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EDITORIAL

Redesign of Traditional Composites for the Building Construction Based on Circular Economy Criteria

In general, Construction and Demolition Waste (CDW) are debris generated in construction, rehabilitation, repair, or demolition works. Obviously, CDW generation depends on the growth and development of the building sector, and thus it is associated with the economic growth of the country. Despite these wastes can be easily recycled, Europe has a CDW recycling rate around 50%. This percentage is far from achieving the objectives set by the European Directive for the year 2020, *i.e.* recycle at least 70% (by weight) of waste generated. Therefore, from a life cycle perspective, it is necessary to reduce the environmental impact of buildings and promote circular economy criteria. Among these criteria are: reducing resources such as raw materials, replacing raw materials with high environmental impact (cement, plastics, steel, *etc*) by recycled materials and using buildings as a digester of CDW.

The aim of this special issue is to address the re-design of traditional composites for the building construction based on circular economy criteria. Both gypsum and cement composites - as well as other materials including different types of waste are presented and analyzed in the articles.

The first article of the special issue: "**Valorization of building retrofitting waste as alternative materials in gypsums**" sets the theme of the special issue, describing the current situation of CDW management and summarizing the main goals reached in "Waste2Resources" project. This project develops new materials, elements and construction systems, manufactured from CDW, to be used as alternative elements in rehabilitation works to improve the energy efficiency of the buildings.

The other articles included in this special issue, analyze the feasibility of incorporating waste in different building composites, aiming to re-design current traditional building materials considering environmental criteria.

The second article entitled "**Characterization of hot bituminous-asphalt mixtures with recycled polyurethane foam**" studies the use of polyurethane foam waste as a partial replacement material for aggregates and dust minerals for bitumen mixtures of road surface.

Moreover, the third article entitled "**The Influence of Natural and Synthetic Fibre Reinforcement on Wood-gypsum Composites**" focuses on the influence of natural and synthetic fibres on the mechanical behaviour of recycled wood-gypsum composites. These composites of wood waste, were tested using different proportions of each type of recycled wood and the experimental procedure was based on the analysis of the physical properties of the reinforced mixtures as well as water absorption by capillarity and their thermal behaviour of the new wood-gypsum materials.

In the article "**Effect of Mortar Reduction in Recycled Aggregates Used in Concrete**" researchers of the Universidad de La Frontera and Università Politecnica delle Marche, analyze the effect of the mortar adhered to the surface of recycled aggregates from pavement demolition used in recycled concrete.

The following article "**Environmental Improvement in use of Fine Fraction Recycled Aggregates as a Raw Material in Masonry Mortar Fabrication**" studies the technical feasibility and environmental sustainability of fine fraction recycled aggregates use in masonry mortar fabrication.

The article entitled "**Development of New Eco-Efficient Cement-Based Construction Materials and Recycled Fine Aggregates and EPS from CDW**" consists on a cement-based compound that includes recycled fine ceramic aggregates and EPS for various dosages from rehabilitation works. A new eco-efficient construction material adapted to

Spanish and European regulations in order to minimise the environmental impact is proposed.

Finally, the article entitled "**Bio-composites to tackle UK Built Environment Carbon Emissions: Comparative Analysis on Load-bearing Capacity, Hygroscopic and Thermal Performance of Compressed Earth Blocks with Addition of Industrial Hemp Waste**" looks into the effect on performance of composite products using hemp waste from agriculture in Earth Blocks and the potential of a closed loop strategy for building materials. Their compressive strength, conductivity and moisture performance was tested, analysed and then compared with standard wall sections.

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