA ABE		6	Henger til v.på ytteriv i.forgang	14.12.98	m 96
H10	Røkovnst.fra Romsdal	NOHA ABE		6	Hengertil venstre rett innenfor døren	16.12.98	m 97
U5	Salvesen (1 etage)	Bavaria PG6T		6	Henger til v. inne i første rummet	28.01.99	m 87
U5	Salvesen (kjeller)	Bavaria PG6T		6	Henger rett frem når vi kommer ned tra.	28.01.99	m 88
U5	Salvesen (2 etage)	Bavaria PG6T	H	6	Henger til høyre etter trappen	28.01.99	m 87
U5	Salvesen (kont. Marit)	Gammel type CO2	?		Står på kontoret til Marit	INGEN	?
L10	Sau & gjeitefj.Øygården	NOHA ABE		6	Henger utenpå veggen t.v.når en går inn	17.12.98	97
O11	Selet Valbj.seter	NOHA T6W ABE		6	Henger til v. inne i gangen	02.12.97	m 96
H6	Sheltar	Bavaria ABE		6	Henger til v.på ytteriv i.forgang	14.12.98	m 88
H9	Skolestue	NOHA ABE		6	Henger til høyre innfor døren	17.12.98	m 97
H 26	Skrefrudstua	Sunde ABE		6	Henger ute til h.for døren	07.01.99	m 85
K22	Smie Bjørnstad	Bavaria PG6T		6	Henger til høyre innfor døren	05.01.99	m 88
div	Snekkerv. Utlån	NOHA ABE		6	Står i verktøyburet til snekkerverkstedet	25.02.99	96
div	Snekkerv. Utlån	NOHA ABE		6	Står i verktøyburet til snekkerverkstedet	25.02.99	96
div	Snekkerv. Utlån	NOHA ABE		6	Står i verktøyburet til snekkerverkstedet	25.02.99	96
div	Snekkerv. Utlån	NOHA ABE		6	Står i verktøyburet til snekkerverkstedet	25.02.99	96
J 08	Stall N Jørstad	NOHA ABE	H	6	Henger til høyre innfor døren	05.02.99	m 97
M1	Stue Knutslykkja	NOHA ABE		6	Henger til h.på ytteriv i.forgang	12.01.99	97
J5	Sterhuset N. Jørstad	Bavaria ABE	H	6	Henger til høyre for døren inne i kroken	03.02.99	m 93
N1	Sue Stykkebakken	NOHA ABE		6	Henger på østsiden av huset	Øvelse	97
?	Søndregt 21	Bavaria PG6T		6	Henger ute til v.for døren	26.01.99	m 88
U1	Søre Hage	Sunde ABE		6	Henger til v. inne i gangen	28.01.99	m 85
O2	Teigsetera	NOHA ABE	H	6	Henger til venstre i passagen	26.01.99	97
H12	Telhuset	Sunde ABE		6	Henger til v. i forrg. rett innenf. døren	15.12.98	m 86
P12	Turhaughytta	NOHA ABE	H	6	Henger på sydsiden av stallen	17.02.99	m 96
T8	V.mest bolig	NOHA ABE	H	6	Henger oppe på gangen tilv.	08.01.98	m 97
T8	V.mest bolig (hybel)	NOHA ABE	H	6	Står på gulvet ved klestativet	08.01.98	m 97
T17	V.mester b. Snekkerv.	NOHA ABE	H	6	Henger ute til venster ved døren	29.01.99	m 97
O12	Valbjørgetra kjøkken	NOHA BE		5,81	Henger v.glasstativ midt på kjøkkenet	22.02.99	96
O12	Valbjørgetra kjøkken	Sunde ABE		6	Henger v.glasstativ midt på kjøkkenet	25.02.99	m 85
K24	Vedskåle Bjørnstad	No.br.sik. TypNB6		6	Henger til høyre innfor døren	05.01.99	m 93
U 21	Veksted Olsengården						
H5	Vigstad stua	Sunde ABE		6	Henger til v. i forrg. rett innenf. døren	14.12.98	m 86
L2	Øygården Holestua	NOHA ABE	H	6	Henger til høyre inne i gangen	17.12.98	m 97
L2	Øygården Holestua	Bavaria PG6T	H	6	Henger utenpå veggen ved brannmelder	03.02.99	93
O6	Øygårdssetra	NOHA ABE	H	6	Henger til høyre innfor døren	26.01.99	m 96
H1	Årestue Tollstad	NOHA ABE		6	Henger til h.på ytteriv i.forgang	14.12.98	m 92
T19	Aaseth-bygningen	Bavaria PG6T		6	Henger ute til v.for døren	07.01.99	m 88
L8	Øygården fjøs	NOHA ABE	H	6	Henger til venstre innen for døren	10.03.99	m 97
U4	Juul ventilasjonsrum	NOHA BE		16,04	Henger til venstre innen for døren	10.03.99	m 96

Enclosure 8 Check list "how to communicate with a terrorist"

DSS MAIHAUGEN
INTERNKONTROLLHÅNDBOKINSTRUKS OG VEILEDNING
for sentralbordbetjeningen ved bombetrussel el.

Hvis du mottar en telefonsamtale om bombetrussel eller lignende, prøv å følge disse regler:

- Vær rolig og vennlig - ikke avbryt den som ringer - få vedkommende til å snakke mest mulig. Forsøk å trekke ut samtalen. Lat som om du ikke forstår. Lytt nøye.
Bryt ikke kontakten selv om røret blir lagt på i andre enden. Telenor kan lokalisere samtalen etter anmodning fra politiet. Hvis ikke kontakten blir brutt, still følgende spørsmål:
- Når skal bomben eksplodere ? _____
Hvor er bomben plassert ? _____
Hva slags bombe er det ? _____
Hva er Deres navn ? _____
Andre opplysninger ? _____
- Forsøk, helst i løpet av samtalen å gi svar på disse spørsmålene om den som ringer:

Kvinne: <input type="checkbox"/>	Mann <input type="checkbox"/>	Gutt <input type="checkbox"/>	Pike <input type="checkbox"/>	
Stemmen er:	kraftig <input type="checkbox"/>	lav <input type="checkbox"/>	mørk <input type="checkbox"/>	lys <input type="checkbox"/>
	snøvlete <input type="checkbox"/>	behagelig <input type="checkbox"/>		
Talen er:	hurtig <input type="checkbox"/>	langsom <input type="checkbox"/>	distinkt <input type="checkbox"/>	forvrengt <input type="checkbox"/>
	stammende <input type="checkbox"/>	lespende <input type="checkbox"/>	dannet <input type="checkbox"/>	slangpreget/ <input type="checkbox"/>
				banning
Dialekt:	Oslo/østlandsk <input type="checkbox"/>	sørlandsk <input type="checkbox"/>	vestlandsk <input type="checkbox"/>	nordnorsk <input type="checkbox"/>
	trøndersk <input type="checkbox"/>	utenlandsk aksent <input type="checkbox"/>	dialekten virker tilgjort <input type="checkbox"/>	
Holdning:	rolig <input type="checkbox"/>	opphisset <input type="checkbox"/>	virker beruset <input type="checkbox"/>	
Bakgrunns-lyder:	maskinlyder <input type="checkbox"/>	gatetrafiikk <input type="checkbox"/>	musikk <input type="checkbox"/>	stemmer <input type="checkbox"/>
	skrivemaskin <input type="checkbox"/>	blandet <input type="checkbox"/>		

- Ikke bryt forbindelsen.** Varsle politiet på telefon 112. Noter ordrer fra politiet. Varsle deretter direktør, driftssjef og vaktmester.
- Denne sjekklisen leveres til politiet når de ankommer.

Dato: _____ Ekspedient: _____

Lillehammer, 21.03.96


Torger Korpberget
Driftssjef

Programvaror

RiTA16

Grundprogramvara för max 16 dörrar och singel-PC. Inklusive modemprogram*.

RiTA STD

Grundprogramvara för obegränsat antal dörrar och singel-PC. Inklusive modemprogram*.

RiTA Nätverk

Grundprogramvara för obegränsat antal dörrar och arbetsterminaler i ett PC-nätverk. Inklusive modemprogram*.

RiTA Modem

För uppkoppling mot externa byggnader. Ingår i samtliga grundprogram*.

RiTA Foto-ID

Används för produktion och kodning av företagskort.

Fotopresentation

Visar de nio senaste dragna korten från valda läsare på datorskärm.

