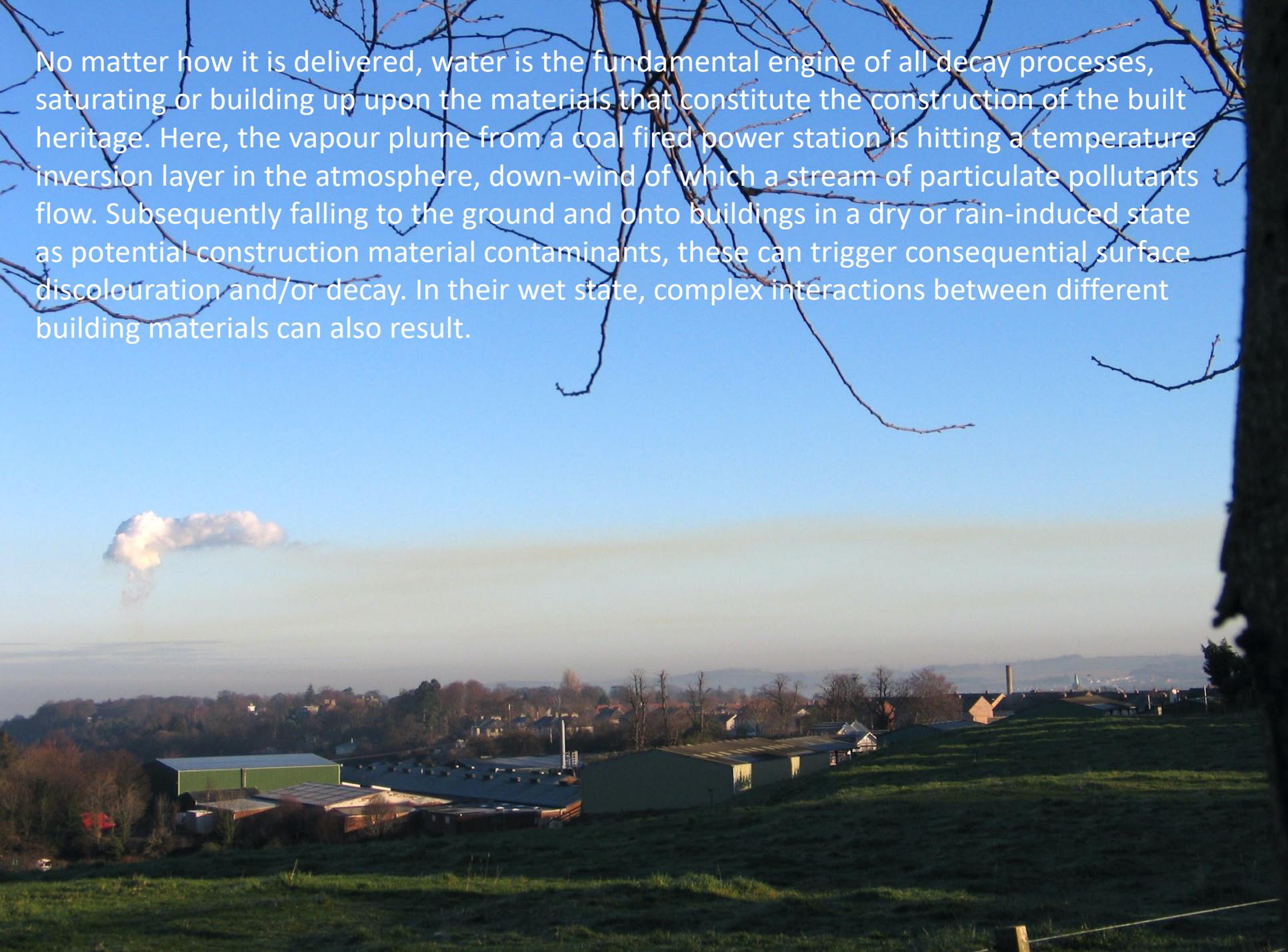


COTAC Insight 2f: The Need to be Aware of the Built Heritage

Exploring ICOMOS Education and Training Guideline
(f): Diagnose intrinsic and extrinsic causes of decay
as a basis for appropriate action

