The changing face of conservation

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Advances in technology and the impacts of climate change are both forcing conservation professionals to consider the way they work

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Building conservation practice has ostensibly stayed grounded in the well-founded, slowly evolving core competencies that are reflected in the requirements of an array of professional bodies including RICS and the Institute of Historic Building Conservation . While much practice will remain relatively static, the conservation sector is today confronted by significant change that will force us to reconsider what services we provide, how we create value through them and how we present them to our clients. Two areas of conservation practice subject to disruptive technologies, or that will rely on disruptive technological innovation for solutions, are digital construction asset management and building resilience to climate change.

Digital construction asset management

Great advances have been noted in new-build applications, with increasing levels of building information modelling (BIM) implementation. It is fair to say that the same has not been the case in the heritage sector, which largely uses digital technologies such as laser scanning and photogrammetry for documentation, recording and interpretation. An example is Historic Environment Scotland ?s RAE Project, a 3D survey to digitally document 336 of Scotland?s most important monuments, which will take place over the next 10 years.

In the future we must use scan data more effectively, extracting value and allowing it to take centre stage in surveying, pathology, repair and maintenance, measurement and cost activities (see Building Conservation Journal, May/June 2017 , pp.31?33).

Scan-to-BIM applications, in which structures are scanned and automatically segmented into individual building elements to create a heritage building information model (HBIM), are considered the holy grail of data processing, and much cutting-edge research is currently being undertaken in this area. The power of extracting value from data cannot be overstated, and efficiencies in this area will enable money to be redirected from relatively mundane survey operations towards fabric repair and the upkeep of buildings. These digital technologies are already changing the way we evaluate, diagnose, repair and maintain our buildings.

Recently, advances in machine learning and artificial intelligence algorithms applied to scanned data have been used to enable automatic defect identification and classification on a scale, rapidity and level of accuracy that is uncommon in traditional practice. The interconnectivity of digital data from numerous sources is therefore paramount to integrated, efficient decision-making and intervention. For example, the extraction of measurement information from laser scanning cannot readily be imported into common digital documents that form the basis of bills of quantities and other common survey report formats. Innovation will link scan data to defects identification, costing, specification and augmented reality using a tablet or iPad, and will help on-site, real-time interaction with point clouds and digital data.

The nature of bespoke manufacture for repair is at a critical juncture thanks to increased use of digital printing technologies and associated novel materials, such as printed artificial stone. Combining dense point clouds with digital printing allows faithful reproduction of eroded and defective building components and assemblages. However, while this is a technological marvel, it poses significant philosophical problems relating to the authenticity and distinguishability of fabric intervention and, importantly, respect for the intangible cultural heritage (ICH) of craft skills in an increasingly automated world. The National Heritage Training Group has raised concerns over this issue and we must work hard to retain traditional craft skills.

Importantly, the rise of automation and robotics is driving increased use of modern methods of construction. This will radically affect the nature of education and training for construction professionals and the skills required of the workforce, both professional and craft, to carry out what will become more of an assembly line rather than a traditional construction process. However, although it will face changes, the area that may be least affected by automation and robotics is repair and maintenance and, by extension, the repair of historic buildings that are characterised by complex, bespoke design, reflecting their diversity in architectural form and fabric.

Resilient buildings

Traditional buildings, whether historic or not, constitute the vast majority of our built environment. These buildings were designed to perform in climatic conditions that did not often fluctuate significantly, and many have performed well in these stable environments for centuries. Climate change is placing these structures under increasing strain and they are now often expected to perform under more hostile conditions. Most notably, fabric is often subject to higher and longer lasting levels of moisture, and buildings are at increased flood risk as well as facing accelerated coastal erosion in certain cases.

We must be vigilant, but more importantly informed about the risks that will likely confront individual structures, either in our care or in the wider environment. This can be practically and objectively achieved by evaluating data sets, such as those at UKCIP , that are geographically contextualised by predicted climate change, for example increased rainfall, flood risk and coastal erosion. The determination and development of evidence-based risk mitigation strategies that support preparation for change will be a growing area of practice. Strategic planning and bespoke technical solutions will be required to help buildings perform under conditions in which they regrettably now find themselves, but the practicalities may be what matters most. Clearly, remedies must be achieved in a context of limited financial resources, forcing difficult decisions to be made in attempts to retain culturally significant fabric and sustain building utility. Organisations such as HES are proactively deploying bespoke strategies, and show us possible future services that we may offer clients in this emerging area.

In the context of building resilience to climate change, digital technologies are helping us diagnose failure, and better inform our strategies for upkeep and in-service performance of buildings. For example, multispectral overlays aligned onto laser-scan point clouds are extremely useful for hygrothermal analysis and can also help us evaluate the performance of complex building detailing that has in the past been more intuitively determined by surveyors assessing building defects. On a macro scale, geographical information systems (GIS) mapping and aerial photogrammetry using unmanned aerial vehicles, or drones, facilitate analysis of coastal erosion or flood risk for wider urban environments.

While building surveyors are not the only construction professionals benefiting from advancing technologies, by virtue of their in-depth and interconnected technical understanding of in-use building performance, repair and maintenance operations, they are arguably better positioned than other construction professionals to navigate this changing world. Importantly, they will themselves be more resilient professionally if digital technologies are meaningfully adopted and used in conservation. After all, it is the passing down of our common inheritance that is important, and if technologies can help us do so more effectively then they should be seen as a force for good rather that something to be feared.

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Further information

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