Facts of the matter

Alan Forster explains the necessity of understanding materials, ahead of our new series of information sheets

The facts of the matter

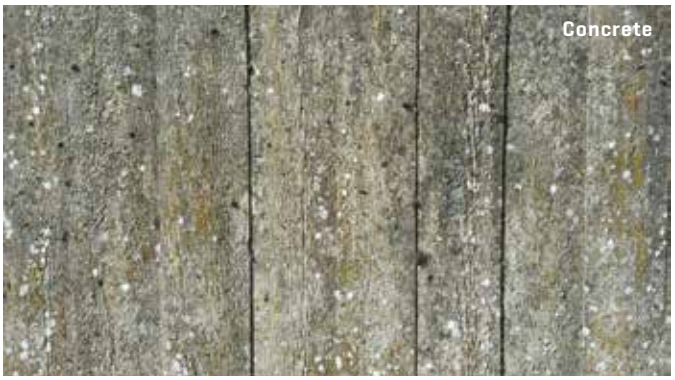
It is easy to forget the role that materials play in our built environment. They are culturally engrained, to the extent that they frame the epochs of human development – the Stone, Bronze and Iron Ages – and are used frequently in idioms with positive associations such as "carved in stone" or "good as gold".

Materials are integral to the pattern, texture and identity of the world's architecture, shaping the way we design and build. Materials and construction innovation has therefore enabled significant leaps in design and aesthetic expression, for instance, with reinforced concrete allowing fluidity of architectural form, or the invention of float glass technologies revolutionising internal natural lighting.

Materials underpin our professional practice and are fundamental for construction, repair and ultimately, recycling and reuse. The materials that we select can only be evaluated effectively if we have an implicit practical and scientific understanding of their properties.

Today, materials form an increasingly important role in fabric-first low-carbon design for historic and contemporary architecture. It is clearly a design aspiration to specify low-carbon materials that are exceptionally durable. Yet all materials deteriorate, and this process is encapsulated in the law of entropy, characterised by increasing disorder in a system with the passage of time. Climate and the efficacy of design, specification and construction play an important role in accelerating or arresting entropy.


Brick


Concrete


Harl and limewash


Sandstone


Stained glass


Entropy in action: corrosion


Terracotta

Understanding materials' performance and the way they will deteriorate is a time-honoured requirement. Indeed, the Italian author and architect Leon Battista Alberti described the "engines" of material decay as "damp, frost, and storm" compounded by the "error of mind and hand" in *The Ten Books of Architecture* in 1452. Materials, design, construction and climate are first-order considerations for sustainable architecture, and if the right choices are to be made they must be given the required analysis.

It is not easy to develop a taxonomy for building materials; traditional attempts to classify them, though, have included opposing pairs of properties such as: organic or inorganic; natural or artificial; structural or non-structural; porous or non-porous; and elastic or inelastic.

Pragmatically speaking, common material groups include: concrete and mortars; masonry materials such as stone, brick and ceramic; timber; metals and their alloys; polymers; composites; glass; structural and non-structural unfired earth; and roofing materials such as slate and thatch. These can be further subdivided into innumerable other types, such as limestones and sandstones; hardwoods and softwoods; combed wheat reed and longstraw, and so on.

The purpose of the *Building Conservation Journal*'s new series of materials information sheets (MIS), which begins in the next issue with a look at glass, is to distil selective yet significant information relating to individual materials' properties. The sheets will include information on manufacture, major uses, and decay and defects.

Together, the MIS series will offer a valuable resource for building surveying practitioners and direct them to additional reading on the subject. We will cover the materials commonly encountered by practitioners, and as such, we would welcome your views on materials topics: please email *journals@rics.org*

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