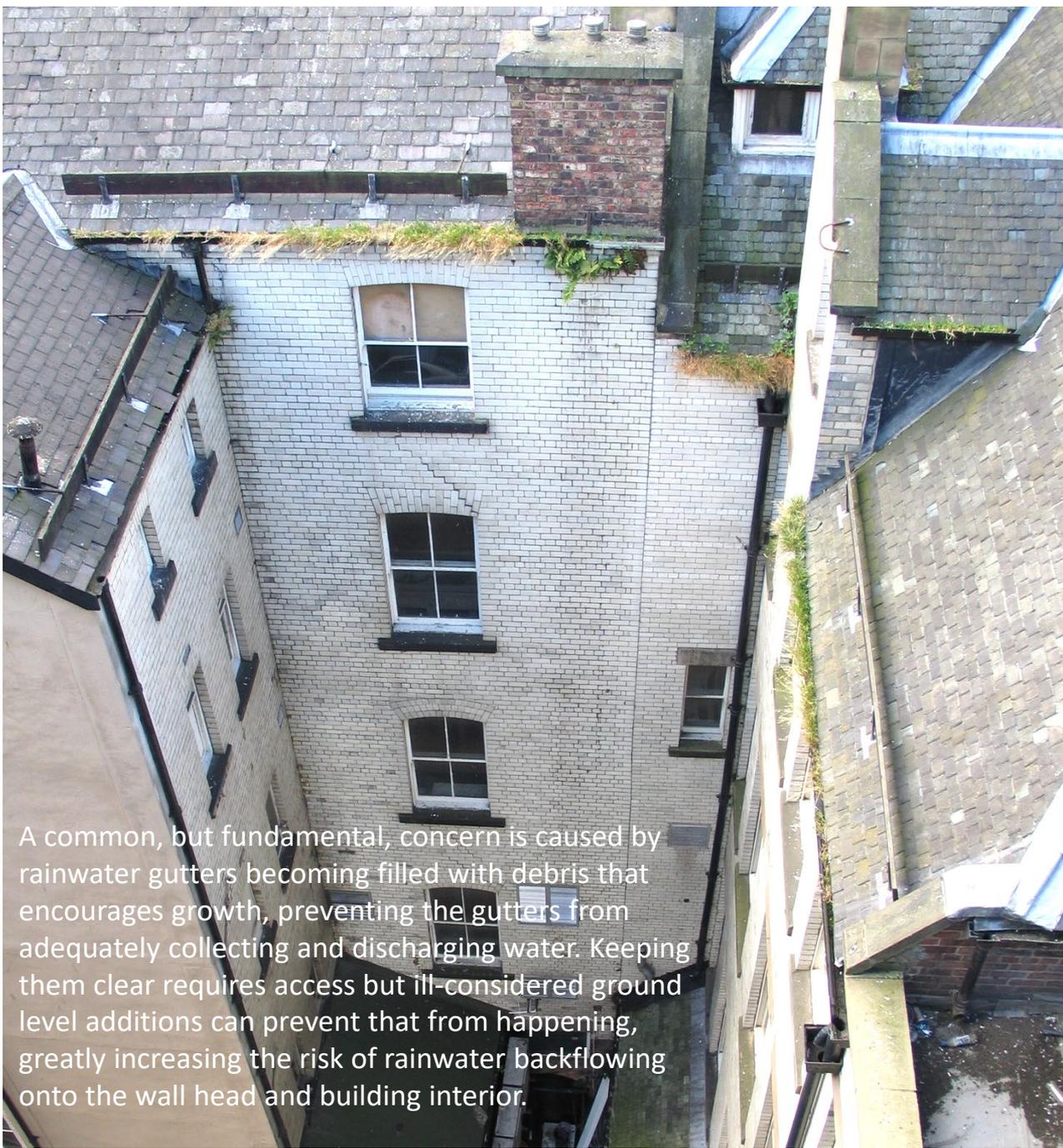


No matter how it is delivered, water is the fundamental engine of all decay processes, saturating or building up upon the materials that constitute the construction of the built heritage. Here, the vapour plume from a coal fired power station is hitting a temperature inversion layer in the atmosphere, down-wind of which a stream of particulate pollutants flow. Subsequently falling to the ground and onto buildings in a dry or rain-induced state as potential construction material contaminants, these can trigger consequential surface discolouration and/or decay. In their wet state, complex interactions between different building materials can also result.

