


E C C R E D I

European Council for Construction Research, Development and Innovation

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ECCREDI was created in Brussels on 19 December 1995 with the signing of a Memorandum of Understanding by representatives of European federations concerned with construction, in its widest sense.

The European federations participating in ECCREDI represent the principal interests within construction: contractors, engineering, consultants, architects and designers, product and material producers, building control organisations and research bodies covering buildings, infrastructure and geotechnics.

The aim of ECCREDI is to contribute to the competitiveness, quality, safety and environmental performance of the construction sector and to the overall sustainability of the built environment – all urban and transport infrastructures - by advocating for effective construction research, technological and process development and innovation.

ECCREDI's key strategic themes

ECCREDI's ongoing **key strategic themes** related to the built environment and urban and transport network development concern:

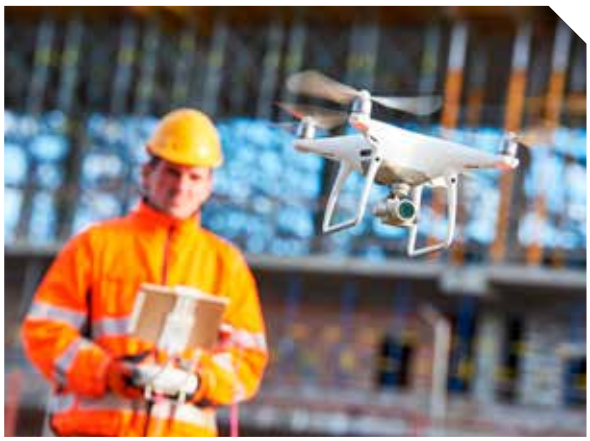
1. **Zero footprint construction:** topics concerned relate to CO_2 – emissions, global warming, resource consumption, circular economy
2. **Low maintenance and adaptable constructions:** a special focus here is on demographic changes, ageing population, robustness and resiliency of our urban environment, respecting Europe's cultural heritage
3. **Safe and healthy construction:** aspects to be considered relate to safety risks in buildings, impact on wellbeing of occupants, monitoring, maintenance and repair of our infrastructure
4. **Digital construction & Industrialisation:** possibly this is the biggest revolution presently going on, it concerns the use of BIM not only in design but also in construction and management of assets, a boost of industrialisation is clearly a logic consequence of this evolution
5. **Education and wellbeing of our existing construction workforce and attracting new talent to the sector:** of utmost importance in this respect are matters related to training and quality, as well as plugging the skills gap and ensuring that a new generation of construction workers at all levels will be waiting to replace experienced workers when they retire.
6. **Competitiveness of the sector in and outside Europe:** aspects concerning procurement procedures, harmonization, insurance and common standards are essential here, as well as adequate investment in new technology and skills.

1 Education and wellbeing of our construction workforce

Changes in the construction sector in connection with the 4th digital industrial revolution call for a new skills agenda for the workforce. Anticipation of skill needs and training schemes are needed to make everyone "BIM ready". Attracting young people into the sector is vital to replace the ageing/retiring older workforce and so is Vocational Education and Training as techniques become increasingly complicated.

Up skilling the workforce to be able to deliver deep renovation projects, to improve energy efficiency is also of increasing importance. In addition, deconstruction and new approaches to handling buildings at the end of their lifetime with respect to circular economy obligations require the workforce to be equipped with knowledge of new approaches and supporting tools.

Health considerations on the jobsite, protection and the ability to interact with Virtual and Enhanced Reality tools are presenting new needs with respect to education tools and infrastructure.



2 Safe and healthy construction

Concepts of security and resilience have become increasingly embedded in urban planning and architectural design practice. Additionally attempts have been made in national security and energy policy to make the built environment and critical energy infrastructure more resistant to disruptive challenges. This with particular regards to the threat of climate change and to the security challenges faced by many cities as a result of the threat of terrorism.

The human and social aspects of planning, designing, producing, maintaining and renewing the built environment include primarily issues that influence safety, health and comfort of users, such as indoor environmental quality, (air, acoustics, thermal comfort,…) and evacuation routes..

The push for zero-energy buildings has resulted in the issue of thermal comfort and indoor environmental quality, and responding to it requires extensive modelling and simulation as well as knowledge about the experience of occupants. Due to complexity and the lack of knowledge concerning the interaction of indoor air and human biological processes, the 'sick building syndrome' still requires extensive research.

3 Digital construction & industrialisation

Digital technology is changing the way we plan, build, maintain and use our social and economic infrastructure, including the built environment (buildings and districts) as well as our transport networks' infrastructures. Building Information Modelling and Building Information Management (BIM) have emerged and provide a means to store all relevant data generated during the life-cycle of facilities. BIM today provides all the appropriate methodologies, models and supporting tools to structure and semantize building-related information, along with sustainable long-term storage, especially as far as design and construction processes are concerned.