RiTA Indikeringstablå

Indikering/statusablå presenterad på datorskärm. Visar låst-, olåst-, forcerad dörr eller larm.

RiTA Besök

För att snabbt och enkelt ta emot besökare samt koda och skriva ut pappersbesökskort.

RiTA Zonkontroll

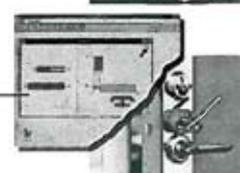
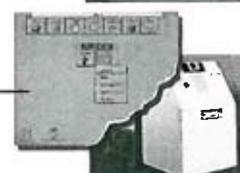
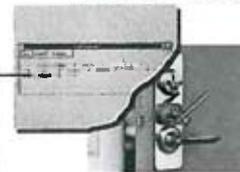
Visar var en eller flera personer är samt hur många personer som befinner sig inom vissa zoner.

RiTA Debitering

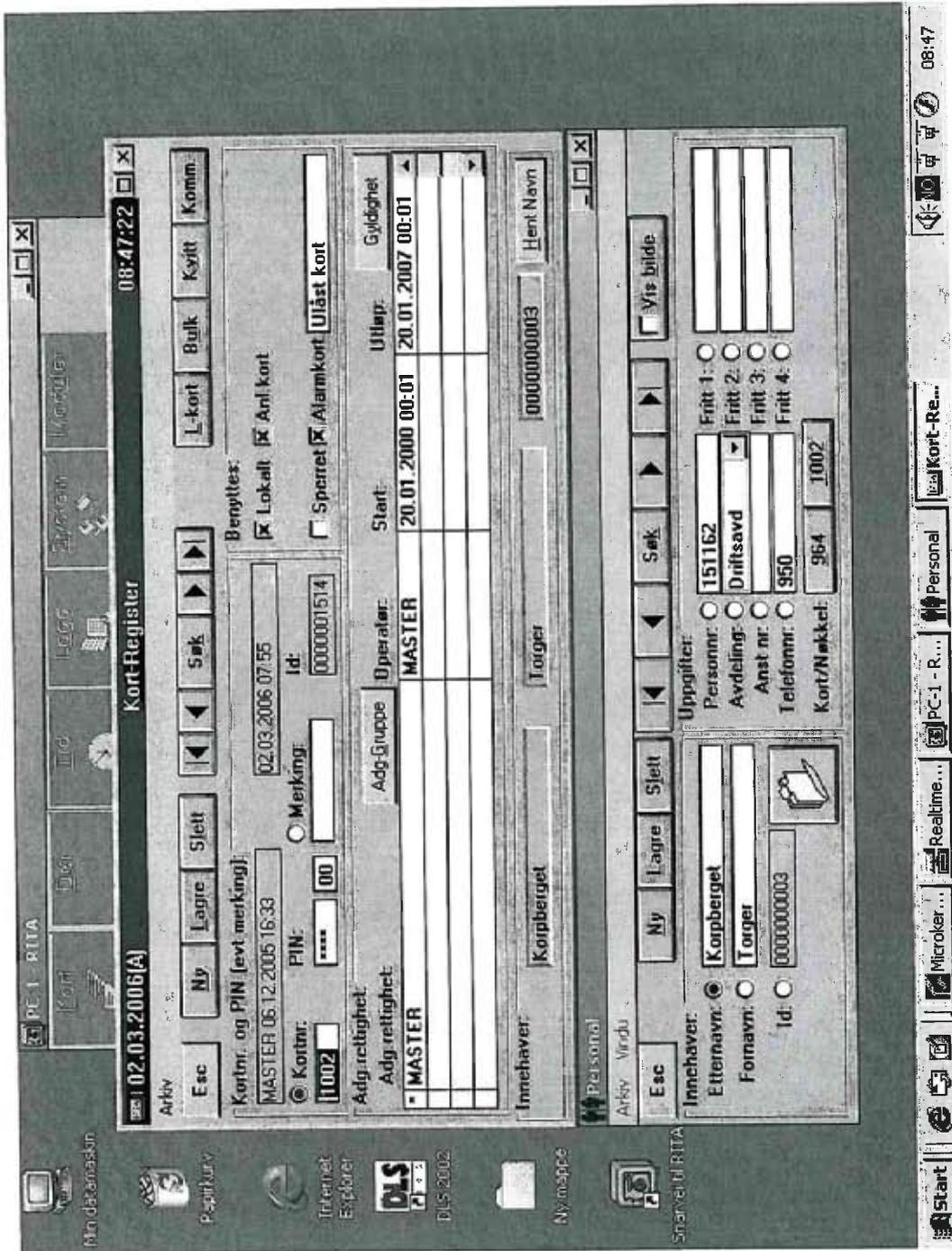
Exempelvis för debitering av måltider i skola/ matsal.

RiTA Larmpresentation

Grafisk presentation med ritningar på datorskärm. Åtgärdstexter, aktiviteter, fördröjning av larm etc.



* fr o m ver. 2.2.



COST Action C17: 'BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS' WORKING GROUP 4 SHORT TERM SCIENTIFIC MISSION: 'MANAGEMENT STRATEGIES TO SECURE INTEGRATION OF DAMAGE LIMITATION TEAMS AND PROFESSIONAL FIRE SERVICES'

Mike Coull

Contents

1. Introduction
2. Purpose of Visit
3. Scientific Meeting
4. Scientific Visit to the Vienna Fire Brigade
5. Schonbrunn Fire Management Plan
6. Damage Limitation Team
7. Damage Limitation Team Training
8. Review of Existing Arrangements
9. Recommendations

1. Introduction

This report summarises the Short Term Scientific Mission (STSM) carried out for COST Action C17: 'Built Heritage: Fire Loss to Historic Buildings' Working Group 4 (Property Management Strategies) by Mike Coull from the United Kingdom's Grampian Fire and Rescue Service during the period 26 February to 03 March 2006. The mission was performed at Schloss Schonbrunn and was complimented by a scientific meeting held at Schloss Schonbrunn on 27 February and a scientific visit to the Vienna Fire Brigade.

As preparation for the STSM I attended a course on 'Emergency Salvage' organised by the National Trust who own properties in England, Wales and Northern Ireland. I also visited Windsor Castle and Hampton Court Palace to obtain an appreciation of systems in place within historic palaces in the UK.

2. Purpose of Visit

Expanding on research undertaken within the United Kingdom, this STSM set out to develop the management strategies required for the establishment of Damage Limitation Teams along with the training and development of these teams to secure integration with professional fire and rescue services. In order to achieve these aims, the following areas for research were identified:

1. Consideration of documentation available on the management of a Damage Limitation Team, including the regulation and control of members of the team.
2. The contents of a written management plan for a historic palace to identify the role and responsibility of the Damage Limitation Team within the plan.
3. The examination of Emergency plans and in particular how Damage Limitation Plans are developed and integrated into these, along with key considerations involving the safe and secure evacuation of artefacts.
4. The co-ordination and integration of the emergency services response with particular emphasis on the relationship between Damage Limitation Teams and the professional fire services.
5. The level of training required by members of Damage Limitation Teams to develop and maintain their skills. The training available to professional fire fighters to consider the unique features of a historic palace and the integration of training through joint exercises.

3. Scientific Meeting

A scientific meeting entitled ‘Fire Prevention In Historic Buildings – Liaison with Fire Brigades’ was held on the 27th February at Schloss Schonbrunn. The following participated in this meeting:

Mike Coull	-	Grampian Fire and Rescue Service
A Feiler	-	Vienna Fire Brigade
Nick Jordan	-	National Trust
Wolfgang Kippes	-	Schloss Schonbrunn
Johannes Legler-Diesbach	-	Austrian Volunteer Fire Brigades
Luca Nassi	-	Santa Maria Della Scala
Frank Peter	-	Vienna Fire Brigade
Herbert Polsterer	-	Schloss Schonbrunn
Robert Tidmarsh	-	Schloss Schonbrunn

During this meeting, five presentations were given. I gave the first one, providing an overview of the Historic Scotland National Fire Database and my role as Heritage Co-ordinator for the Scottish Fire Services, a unique partnership between Heritage Agencies and the Fire and Rescue Services.

Luca Nassi then gave an overview of the Santa Maria Della Scala in Siena, Italy. He spoke of a major programme of work being undertaken and the need to look at tailored design solutions for the particular building along with the need to consider management solutions. He highlighted the need for close liaison during the renovation work and the need to define the project scope, and have this agreed by all stakeholders who he listed as:

- Building Owner
- Building Manager
- Designers
- Construction team
- Tenants
- Maintenance Personnel
- Jurisdiction Authority – in this case the Fire Brigade.