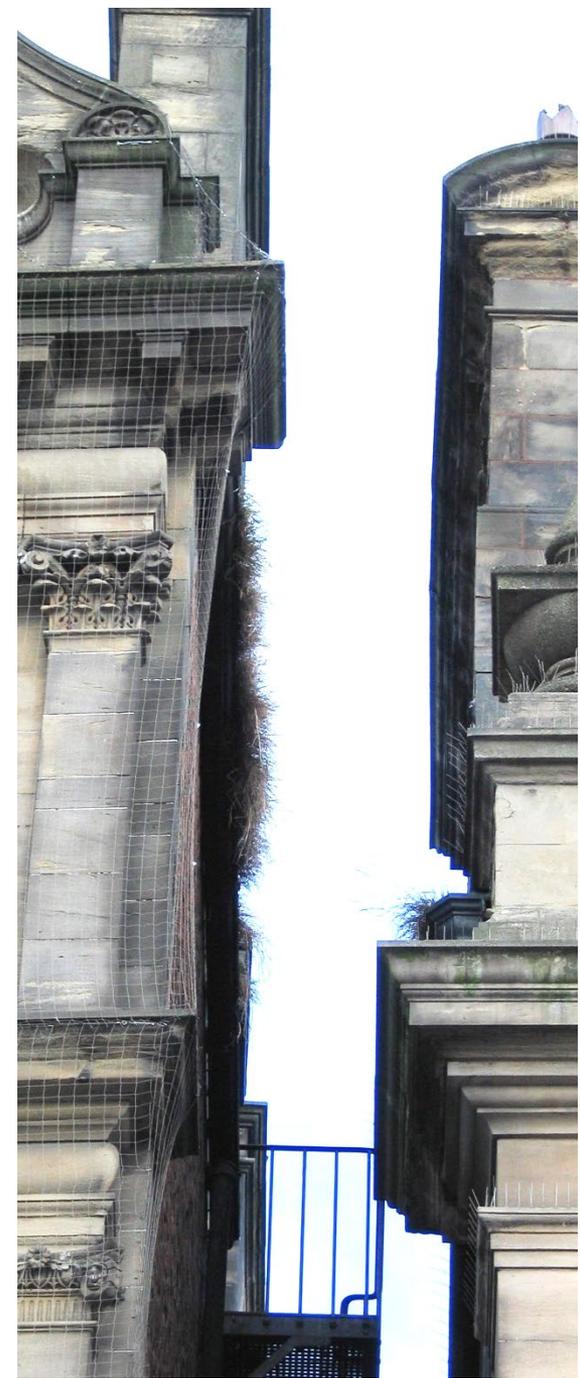




A longstanding progressive series of degradation processes can lead to significant degrees of structural collapse, unsafe buildings and the need for temporary bracing work to secure the remnant remains before planned remedial work can start. Undertaking necessary survey work in such conditions can be hazardous, requiring stringent safety precautions to be put in place



A common, but fundamental, concern is caused by rainwater gutters becoming filled with debris that encourages growth, preventing the gutters from adequately collecting and discharging water. Keeping them clear requires access but ill-considered ground level additions can prevent that from happening, greatly increasing the risk of rainwater backflowing onto the wall head and building interior.





Regardless of location, nature has a remarkable ability to take hold whenever the opportunity presents itself on decayed masonry, ledges and open joints. Established and flourishing growth clearly illustrates the need for remedial action at the site of the growth to prevent further damage.





The visual effect of prolonged in-depth water penetration of solid structural masonry results in dark coloured surface staining, often fringed with white salt deposits (efflorescence). Resulting from interactions within the stone and lime mortar, as the moisture evaporates to outside air it carries with it diluted salts and minerals to be deposited on external surfaces. Two main issues need to be considered: where is the penetrating water coming from; and what is happening on the internal wall face. Comprehensive remedial works will be called for, with consequential external staining liable to be permanent once these are complete and the wall has dried out.





Left unattended, broken or missing slates (or tiles) can lead to increasingly expensive repair work as deterioration progresses in consequence of unhindered rainwater penetration. Preventing this calls for regular inspections and immediate remedial work when defects are discovered. The Dutch 'Monumentenwacht' scheme offers an ideal model to follow in response.

