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European circular economy project with two pioneering demonstration cases in Aveiro

paperChain assesses the use of industrial waste in several sectors

- Industrial prefabricated concrete pavilion and a road pavement in Aveiro are the two pioneering demonstration cases of using waste in construction
- Residues from the pulp and paper industry are tested as secondary raw materials, with a circularity and industrial symbiosis basis
- paperChain intends to contribute to the goal of Zero Waste and demonstrate the concept of Circular Economy
- Research and innovation project funded by the European Union's H2020 program brings together 20 entities from five countries to demonstrate on a large scale the recovery of waste

An industrial pavilion and a road section, both in the Aveiro region, are the first visible results at real scale of using waste generated in the pulp and paper industry in precast concrete structures and in bituminous mixtures for roads paving in Portugal.

The challenge, which is both complex and ambitious, emerged as part of the paperChain European project and is already being put into practice in Ílhavo and Cacia: using waste from pulp production, such as lime ash, dregs and grits (granular waste) as secondary raw materials in the construction sector, integrating them in a circular economy logic. The **paperChain** project includes 20 partners from five EU countries committed to circularity boosting). In Portugal, the entities involved include the University of Aveiro, The Navigator Company, Spral, Megavia, RAIZ Research Institute and the Sustainable Habitat Cluster. Called "New niche markets for waste from the pulp and paper industry based on the circular economy", it is coordinated by the company Acciona Construction (Spain).

The first case of circularity application in Portugal, in the scope of paperChain project, focuses on the use of lime ash as filler in prefabricated concrete, and an industrial pavilion has just been built in Ílhavo, at SPRAL facilities, and whose structure has been prepared for long-term monitoring. The second Portuguese case, focused on the use of dregs and grits as fine aggregates and fillers in the surface layer of roads, was implemented at the facilities of The Navigator Company in Cacia (Aveiro). It consists of a 250 m road section in a total area of 2800 m², by involving the addition of a reference bituminous mixture (standard), and two different mixtures containing dregs and grits in the final formulation. Before the use of dregs and grits in the final bituminous mixture, the residues were pre-

treated by a waste management company (Dilumex). This road section is being monitored until February 2021.

Technical and environmental monitoring is now being carried out to validate the long-term durability and performance of these new circular solutions. The tests are being carried out by the University of Aveiro and by RAIZ - Forest and Paper Research Institute, a private, non-profit research centre, recognized as an entity of the National Scientific and Technological System and as an Interface Centre - Valorisation Centre and Technology Transfer.

An European Project

PaperChain is a project funded by the European Commission (H2020 research and innovation programme) aiming to contribute to the goal of zero waste and demonstrate the concept of circular economy. The use of these specific residues will also contribute to eliminate their current deposition in landfills but also with the future replacement of natural raw materials, such as fillers and fine aggregates, with other associated benefits, such as the reduction of CO₂ emissions.

The project includes five demonstration cases in three different operational sectors: Construction, Chemical and Mining. Portugal welcomes the cases focusing on prefabricated concrete structures and bituminous mixtures for road paving, while Spain tests the soil stabilization layers on roads. In Slovenia, on the other hand, composite material for slope stabilization is being analysed. Applications in the Chemical and Mining sectors are being investigated in Sweden for sealing layers for landfills in mines. Also in Sweden, bioethanol is being produced for the production of secondary chemicals.

In Portugal, and once the technical details were defined in a joint work between the companies involved (NVG, Megavia and SPRAL) and the University of Aveiro, the project received the green light from the Portuguese Environment Agency (APA) to move forward with the two demonstration pilots in July 2019. APA played a fundamental role in enabling circular economy projects in Portugal, such as CCDD-C (Commission for Coordination and Regional Development of the Center) at the level centre region of Portugal, where the Portuguese demonstrators of paperChain are located.

For more information, visit www.paperchain.eu

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