When considering the design solutions he spoke of performance-based tools where engineering field models were used. This demonstrated that the specified fire safety goals could be achieved even where prescriptive standards could not be met.

He also explained that a technical committee promoted by Santa Maria Della Scala and the National Fire department was actively developing studies on the protection of cultural heritage.

Nick Jordan explained that the National Trust have 350 major properties that are open to the public. He stated that he saw good liaison as providing opportunities to review safety strategies, methods of working and training.

The National Trust encourage liaison through property managers who are required to:

- Liaise with their local Community Fire Station
- Encourage fire crews to visit their properties
- Participate in the formation of a Property Risk Management plan.

When considering the benefits of good liaison, Nick listed these as:

- Having robust and tested procedures in place to deal with an emergency
- Provides for assistance when considering compliance issues
- Knowing what to expect should an incident occur.

Frank Peter then spoke about liaison between the Vienna Fire Brigade and Schonbrunn. When considering the relationship between Schonbrunn and the Vienna Fire Brigade, he stated that the level of intensive collaboration is greater than at any other building in Vienna.

He used two case studies to highlight difficulties in fighting fires in historic properties; these were the Hofburg Palace and the Sofien Saal. In both of these incidents there were no plans available to the Vienna Fire Brigade and there was little or no compartmentation of the roof, allowing fire to quickly spread. In addition, there was only partial fire detection at Hofburg thus enabling the fire to develop undetected until it had fully established and spread through the roof.

The major risks within Schonbrunn that have been identified by the Fire Brigade are:

- Fire in the cavities of walls and ceilings
- Fire in a flat
- Roof Fire

He explained that the roles of the Vienna Fire Brigade and the Damage Limitation Team at Schonbrunn had been clearly defined. The fire brigade would be responsible for:

- Rescue of People
- Smoke Management
- Firefighting

The Schonbrunn Damage Limitation Team is responsible for:

- Evacuation of the premises
- Rescue of artefacts

Through liaison with Schloss Schonbrunn it had been possible for the Vienna Fire Brigade to identify key staff members. The brigade has information on the fire detection and suppression systems, which is also provided to crews responding to an incident.

Maps of the building are made available to responding appliances to assist the orientation of firefighters in the building; there is also a table of flats including a description and direction of windows. To further assist in the orientation of crews, the brigade undertakes 2 or 3 visits of the building each year.

Clear procedures have been developed to assist in the rescue of persons that will indicate the numbers and location of any missing persons.

Johannes Leglar-Diesbach is in charge of a volunteer fire brigade and owner of a historic castle. He is on the board of the Austrian Association of Volunteer Fire Brigades where he has specific responsibility for training of volunteer firefighters and for the cultural heritage.

He explained that 80% of castles in Austria are in private ownership. He further explained that in lower Austria the fire brigades are all volunteer. He has set up a programme of working with owners of properties and fire brigades to develop liaison between both parties to develop joint training exercises and the fire management of the property. During the last 10 years he has organised over 70 exercises in properties. In order to arrange each exercise he has gone through a four-stage process:

- Speak to the local fire brigade to consider the property and the need for an exercise
- Speak to the owner to consider the benefits of holding an exercise
- Bring the owner and the fire brigade together in order to develop a fire plan and to develop the exercise
- Undertake the exercise and consider the learning opportunities that present themselves.

In addition to the training exercises undertaken, a number of seminars have also been held. These cater for some 60 participants and include theoretical issues in the prevention of fires. There is also input on developing management plans for the property.

This scientific meeting proved to be of great benefit in establishing the level of liaison between heritage agencies and professional fire services across a range of countries and differing scales of properties.

4. Scientific Visit to the Vienna Fire Brigade

A scientific visit to the main fire station in Vienna was undertaken. This fire station, located at Floridsdorf, houses four standard fire engines along with specialist units including Turntable Ladder, Hydraulic Platform, two cranes and a number of specialist vehicles utilising a demountable unit system.

During the visit we saw the training facility available to the Vienna Fire Brigade including an indoor tower for training with ladders. Also in this building was a facility for hot fire training. This involves a gas system that includes the ability to have fires in a simulated kitchen and bedroom. There is the facility to use the system for flashover training. In addition, there was a simulation of a gas leak from a pipe, which allows crews to control the flame with a jet of water whilst other members of the team extricate a casualty from a car.

5. Schonbrunn Fire Management Plan

The fire management plan including the roles and responsibilities for individuals within that plan was considered in conjunction with Wolfgang Kippes. Any changes to the fire management plan or proposals for changes to the physical fire prevention and protection measures to be adopted in Schonbrunn is discussed and agreed with the heritage agency and the Vienna Fire Brigade.

5.1 Calling The Fire Brigade

There are five different automatic alarm systems covering the most important buildings at Schonbrunn that alerts the fire brigade. When an alarm is actuated, this sounds in the guardhouse and it is the responsibility of the security staff to ensure that the gates are opened to allow access to fire brigade appliances.

The Vienna Fire Brigade will attend all alarms, even if they are informed prior to arrival that it is a false alarm. The local station has one appliance and normally takes approximately 2 – 3 minutes to arrive. The next station can respond in approximately 3 – 5 minutes.

There is no automatic fire detection system in the flats however these areas are covered by the alarm system that is actuated through break glass points. The impact of this to the risk profile can be demonstrated through the fact that there are over 180 flats within Schonbrunn, 52 of which are situated in the main building.

Plans are held in the property showing the layout of the building including features that are of importance in a fire situation. This includes the location and type of fire detection equipment, location of firefighting equipment, location of stairs and emergency exits. These plans are kept in a folder and there are three copies of the folder. One copy is kept in the security office, which is also where the fire alarm control panel is located, the second set is kept in the gatehouse where it can only be accessed in an emergency and the security guards on duty outwith opening hours will provide this to the responding appliance. The third set is kept in a parallel office and can be accessed by the Fire Brigade.

5.2 Staff Training for Dealing with Emergencies

Schloss Schonbrunn has forty showrooms and is visited by over two million visitors per year. The safety of visitors is the responsibility of all staff and external guides who are trained by Robert Tidmarsh who is responsible for risk management within the showrooms.

Staff are trained on the emergency exits and their responsibility to ensure the safe evacuation of all visitors. They also receive regular training on the use of portable fire extinguishers. They are instructed to tackle a fire if it is safe to do so utilising the nearest fire extinguisher. If the fire cannot be extinguished using this extinguisher then the member of staff has to evacuate.

External guides are trained on the emergency exits and their responsibility to ensure the safe evacuation of their guests.

5.3 Evacuating Non-Essential Personnel

In the event of a fire then staff and external guides are notified through a system of pager and hand held radios. The external guides are issued with pagers and it is their responsibility to ensure that all members of their group are evacuated to one of the rendezvous points.

The evacuation of all other visitors is the responsibility of staff. The staff are informed of a fire situation by means of hand held radios whilst tannoy announcements will instruct visitors to vacate the premises. A member of staff is usually responsible for 2 – 4 rooms and they are responsible for ensuring these rooms are evacuated. In addition, on each floor there are one or two (depending on season) members of staff responsible for all rooms on that floor. In the event of a fire these staff will check all rooms to ensure that they are evacuated. These members of staff will then advise the Head of Showrooms or the Fire Brigade that all persons have left the building.

Contractors working within Schonbrunn are issued with pagers. This ensures that when guides are notified of an incident, contractors are alerted at the same time and they can evacuate the premises.

Tenants are not evacuated when the fire alarm is actuated. This is a procedure that has been agreed with the Vienna Fire Brigade. In the event that the Vienna Fire Brigade wishes the tenants to evacuate the building there is a siren, which they will sound.

5.4 Technical Assistance to the Fire Brigade

In the event of a fire, the brigade will be called by one of the five different automatic alarm systems with the location of the building in which the alarm has actuated forming part of the automatic information system to the brigade. On arrival, they will go there and find the fire alarm plans provided. The duty of the security staff at the main gate is to open the gate for optimum access to the brigade and to provide the override key to the brigade if required.

The contact person for the fire brigade is the person responsible for the Showrooms who will make themselves known to the Fire Brigade and will provide any technical assistance required. Outwith opening hours the security staff will contact a member of staff who will respond and provide the technical assistance.

