ADVAMCE – Development of Techniques to Adding Value on Recycled Materials to Promote the Circular Economy in Transport Infrastructures

Summary

The application of the principles of the circular economy in transport infrastructures has a greater importance due to the diversity and complexity of its components and, in general, they involve a multidisciplinary of activities of high economic, environmental and societal impact. This concern has been reflected in the development of technologies based on the preservation of natural resources and on the waste valorisation.

This project intends to further promotion of the circular economy by the application of recycled materials to the highest level of utility that is possible. Transport infrastructures have great potential not only for generation but also for waste consumption that it is very important to promote in more noble and ambitious applications in relation to the present practice.

The main objective of the project is to value construction and demolition waste (CDW), the most significant component of waste generated by the respective industry, through not only the treatment and reinforcement techniques (binders and eco-efficient fibres), enhancing the performance when the wastes are reused, but also the application in technological solutions more demanding and of greater utility, as for example in pavements of more intense traffic.

The cooperation of the countries involved - Portugal and Brazil? focus the interest of this project in four levels:

1. The great experience of the two countries on this subject.
2. The development of treatment and reinforcement techniques not yet exploited in the case of CDWs on the promotion of low or zero carbon footprint materials (binders and other eco-efficient materials), reducing the use of traditional hydraulic binders and synthetic fibres produced in high energy consumption industries and greenhouse gas emission levels that can give materials better performance in more demanding applications.
3. The comparison and development of technical specifications on materials and constructive methods in the two countries.
4. The technological validation of the products resulting from the project, with great potential for industrialization.

The main expected result for the project is the development of an optimized bound mixture of recycled aggregates from CDW, with ceramic residues and cement, and reinforced with natural coconut fibres, with more resistance and durability for applications in structural layers of pavements and in paving blocks.

The development and validation of the final product is based on an intensive experimental research to be developed in the two countries, provided already with specialized human and material resources in this field. Although CDW are abundant in both countries, Brazil's cooperation is an advantage in this research because it is a source of natural raw material for coconut fibres that, although already applied to other geomaterials and composites, has not yet been investigated the application in the case CDW.

Project Reference

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Leading Institution

IST-ID – Associação do Instituto Superior Técnico para a Investigação e Desenvolvimento (Portugal)

Partners

UFC – Federal University of Ceará (Brazil)

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Project Website

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