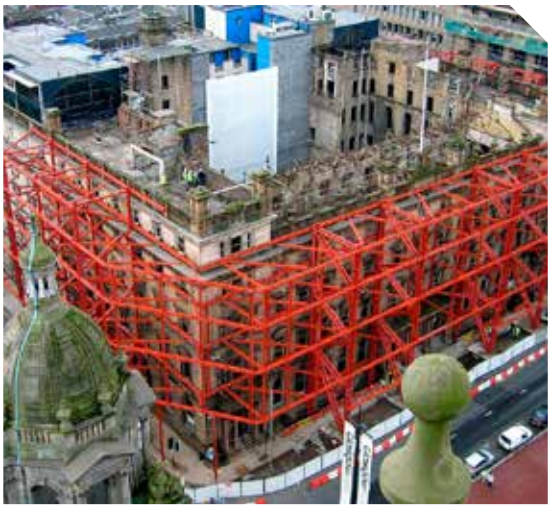
At the planning stage BIM enables designers, including architects, owners and users to work together to produce the best possible performance driven and inclusive designs and to test them in digital form before they are built. In construction, it enables engineers, contractors and suppliers to integrate complex components, cutting out waste and reducing the risk of errors as a consequence of better preparations. This upstream view, arising from the design and construction stages, currently extends to the downstream operations, where building and industrial facilities act as huge dynamic data producers while being operated. This has created new challenges leading to what is referred to as Intelligent and Smart Constructions (ISCs).

The evolution towards Building Information Modelling and Management (BIMM) will change the construction industry over the next decade – supporting the overall process for components and buildings life-cycle management. It will combine with the Internet of Things (IoT) i.e. all dynamic data and information provided by sensors and so-called connected objects, components and buildings, advanced data analytics and the digital economy.

4 Low maintenance and adaptable constructions

Civil engineering failures currently amount to 5 to 10 % of the total investment in new buildings and structures. Failure of such structures is not only expensive, but also has a large environmental cost. Structures often deteriorate because not enough attention is given during the design stage and standards for structural design codes should be further completed to include design for service life and rehabilitation of existing structures. Knowledge of the long-term performance of materials, building components and structures is the basis for securing low maintenance and long lasting structures.

The ageing of European societies has highlighted the gap between the capabilities of human beings and the usability of the built environment. Together with elderly and disabled people, pregnant women and children are often identified as a "weak group in design". Design-for-All is the process of creating products, services and systems, which are usable by people with the widest possible range of abilities, operating within the widest possible range of situations.



5 Zero footprint construction

Addressing the refurbishment of existing buildings (including historic ones) is critical in order to fulfil the decarbonisation goal of the European economy, if we consider that by 2050 more than half of the existing building stock will still be operational. This is posing tough technical challenges requiring innovative approaches and solutions. Many aspects are to be considered, but which options are to be favoured: renovation or rather demolition, recycling and rebuilding new infrastructure…?

The existing linear economic approach to growth based on 'take-make-consume and dispose' obviously has negative effects on the environment, on economic resilience, and consequently on the quality of life of European citizens. The circular economy approach on the other hand is based on maintaining the value of the materials and the energy used in products in the value chain for as long as possible, and on the minimising of waste and consumption of resources. Due attention is of course to be given to 'affordability' and 'new business models', 'return on investment', as well as aspects dealing with 'design for deconstruction' and even 'design for disassembly'.

The big challenge for the building and construction sector is how to find the most realistic and balanced option for the utilisation of recycled waste into new innovative products, in terms of both the nature and quantity of the waste.

6 Competitiveness of the sector in and outside Europe

In many European countries the construction industry has attracted criticism for inefficiencies in outcomes such as time and cost overruns, low productivity, poor quality and inadequate customer satisfaction. Practitioners, researchers and society at large have, therefore, called for a change in attitudes, behaviour and procedures. In recent years, increased complexity, uncertainty, and time pressure in construction projects have increased the need for cooperation among different project actors. Therefore, in order to take advantage of collaboration, improved procurement procedures can contribute substantially to project success.

In particular procurement procedures have to cope with many boundary conditions i.e.: uncertainties created by the legal framework (CPR) and risk in general. At the same time there is a tendency to introduce approaches for innovative and green tendering. It remains to be seen how to balance all relevant aspects. Changing business models are also appearing. For example, traditional contractors are evolving into service providers, where they maintain ownership of the infrastructure and deliver services at an agreed cost.

The importance of European standards in general as a support to exporting solutions should not be underestimated. International penetration of European standards can help European contractors to get an increased share of the world market.

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ECCREDI is a member of ECTP and its steering committee