The end grain of venerable timbers, their joints, horizontal structural members and associated construction techniques can become exposed to the elements. Despite protection offered by overhanging upper elements, timbers can be vulnerable to the effects of wetting, eventual rot and decay resulting in the need for replacement of damaged sections.





Dry rot within a property can be structurally devastating and expensive to treat. It occurs when airborne 'spores' come into contact with damp timber that has a moisture content of over 20%. On germinating, the 'spores' sprout white strands or 'hyphae' that grow into 'mycelium' which attacks timber, potentially travelling some distance and through masonry to do so. Subsequent 'fruiting bodies' release a considerable number of airborne 'spores, initiating a repeat of the process wherever the right conditions are found elsewhere. Regular building inspections and the stemming of any timber-saturating water sources are the primary defence mechanisms that can be deployed.



Amongst other reference sources, for additional information see:

<https://www.property-care.org/partnerships/countrywide/timber-decay/dry-rot-hyphae/>

<http://www.ourdiyprojects.net/wp-content/uploads/2013/08/dry-rot-lifecycle.jpg>

<https://advancedbasements.co.uk/wp-content/uploads/2014/12/Timber-bodyimage-01.jpg>



Until the advent of canals and railways, locally available stone was used for building purposes. Dated gravestones offer good visual and physical evidence about how effective local stone is at resisting the effects of weathering and degradation. Despite visual distressing some deterioration can occur without loss of structural integrity.



A wide variety of masonry defects occur: correctly identifying cause will greatly aid the choice of specialist conservation techniques needed to rectify. For a detailed awareness of the types of stone deterioration see: <http://iscs.icomos.org/glossary.html>

INTERNATIONAL COUNCIL ON MONUMENTS AND SITES **ICOMOS** CONSEIL INTERNATIONAL DES MONUMENTS ET DES SITES

ICOMOS-ISCS :
Illustrated glossary on stone deterioration patterns
Glossaire illustré sur les formes d'altération de la pierre

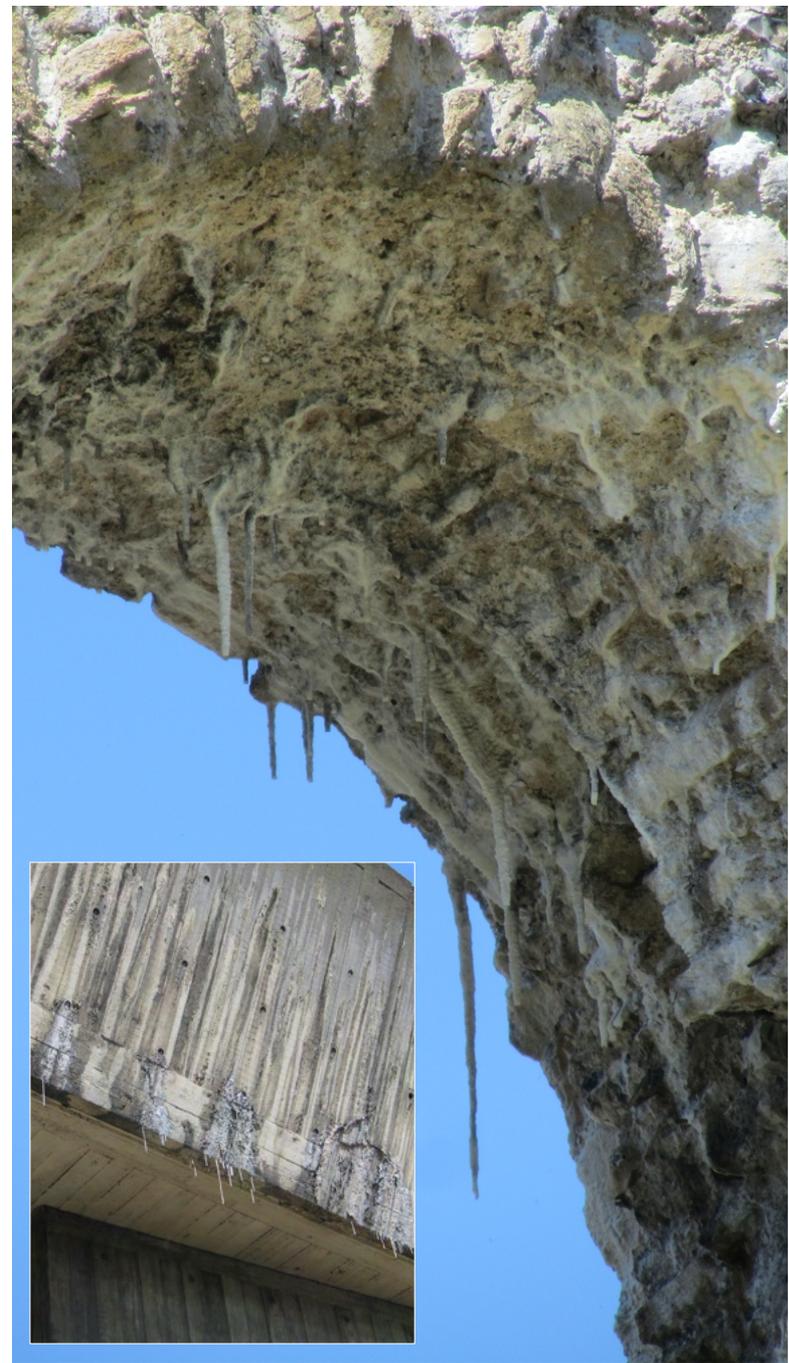
English-French version
Version Anglais-Français

