

CirMat – Circular Aggregates for Sustainable Road and Building MATerials

Summary

This project aims to develop the industrial sector and to promote multiple products / materials with a high degree of incorporation of waste from the construction and steel industry sectors. Most of the construction companies' operations rely on the use of structural and bituminous concrete, which in part is due to the large-scale production of the sector, has an intensive use of raw materials and energy resources, as well as the dubious distinction of being one of the biggest contributors to CO₂ emissions. Therefore, this project aims to contribute to a radical increase in the sustainability of the construction sector, through a paradigm shift in the implementation of the principles of circular economy, based on the following activity: i) development of industrial technology for structural concrete (Figure 1) and bituminous concrete with waste incorporation; (ii) systematic models for the recovery of waste in a business environment and its transition to the market. This application is based on the industrial development of a range of innovative and widely used structural and bituminous concrete manufactured mainly using construction and demolition waste and industrial byproducts. The development of these innovative products intends, on one hand, to drastically reduce the use of natural resources and energy-intensive products, and on the other hand to boost the reintroduction of waste and by-products into the value chain under the circular economy concept.



Figure 1. Laboratorial study of concrete with recycled aggregates.

The proposed project also involves the development of all manufacturing processes associated with an industrial scale, as well as the elaboration of Environmental Product

Declarations so that the Lead Promoter can fully and unambiguously demonstrate the mitigation of environmental impacts related to the developed products throughout their life cycle, thus providing an eminently differentiating option.

In a future context in which a much higher requirement in terms of legal environmental standards for the construction industry is expected, this project aims to substantially increase the competitiveness of the products and processes associated with structural concrete and bituminous concretes (Figure 2) in the construction sector, which represent a very significant of it.

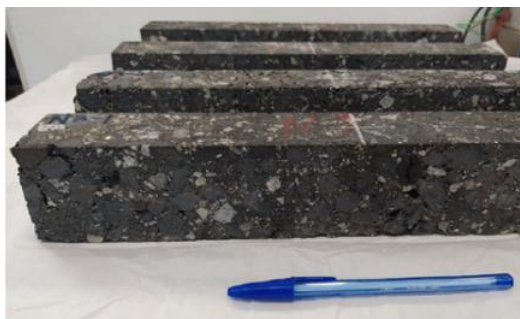


Figure 2. Laboratorial study of bituminous mixtures with steel slag aggregates (ASIC).

This application is unequivocally intended to contribute to the multiple objectives of the "Environment, Climate Change and Low Carbon Economy" program. As part of the first objective of the PA11 program area, it is intended to contribute to a high degree of recovery of construction and demolition waste (CDW) by incorporating it (up to 35%) in the development of structural and bituminous concrete. In addition, and for the same purpose of this program area, structural and bituminous concretes also aim to contribute to the increase and promotion of the use of secondary raw materials, namely, with a high degree of incorporation (up to 75%) of Inert Steel Aggregate for Construction (Portuguese acronym: ASIC). Finally, it can be said that this project will contribute to the output 1.4 of this framework program by carrying out four innovative solutions in Pilot constructions for each of the four products developed, namely: Structural Concrete with recycled aggregates from CDW; Structural Concrete with EAFs; Bituminous Concrete with recycled aggregates from CDW; Bituminous concrete with EAFs. This project will also contribute to output 1.5 with the 4 EPDs and circularity passports that will be developed.



Project Reference

16_ EEA grants - Call #2 – Outcome #1/Output #1.4 - Projects for promoting the Circular Economy in the Construction Sector

Leading Institution

DST Group (Portugal)

Partners

IST – Instituto Superior Técnico (Portugal), CERIS – Civil Engineering Research and Innovation for Sustainability (Portugal), UMinho – University of Minho (Portugal), NTNU – Norwegian University of Science and Technology (Norway)

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EEA Grants

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499 967.00€

CERIS

89 300.00€

Project Website

cirmat.pt