In the event of the Damage Limitation Team being called out to attend the incident then the leader of the Damage Limitation Team will liaise with the Fire Brigade.

Schloss Schonbrunn is currently developing a 'Crisis Management Handbook which includes development of a communications policy. This handbook will be discussed with all external agencies having an interest in Schonbrunn, including the Vienna Fire Brigade in order to ensure full cooperation between all agencies.

5.5 Fire Brigade Support of Damage Limitation Activity

The Damage Limitation Team have a role to play in guiding the Fire Brigade through the property should the Fire Brigade request this. It should be stated that no members of the Damage Limitation Team wear Breathing Apparatus and consequently they cannot lead the Fire Brigade in smoke filled areas.

Showroom staff, or the Damage Limitation Team provide any necessary assistance to the Fire Brigade to access secure areas. There is an automatic security system throughout the premises however an over-ride key for the brigade is provided in a key box at the main gate, which only can be opened by a standardised brigade key. This means, the brigade will have access to the over-ride key even when the security staff at the main gate is not present.

6. Damage Limitation Team

Dr Kippes gave me a history of the Damage Limitation Team at Schloss Schonbrunn. The concept of managing fire safety and developing the team was first discussed with Stewart Kidd at a conference held at Duff House, Scotland in 1998. The following year, Mr Kidd undertook an audit of safety management at Schonbrunn and one of his proposals was to improve operational matters of preparedness. Following the publication of his report, Schonbrunn then employed one individual to organise the issues in relation to those recommended by Stewart Kidd.

This included the formation of a Damage Limitation Team and this team commenced training in late 2000. During a meeting of the National Fire Protection Association (NFPA) in June 2001 the work of the Damage Limitation Team was demonstrated through a joint exercise with the Vienna Fire Brigade.

The project to establish the team was then complete and the management of the team became the responsibility of an employee within Schonbrunn, Herbert Polsterer as head of the Damage Limitation Team. Mr Polsterer is the head of a volunteer fire brigade and consequently has experience of fire service procedures.

All members of the team are volunteers. They are not paid for being members of the team, however they do receive a payment for attending the training evenings once per month and they would be paid in the event of responding to an incident.

In addition to their regular monthly training sessions, team members have visited networking partners in Berlin (Castles and Gardens of Prussia Foundation), Hampton Court Palace, London, Imperial Palaces, Madrid, Versailles Palace, Paris and Windsor Castle, London in order to exchange information and good practice with colleagues. This programme will continue with a proposed visit to Scotland in autumn 2006.

These visits also enable team members to collaborate with the host institution and add to their expertise. One example of this is the gloves, which team members wear for training purposes when handling artefacts. On a visit to Hampton Court Palace they established that the gloves worn by the Hampton Court team had a dimpled surface to improve handling and as a result similar gloves were purchased by the Schonbrunn team on their return.

There have been no fires to date for the team to respond to, however they were called out in May 2004 when, following a period of extreme rainfall, they were required to ensure that machinery and equipment located in the basement area avoided damage.

6.1 Selection of the Team

When selecting team members then fitness is one important factor. The standard applied is a general level of fitness; it is not as prescriptive as that which may be applied to staff joining the volunteer or retained fire service. Another factor is the availability of staff to respond to an incident. For this purpose it is preferred if team members live within 20 minutes of Schonbrunn, however if there are sufficient team members meeting this criteria then the distance can be extended as it is recognised that there will be many tasks to be undertaken by the Damage Limitation Team and consequently someone responding in an hour will still have a significant role to play.

Finally, the benefits of having team members from across the range of departments and sections within Schonbrunn enables an exchange of expertise in dealing with the problems that the Damage Limitation Team may face.

6.2 Removal and Relocation of Priority Items

In order to assist in the removal of the priority items a handbook has been produced that gives a photograph of each room and within the photograph the priority items are colour coded.

Each member of the Damage Limitation Team is issued with a pocket book that has a plan of the building with items such as exit routes; alarm points, extinguisher locations and disabled persons escape points clearly marked.

An object evacuation list is placed within each of the Damage Limitation trolleys. This has details of some 400 items in 40 showrooms. When an item is recovered then the sheet relating to that item is attached to the item. This aids recognition in the post fire phase. These cards are of A5 size and include a photograph of the item and where necessary the number of personnel required to carry the item.

Where it is not possible to remove an item due to its size then the item is protected in-situ by means of fire resistant covers being placed over it.

There are currently 34 members of the Damage Limitation Team. The initial response requires a team of six. This enables two members of the team to be committed to salvage operations, two members of the team to consider security and liaison and the final two members of the initial team to be involved in the packing of removed items. As more team members arrive, they are assigned to a task dependent on the needs of the incident.

Two pre-determined locations for the relocation of items have been agreed with the Vienna Fire Brigade and the team manager will decide on which one should be used during an incident.

The priority lists that have been produced have been developed in a pragmatic manner, considering ‘what can reasonably be done by the team in an emergency situation’.

6.3 Mobilising

If the team are to attend an incident then the method for calling them out is through SMS on their mobile phones. The control room will enter the message and this will be relayed to all members of the team. This relies on coverage of the mobile phone service and can also be slowed down in the event of heavy use of mobile phones.

In the event of the team being turned out for an incident, they will report to the DLT centre. Here there is a sheet for each member of the team to sign when they arrive. This sheet identifies who will be the team leader and there is a section for each member of the team to sign along with a section for where they are to respond. There are clear written instructions provided.

The first member of the team will get information on the alarm and will be responsible for communication and liaison with the Fire Brigade and passing information to other team members via the hand held radios. The next member of the team will be responsible for leading the team. An initial team will consist of six members and as further members of the DLT arrive they will be allocated tasks.

The first two members of the team to respond wear high visibility waistcoats over their overalls to ease identification and to ensure that team members and the Fire Brigade are aware who the team leaders are.

6.4 Damage Limitation Equipment

There are six trolleys strategically placed around the palace, each holding a similar list of contents. In addition, larger, more specialist equipment is stored within the workshop area.

The equipment on the trolleys is not tested during every training session. It is checked on an annual basis and then a seal applied in order to ensure that the equipment has not been used since the last test.

For Personal Protective Equipment the team are provided with hard hats complete with chin straps. In addition, battery operated flashlights can be attached to the hats.

Each member of the team has a one-piece coverall made from Nomex® flame retardant material. The coveralls have 'DLT' printed on the back of them and the persons name is on the front. Boots and gloves are provided to each member of the team.

7. Damage Limitation Team Training

On the evening of 01 March I attended the training session of the Damage Limitation Team. The team train once per month and training lasts for approximately two hours. In addition to this training session, the team are also involved in moving objects and clearing rooms in Schonbrunn when they need to be emptied for renovation work. This provides an additional training opportunity for team members.

There are a total of 34 team members, of which 20 attended the training exercise that I observed. It is a requirement that each team member attends training and they should not miss more than two sessions each year.

During the training sessions all radios and hand held torches are tested. In addition all those attending will register their attendance and a record is maintained of training undertaken.

Within the DLT centre there are training notes on such things as dealing with water damage, what to do in the event of a terror attack and operational instructions for the hand held radio system.

For the exercise, one of the showrooms had to be cleared of all artefacts. The original items are used in all cases except when the team train on the removal of pictures. It was obvious from my observations that the team were well practiced and comfortable with what was being asked of them. The room was cleared in a quick and professional manner.

Items were moved a few rooms along the building where other members of the team were responsible for the packaging and labelling of the items. The Damage Limitation team trolley was taken to this room. The labels that were used for training purposes were hand written, in the event of an emergency then the pre-printed cards identifying each item would be secured to the item.

Following the exercise there was a debrief which enabled all members of the team to contribute and discuss any learning issues from the exercise. Some discussion took place on the brief that team members had received whilst a further discussion was on the number of staff that should be used for carrying some of the vases that were evacuated.

It had been intended to organise annual exercises with the Vienna Fire Brigade, unfortunately this has not been possible and the last exercise was held in 2001. However, the brigade attend on a regular basis to undertake visitations in order to familiarise themselves with the layout of the building and to consider the risks and control measures in place.

These visits enhance the liaison that exists between Schonbrunn and the Vienna Fire Brigade at management level.

8. Review of Existing Arrangements

When identifying the purpose of the visit, it was established that there were five areas for research. Having now undertaken the visit, I felt it would be beneficial to consider the arrangements, not only at Schloss Schonbrunn but also with the other heritage agencies that I have considered and consequently this review considers arrangements at all these properties.