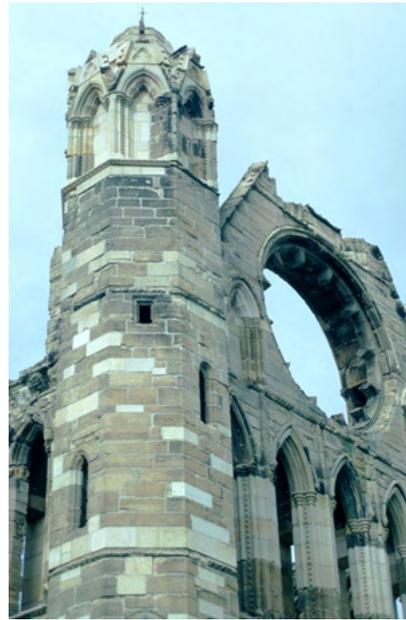
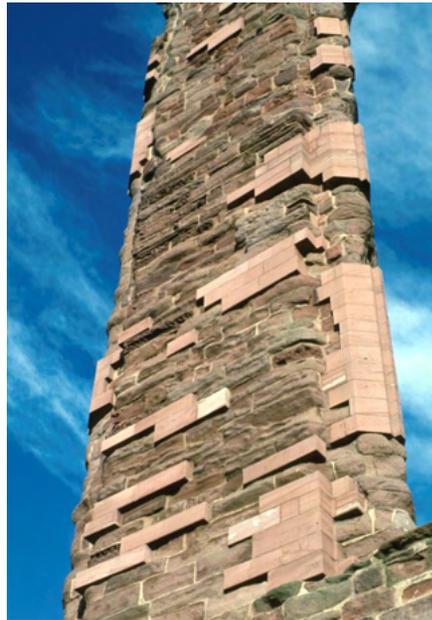
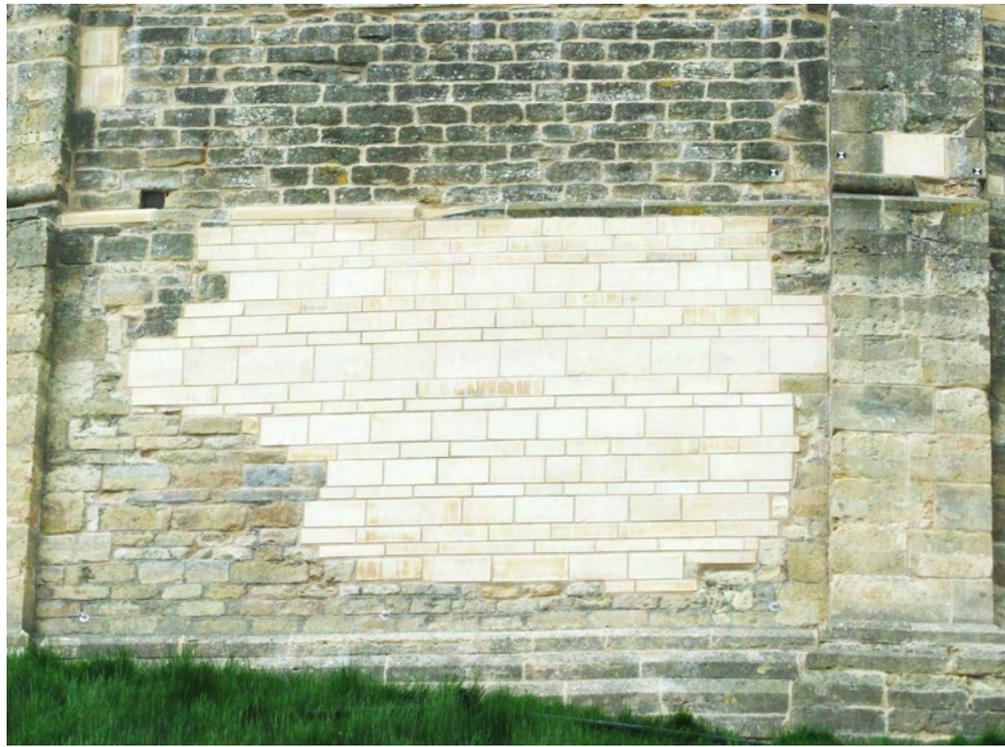
MONUMENTS AND SITES **XV**
MONUMENTS ET SITES

