

Petro-mineralogical characterization, recycling and separation of the inert construction and demolition wastes

Summary

The development of low environmental impact and innovative sustainable materials for the construction industry is a strategic priority of the European Community, and one that can generate tangible opportunities. At the same time, the market has been witnessing a more systematic demand for high-performance products that can effectively meet the needs of modern architecture and sustainable construction. The concept of sustainability applied to the construction sector has stimulated the development of unconventional building materials using waste and renewable resources.

In this context, the application of by-products from the agro-industry, such as rice husk and cork waste, and rubber waste generated from tyres disposal, has been studied and successfully used as building materials due to their intrinsic characteristics and environmental properties. Combining the most useful properties of each waste product into innovative composite materials, whose characteristics are better than those of its components, the aim of this dissertation is to develop new products with high dynamic, thermal, acoustic and environmental performance, such as eco-boards, resilient layers and floor coatings.

The application of these products in building systems will also be validated. The product development process will be supported by experimental and numerical methodologies. The development of innovative materials with high quality standards demands a complete identification of the main properties and full characterisation of its performance, in order to feasibly be considered for constructive applications. This research plan is based on the exploitation of sustainable constructive processes. First, by developing materials that incorporates waste and by-products and then by using those in constructive systems designed to have a lower environmental impact than competing products. Commercial success will be boosted by showing that the new composite materials in fact ensure all the functional requirements for the specified applications and introduce high standards of sustainability.

Keywords

CDW, concrete, masonry, compressive strength, flexural strength, petrography, XRPD, XRF, recycling.



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Period

2018-2021

Funding

PON-European scholarship



Samples of the mortar, produced with CDW' rubbles.