8.1 Consideration of documentation available on the management of a Damage Limitation Team, including the regulation and control of members of the team.

During my visit I was able to establish that there were good, well-practiced management systems in place at Schloss Schonbrunn. There are written management instructions available in the Damage Limitation Team Control Centre, which detail the roles and responsibilities for team members. The control of team members commences with them 'signing in' when they respond to an incident before control of the team passes to the Team Leader.

The management strategy aligns itself, where possible, to the report on the development of Damage limitation Planning at Schloss Schonbrunn submitted by Stewart Kidd on 12 December 1999.

During the scientific meeting Nick Jordan explained the management systems in place within the National Trust. This includes the requirement for property managers to participate in the formation of a Property Risk Management plan including the need to incorporate written procedures of Damage Limitation Teams.

Prior to undertaking the STSM I visited Hampton Court Palace where I saw documentation relating to their Salvage Team. This contained instruction on the control of members of the team and stipulated "The role of the Salvage Team is to work alongside and, under the direction of, the Emergency Services."

8.2 The contents of a written management plan for a historic palace to identify the role and responsibility of the Damage Limitation Team within the plan.

Wolfgang Kippes provided a comprehensive understanding of the management plan for Schloss Schonbrunn and the role and responsibility of the Damage Limitation Team within that. As stated above, there are clear guidance on the roles and responsibilities of Team Leaders and team members when the team responds to an incident.

The role of the Damage Limitation Team is also well known and clearly defined by the Vienna Fire Brigade, as demonstrated by Frank Peter during his presentation to the scientific meeting.

During the National Trust course on Emergency Salvage, the roles and responsibilities of the salvage team and the property manager were well highlighted with property managers tasked to include this in their plans.

Hampton Court Palace clearly define the roles and responsibilities of their salvage team members through a series of scenarios relating to their attendance at various properties.

8.3 The examination of Emergency plans and in particular how Damage Limitation Plans are developed and integrated into these, along with key considerations involving the safe and secure evacuation of artefacts.

The Damage Limitation Plan is well integrated into the emergency plans for Schonbrunn. The development of the Damage Limitation Team has secured this integration while the structured approach to training ensures safe and secure evacuation of artefacts.

Damage Limitation Plans ensure appropriate equipment and floor plans are provided for the team along with detailed information in relation to items, including photographs and advice on removal of items. The provision of pre-arranged storage areas for any items removed from the palace further improves the security considerations of damage limitation.

The information provided as part of the Damage Limitation plan is similar to that provided at Hampton Court Palace where they also catalogue all items and provide detailed floor plans.

8.4 The co-ordination and integration of the emergency services response with particular emphasis on the relationship between Damage Limitation Teams and the professional fire services.

Schloss Schonbrunn provided a very good example of cooperation between the professional fire services and heritage agencies. The one area for improvement that I would identify would be that the Damage Limitation Team and the Vienna Fire Brigade should undertake another joint exercise, as they haven't done so since June 2001. Having said that, it is clear from the presentation given by Frank Peter to the scientific meeting that the fire brigade work closely with Schonbrunn on the development of their management systems and in developing the role of the Damage Limitation Team.

Frank Peter did highlight that the relationship between the Fire Brigade and Schloss Schonbrunn was greater than at any other building in Vienna.

Outwith Vienna, the co-ordination and integration rests with the Austrian Association of Volunteer Fire Brigades. During his presentation to the scientific meeting, Johannes Leglar-Diesbach explained the work he has completed to develop joint training and fire management in heritage properties, again demonstrating a very good example of cooperation.

During my visit to Hampton Court Palace I was made aware that London Fire Brigade attends the palace to look at the procedures and for familiarisation, however there have been no joint training exercises. Therefore it is unlikely that London Fire Brigade would be fully aware of the capability of the salvage team.

The National Trust encourages liaison with the fire service through property managers and Nick Jordan explained that property managers are required to liaise with their local Community Fire Station and encourage fire crews to visit their properties.

8.5. The level of training required by members of Damage Limitation Teams to develop and maintain their skills. The training available to professional fire fighters to consider the unique features of a historic palace and the integration of training through joint exercises.

At Schonbrunn the team train once per month, for approximately two hours. In addition to this training session, the team are also involved in moving objects and clearing rooms in Schonbrunn when they need to be emptied for renovation work. This provides an additional training opportunity for team members.

There does not appear to be any formalised training for professional firefighters to consider the unique features of a historic palace and there have been no joint training exercises since June 2001.

The training regime employed by the Damage Limitation Team at Schonbrunn is similar to that utilised by the Salvage Team at Hampton Court Palace. Again, there is little formalised training for professional firefighters to consider the unique features of a historic palace and there have been no joint training.

The training undertaken by the Volunteer Fire Brigades in Austria is a good example of joint training making both property owners/managers and the volunteer fire brigade more aware of the issues in relation to fire in heritage properties.

The training provided to managers within the National Trust is another example where fire professionals come together with a heritage agency to discover the unique features of firefighting in heritage properties.

However the number of fire professionals that can attend is limited.

The conclusions above all relate to the specific areas of research that was identified prior to undertaking the STSM. There are additional, very good examples of cooperation between the heritage agencies and professional fire services.

All elements of the management strategy in place within Schloss Schonbrunn, including the roles and responsibilities of the Damage Limitation Team, the fire action plan, the introduction of fire detection and suppression systems and all fire safety issues are agreed between Schloss Schonbrunn and the Vienna Fire Brigade.

Luca Nassi was able to provide the scientific meeting with an overview of the Santa Maria Della Scala in Siena, Italy. He highlighted the need for close liaison during renovation work and demonstrated that through this specified fire safety goals could be achieved even where prescriptive standards could not be met.

During my presentation I provided details of the unique partnership that exists between Historic Scotland and the Scottish Fire and Rescue Services.

The STSM and scientific meeting proved however that there is still a need for further work to enhance the relationship between the professional fire services and heritage agencies. There is a need for fire services to be more aware of the unique features that will affect firefighting in a heritage property, property owners and managers need to be aware of the fire service need for information in the event of an incident and the need to pre-plan in order to limit damage in the event of a fire and both must have protocols in place that will ensure cooperation between them.

9. Recommendations

In order for all members of the Action to benefit from this Short Term Scientific Mission, the good practice that has been highlighted within this report needs to be disseminated and where necessary supplemented. Where there are areas for further development this must be addressed as part of the outcomes of the action. I therefore make the following recommendations:

9.1 The Management committee approve this Scientific Report and include this within the final report of COST Action C17, Working Group 4 to demonstrate examples of 'Management Strategies to secure integration of Damage Limitation Teams and professional fire services'

9.2 Guidance be provided to owners of properties on developing management plans for their properties to include areas such as Damage Limitation and Liaison with the fire service. I would propose to produce this as a short guide, published through Historic Scotland and included within the final report of the Action.

8.3 Guidance to be provided to Fire Services. In particular, the information available to crews and how this is being used, training provided on the unique features of a fire in a heritage property, exercises being carried out at heritage properties, Damage limitation awareness and training along with the level of operational response to heritage properties.

9.4. The terminology used to describe the mitigation of fire damage should be standardised across Europe as 'damage-limitation'. Maintaining the term 'salvage' does not convey the positive and proactive approach necessary from damage limitation strategies. 'Salvage', by implication suggests a tactic of recovering contents and mitigating damage at the time of, or immediately following, intervention tactics. 'Damage limitation' is about pre-planning, consultation with occupiers, having established and widely understood procedures for individual risks and is a dynamic process conducted before, during and after incidents.