ICOMOS International Scientific Committee for Stone (ISCS) . Comité scientifique international "Pierre" de l'ICOMOS



Water saturation through masonry parapets, arches and bridge infill construction can create an interaction with calcite in mortars. This solution/suspension can be transported through joints to be re-deposited as 'stalactites' and surface build up on the under-side as contained moisture evaporates. Of limited structural concern the visual effects can be disfiguring and affect modern buildings too.

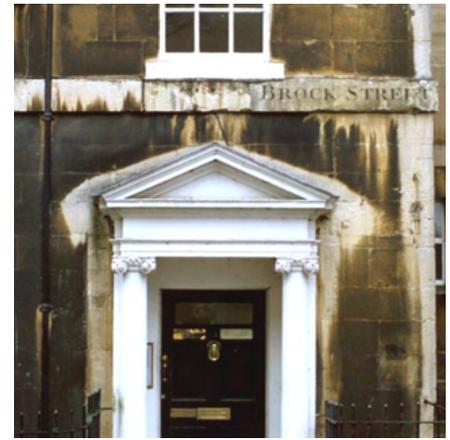




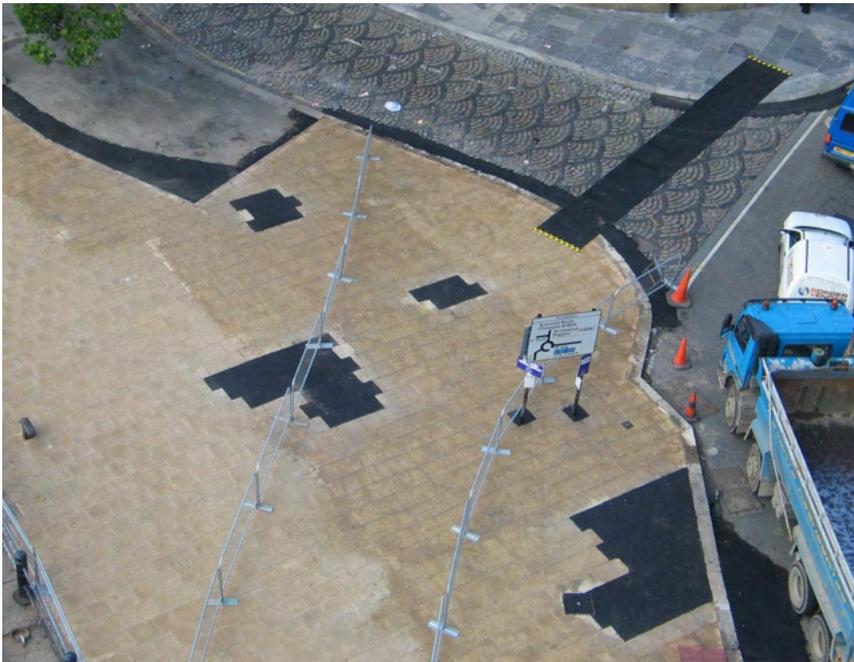
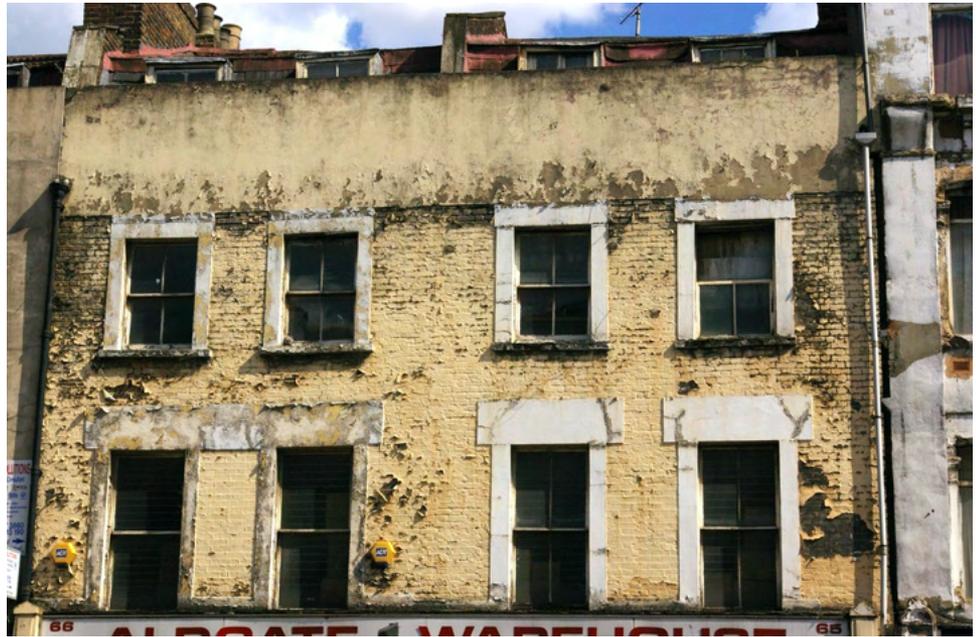
Difficult decisions may be required in deciding the best course of action when dealing with badly and/or uniformly eroded masonry. A fundamental question comes in deciding where to start interventions and more significantly, where to stop!



Brickwork can suffer a similar range of degradation problems as stone masonry, including loss of surface and body; poor workmanship; growth in mortar joints; efflorescence; structural movement and fracturing by in-built rusting elements.



How buildings discolour is a complex issue with numerous variables coming into effect: including stone type and its mineralogical makeup, microclimatic influences, surface growths and concentrated runoff. Should cleaning be considered a full range of issues need to be taken into account on a damage limitation basis.



The integrity of the built heritage can be undermined in a variety of ways, such as storm damage; the misguided use of the 'wrong' materials; the 'economic' reparation work of utility companies and through vandalism.

