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Editorial

Solidarity and Sustainability in Architectural Engineering Technology

Scientific progress in the construction sector must take care of safety and global well-being through updated construction techniques and methods, new materials, and design tools. In the last years, best practices linked to traditional techniques have developed thanks to technological and digital innovation which look at safety & security issues, the health of people and the planet.

For these reasons, research in the field of architectural engineering has to put technological innovation at the service of eco-compatible buildings and cities, imagining new ways to ensure equitable access to natural resources, based on sustainable development and responsible consumption.

The special issue presents researches that aim at identifying new or renewed methods, techniques, and technologies for the management of construction projects and processes, as well as in the field of eco-solidarity economies and communities. The paper collection gave particular attention to several fragile territorial realities, which are characterized by different types of risks of an economic, social, and cultural nature that have repercussions on the construction processes and safety rules associated with them during the whole construction site and building life cycle management.

Even from a geometric and spatial point of view, architecture is proposing new solutions that are often transversal between developing and already developed countries. An example could be large roofs, which, being able to accommodate very different spaces in terms of intended use, are of extreme interest throughout the planet, without geographical distinctions. The construction technologies that support the creation of large spans and spatial surfaces are constantly evolving and are characterized by the lightness of the materials and the curved shapes that can be created when combining different structural elements. This characteristic leads to difficulties in correctly determining the distribution of loads, in many cases limiting the applicability of complex spatial structures in territorial contexts where they would be functional to socio-economic development. To answer this issue, the first paper of this Special Issue [1] intends to introduce the concept of the multiple-target equivalent static wind loads and to demonstrate how to reduce the heavy computational burden when the structural designer needs to consider multiple loading effects of the structure.

Concerning the structural calculation problems highlighted, the further issue of spatial optimization arises for the applicability of large structures even in developing contexts, a topic developed in the second paper [2] with a focus on supertall buildings. The research guides architects, in their efforts to address space optimization issues in supertall buildings while maintaining them at the same time sustainability principles. In a time marked by the continuous growth of urban areas, understanding and improving the use of space has the potential to influence the creation of more efficient and environmentally friendly buildings.

An interesting reversal of perspective occurs in the third contribution [3], where self-building and eco-design are the keys identified to guarantee sustainability in constructions as they are closer to the culture of the places in which they are built and such as to favor the development of the countries themselves creating jobs, using 0 km raw materials, developing an awareness of living and a virtuous technological and procedural knowledge because in direct contact with users starting from the genesis of the project up to its maintenance.

The last paper [4] takes us to a post-war scenario in Damascus, where the crisis generated by human action adds to the triggering of urban and landscape degradation processes mainly due to the loss of green areas that would balance - through agricultural land, parks, etc. - the part of the territory dedicated to buildings. The importance of imagining technologies and scenarios for overcoming crises induced by natural calamities and disasters caused by people is therefore a further research topic that must be linked to the previous ones in an overall vision of a sustainable future for the Planet dictated by the culture of eco-solidarity design.

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