SECTION 14

COST Action C17: “BUILT HERITAGE: FIRE LOSS TO HISTORIC BUILDINGS”

Associated Publications

SECTION 14: Contents



COST Action C17: 'Built Heritage:
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COST Action C17: ASSOCIATED PUBLICATIONS

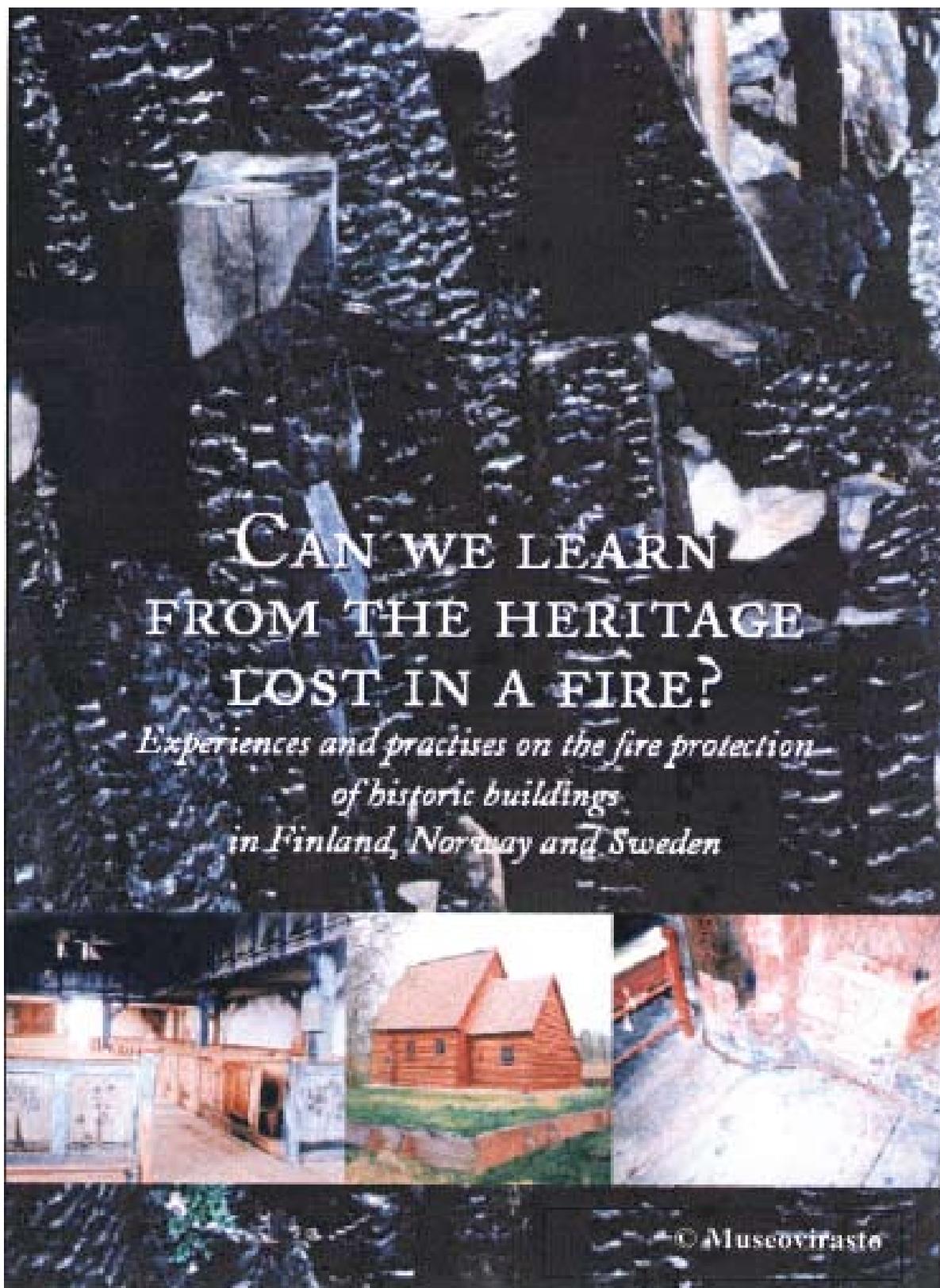
Ingval Maxwell

Over the course of the Action a number of relevant publications have been produced by members. These have greatly contributed to the debate on fire loss and contain much useful material on the subject.

From the outset of the Action members were advised, and consulted, on the production of Historic Scotland's Technical Advice Note TAN 28 Fire Safety Management in Heritage Buildings published in 2005. Colleagues in Riksantikvaren (The Norwegian Directorate for Cultural Heritage), in conjunction with Historic Scotland, jointly produced three documents in support of the Action. In addition the Directorate also produced a further volume in support of C17's remit, all during 2006.

In 2003 Swiss, and in 2003 and 2006, UK colleagues also used material emerging for the Action to support the production of documentation in each of their countries. Conference proceedings and abstracts were published in 2006 following the 2004 Action event in Varna, Bulgaria and that in Ljubljana, Slovenia during 2006.

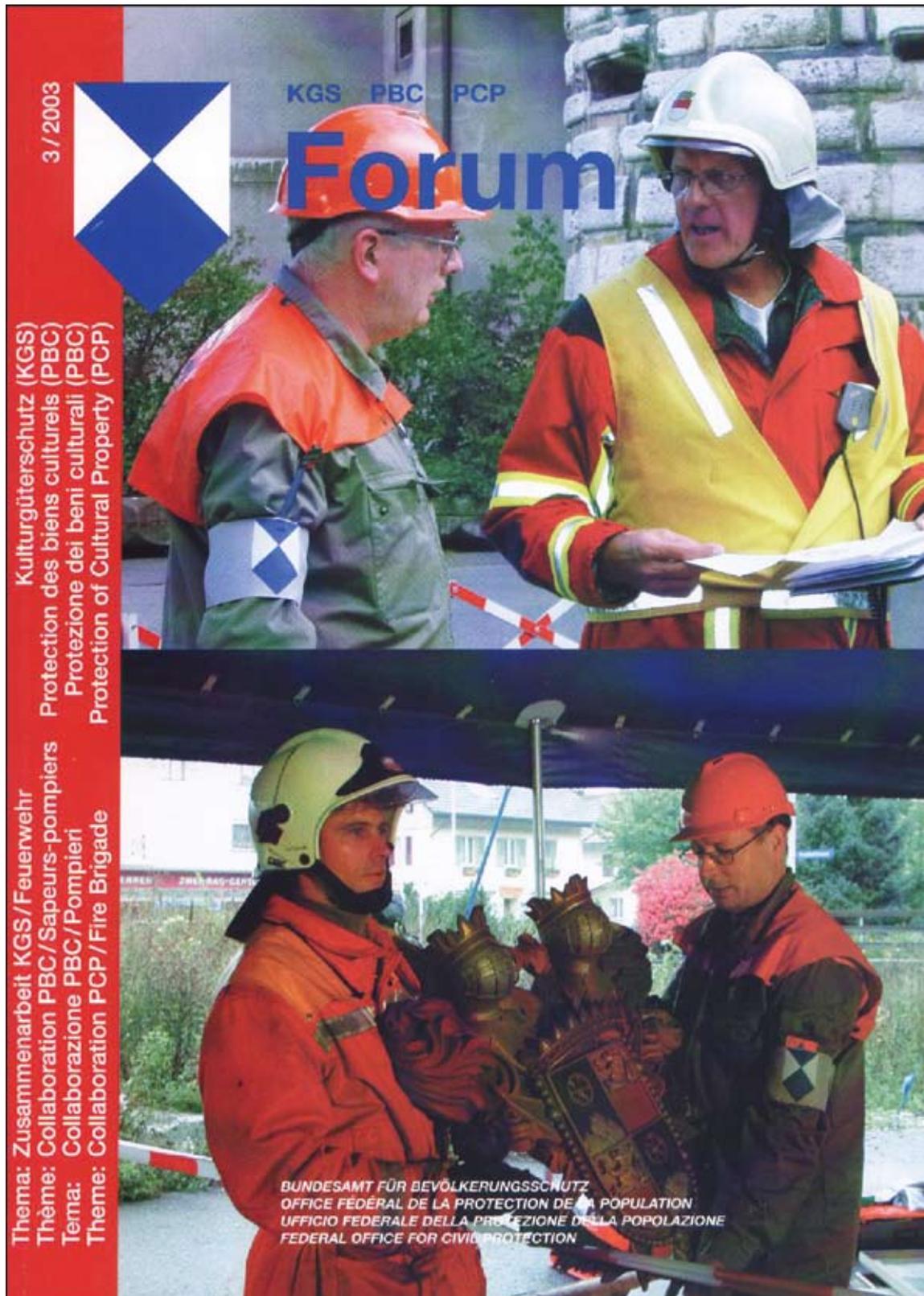
In addition to the Final Report documents, seven publications can therefore be directly attributed to the influence and work of COST C17.



Can we Learn from the Heritage Lost in Fire – Research Report

80pp A4, 2004 (PB) ISBN 951-616-115-4, ISSN 1236-6439

Jointly produced by the Nordic Council of Ministers, National Board of Antiquities, Riksantikvaren and Riksantikvarieämbetet, this publication is the result of the “Can we learn from the heritage lost in fire?” project in which Finland, Norway and Sweden consulted about their experiences and knowledge of fires and fire protection in historic buildings. Copies were freely given to C 17 members to assist them in their work.