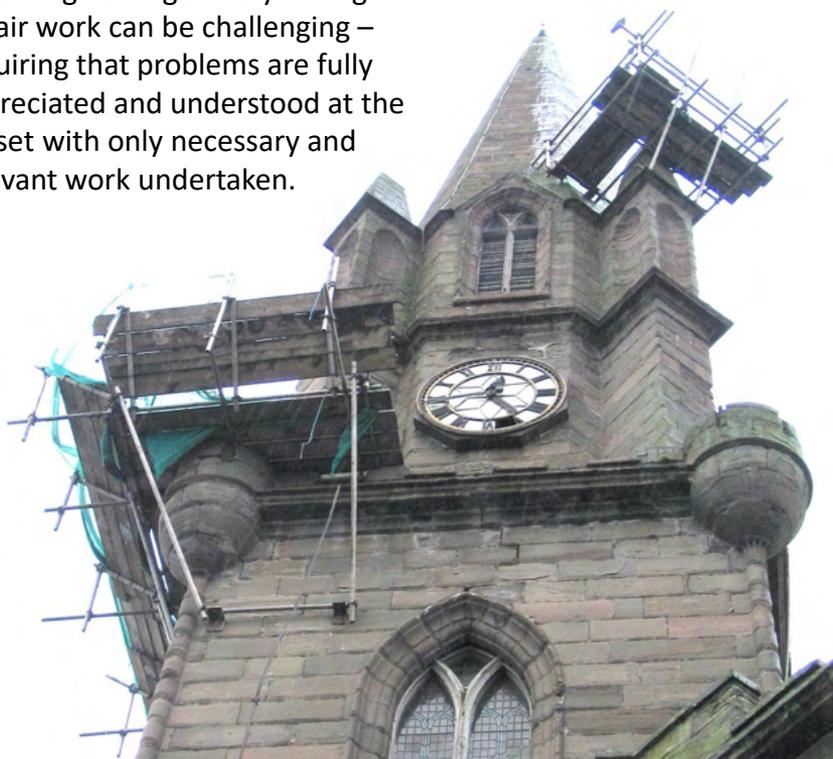


The degree to which built heritage is lost to the effects of fire each year is considerable. This calls for more effective analysis of vulnerabilities, compartmentation and alarm and suppression systems; in addition to effective management and training to reduce loss and impact.

In pursuing the need to appreciate *Guideline (f) Diagnose intrinsic and extrinsic causes of decay as a basis for appropriate action*, amongst other sources, accessing on-line articles can be informative as to the diversity of what issues might have to be considered and taken into account when determining the correct approach. See: <http://www.buildingconservation.com>

In addition a number of Guideline-specific URL links are offered on the COTAC Global website under the Menu tab '*Digital Bibliography*' at '*f. Diagnose causes of decay*'. See: http://www.cotac.global/digital_bib/

Accessing heritage safely during repair work can be challenging – requiring that problems are fully appreciated and understood at the outset with only necessary and relevant work undertaken.



www.[buildingconservation.com](http://www.buildingconservation.com)

HOME ▾ DIRECTORY ▾ ARTICLES ▾ BOOKSHOP WHAT'S C

ARTICLES

Subject Index (scroll down for a full alphabetical list)

| | | |
|--|---|--|
| <p>COMPONENTS</p> <p>1. GENERAL</p> <ul style="list-style-type: none"> • Chimneys • Door furniture • Fireplaces • Ironmongery • Joinery and cabinetmaking • Leadwork • Masonry • Nails • Paint and decorative finishes • Roofing • Services (heat, light, power) • Stained glass • Statuary and sculpture • Stucco • Tiles • Timber frames • Windows <p>2. INTERIORS</p> <ul style="list-style-type: none"> • Carpets • Cabinetmaking • Interiors (general) • Paint and decorative finishes • Papier mâché • Plasterwork • Textiles • Tiles <p>3. EXTERNAL WORKS</p> <ul style="list-style-type: none"> • Landscape and townscape • Conservatories • Churchyards • Gardens • Shopfronts | <p>MATERIALS</p> <ul style="list-style-type: none"> • Brick • Cast iron • Concrete • Earth • Glass • Lead • Lime (mortars, renders etc) • Paint • Papier mâché • Plaster • Metals • Stone • Terracotta • Thatch • Wood • Wrought iron <p>PROCESSES</p> <ul style="list-style-type: none"> • Archaeology • Cleaning • Damp and decay treatment • Decoration • Design • Fire protection • Heating • Heritage crime prevention • Insulation • Lighting • Lightning protection • Non-destructive investigations • Pest control • Record making • Security • Scaffolding • Structural engineering • Survey | <p>THEORY & PRACTICE</p> <p>1. GENERAL</p> <ul style="list-style-type: none"> • Courses, training and standards • Conservation principles • Conservation science • Project management • Restoration case studies <p>2. PLACES OF WORSHIP</p> <ul style="list-style-type: none"> • Conservation • Church bells and bell towers • Church organs • Church tourism • History • Churchyards • Stained glass <p>3. ENVIRONMENTAL</p> <ul style="list-style-type: none"> • Ecology • Pollution • Sustainability <p>4. FUNDING & FINANCE</p> <ul style="list-style-type: none"> • Cost management • Grants • Insurance <p>5. REGULATIONS</p> <ul style="list-style-type: none"> • Building regulations • Heritage organisations • Legislation and guidance • Planning (listed buildings, conservation areas, etc) |
|--|---|--|