KGS PBC PCP Forum 3/2003 theme: Collaboration PCP/Fire Brigade

68pp A4, 2003 (PB)

This Swiss Journal concentrated on achieving closer collaboration between the built heritage sector and the fire brigades. It contained a number of topics relevant to the work of C17 with articles on the Action, and the Scottish Historic Buildings National Fire Database. Copies were given to C 17 members to assist them in their work.



DEPUTY FIREMASTER DAVID DALZIEL

GRAMPIAN FIRE BRIGADE

INTERNATIONAL RESEARCH PROJECT

BRIGADE COMMAND COURSE 2002



SAFEGUARDING OUR BUILT HERITAGE AND PROTECTING IT FOR THE FUTURE



Coventry University



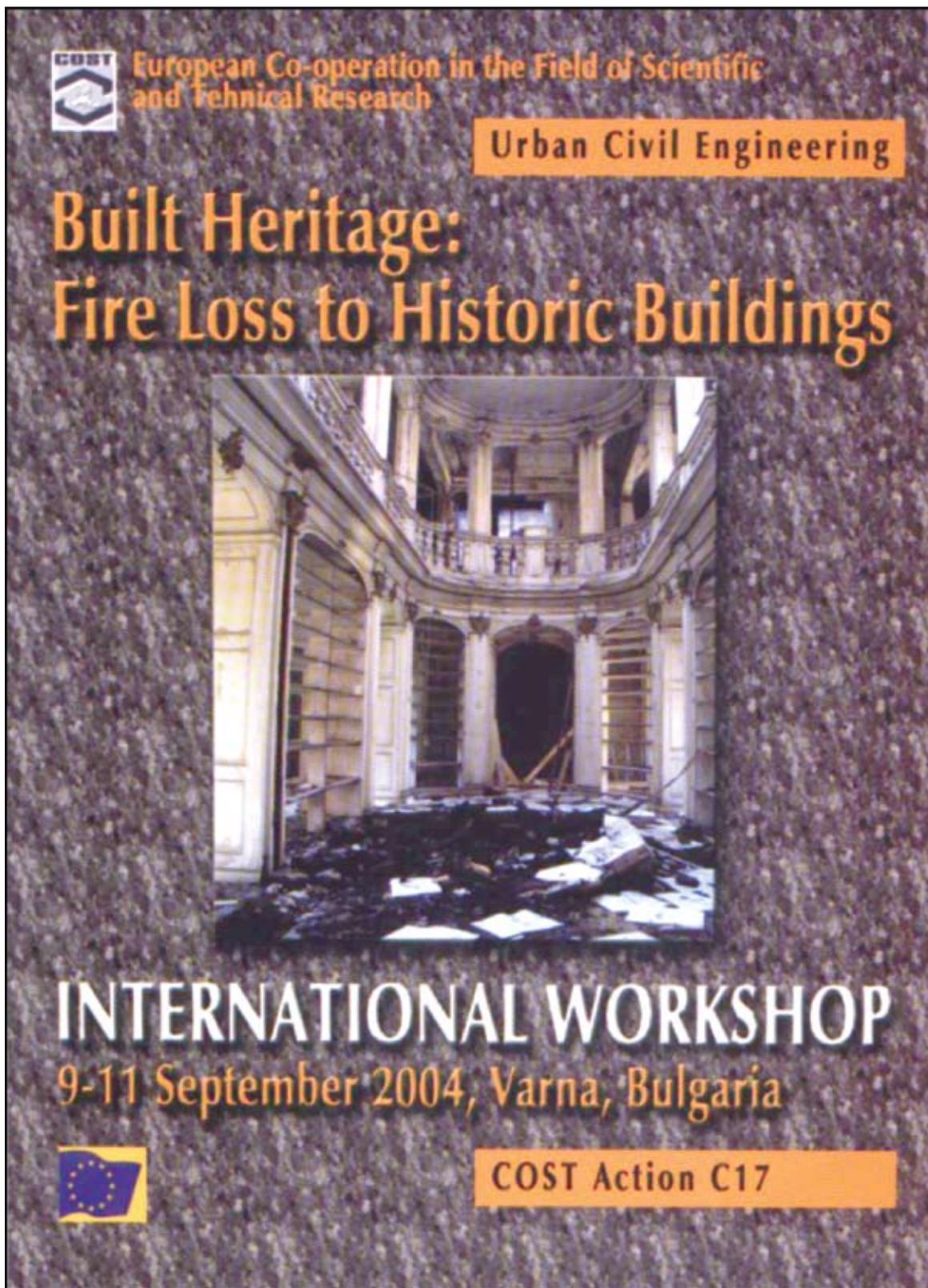
Fire Service College

APRIL 2003

Safeguarding our Built Heritage and Protecting it for the Future

148pp 2003 Un-published Fire Service College thesis

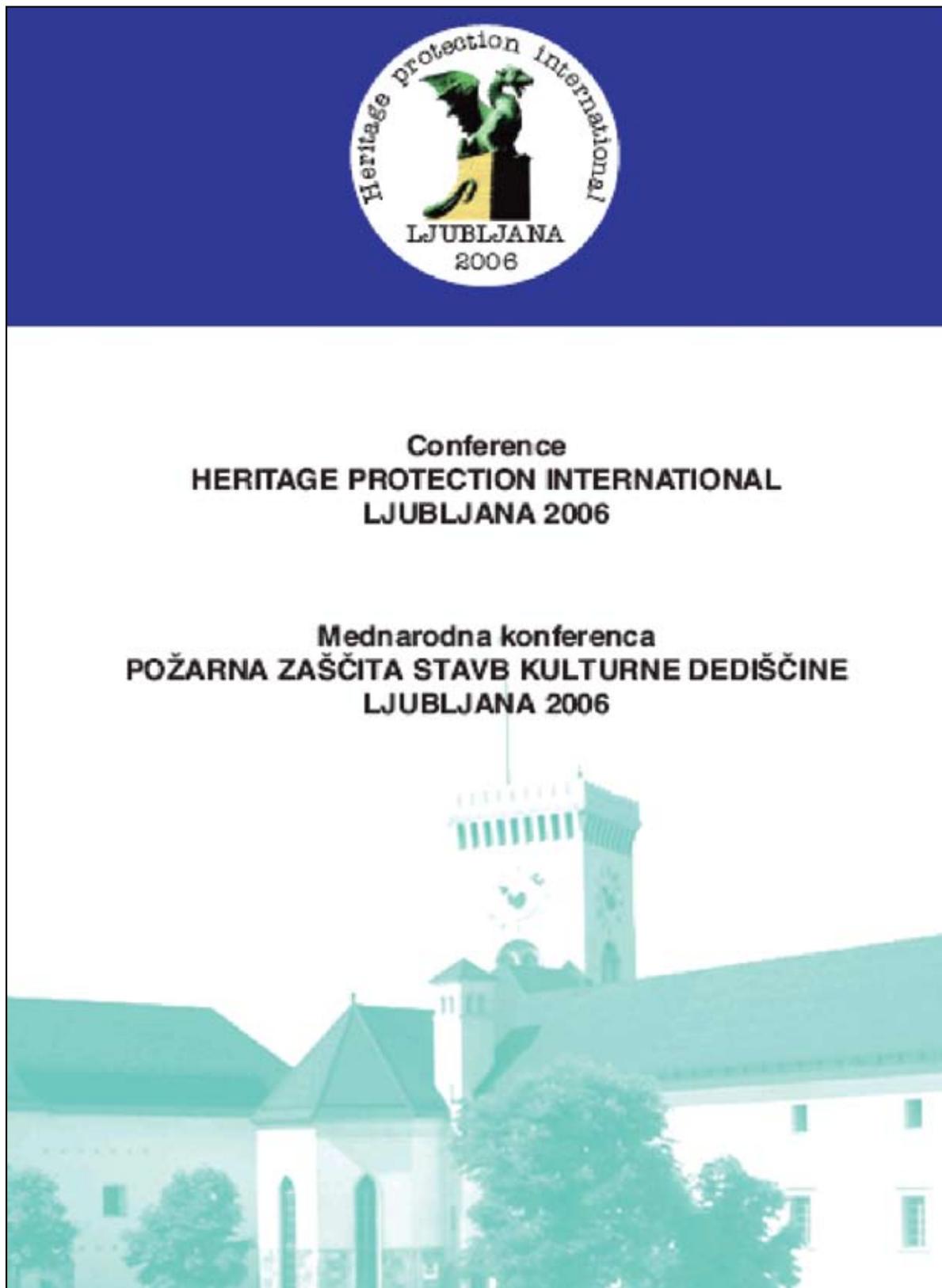
Building upon contacts achieved via the COST C17 network a comparative study between the UK and Sweden investigated the degree of liaison between the fire services and the heritage bodies and whilst noting similarities between the two countries, a call is made in the report for improvements in the way information is issued to the fire services on specific operational considerations and intervention measures associated with fires in historic buildings.



Built Heritage: Fire Loss to Historic Buildings International Workshop 9-11 September 2004, Varna, Bulgaria. COST Action C17

172 pp, 2006 (PB) ISBN-10:954-751-072-X, ISBN-13:978-954-751-072-2

Conference Proceedings of 14 papers presented at the COST Action C17 International Workshop in Varna, Bulgaria in September 2004, with a Summary of each and an Interim Progress Report on the work of the Action to date.



Heritage Protection International Ljubljana 2006

64 pp, 2006 (PB)

Conference abstracts of 22 papers presented at the joint Slovensko Združenje Za Pozarno Varstvo (SZPV), American Fire Protection Association (NFPA) and COST Action C17 International Workshop in Ljubljana, Slovenia in May 2006, with speaker CV's.

RESEARCH REPORT

Minimum Invasive Fire Detection for Protection of Heritage



by
COWI

on behalf of



in support of



Minimum Invasive Fire Detection for Protection of Heritage – Research Report

40pp A4, 2006 (PB) ISBN 82-7574-040-1

Produced for Riksantikvaren (The Norwegian Directorate for Cultural Heritage) with Historic Scotland's sponsorship in support of COST Action C17, this publication reviews the available range of fire detection equipment for historic buildings application, including line heat detection and area fire detection for wider townscape protection.

RESEARCH REPORT

Hypoxic Air Venting for Protection of Heritage



by
COWI

on behalf of



in support of



Hypoxic Air Venting for Protection of Heritage – Research Report

80pp A4, 2006 (PB) ISBN 82-7574-037-1

Produced for Riksantikvaren (The Norwegian Directorate for Cultural Heritage) with Historic Scotland's sponsorship in support of COST Action C17, this publication examines innovative systems for modifying air oxygen concentration in enclosed spaces, setting out the scientific background and considering heritage building fire protection application potential.

RESEARCH REPORT

Manual Fire Extinguishing Equipment for Protection of Heritage



BY
COWI

in cooperation with



in support of

cost

Manual Fire Extinguishing for Protection of Heritage – Research Report

62pp A4, 2006 (PB) ISBN 82-7574-039-8

Produced for Riksantikvaren (The Norwegian Directorate for Cultural Heritage) with Historic Scotland's sponsorship in support of COST Action C17, this publication evaluates manual fire fighting techniques, equipment and extinguishing media, taking particular account of impact on historic contents and building fabric.

Riksantikvaren - The Norwegian Directorate for Cultural Heritage (RNDCH)

Analysis of Sprinkler Failures in Listed Heritage Buildings

Analysis of unintended activations of water based extinguishing systems in Norwegian heritage buildings



^{BY}
COWI

in support of



in support of

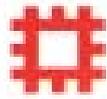
COST

February 2006

Analysis of Sprinkler failures in Listed Heritage Buildings – Research Report

16pp A4, 2006 (PB)

Produced for Riksantikvaren (The Norwegian Directorate for Cultural Heritage) in support of COST Action C17 this volume considered the causes and effects of a series of Norwegian cases where sprinkler failures have occurred.



ENGLISH HERITAGE

Fire Safety in Historic Town Centres



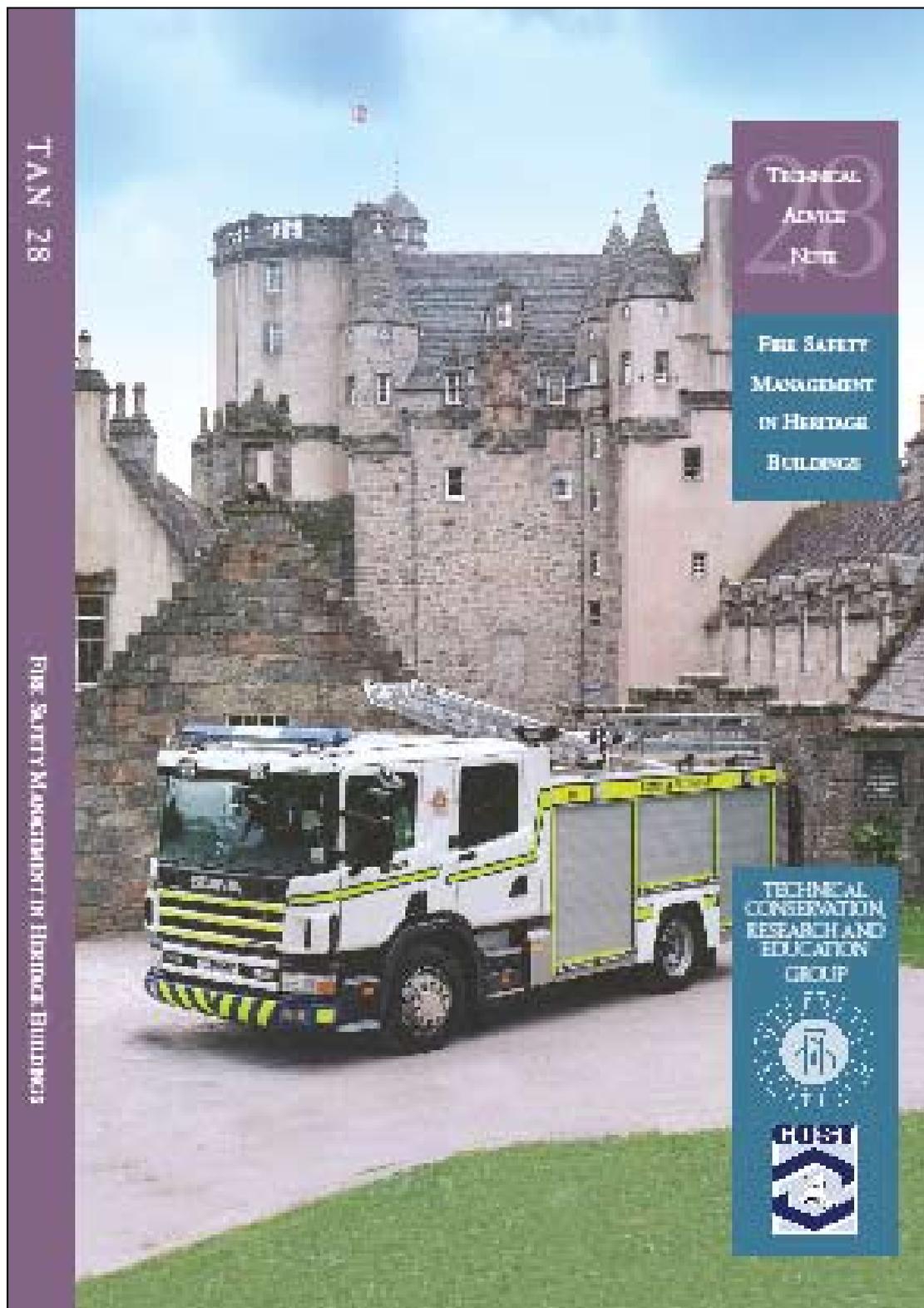
Bergen Wooden Town protected by Gornner System

Steve Emery
Fire Safety Adviser for English Heritage

English Heritage Fire Safety in Historic Town Centres

28pp 2006

Incorporating material achieved through the work of the Action and building upon the Chester Rows fire experience, this publication offers a history of fires in town centres and explores the enforcement, education and environmental techniques that can improve fire safety in the community. It also considers legislation, detection and operational themes.



TAN 28 Fire safety management in Heritage Buildings

112pp A4, 2005 (PB) ISBN 1 904966 11 X

Published by Historic Scotland this Technical Advice Note aims to reconcile the continued use of historic buildings with protection from loss by fire. Building management measures are outlined in addition to offering an overview of fire legislation, standards and codes.

ISBN 1-904966-61-6



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