

SustainAsphalt

Summary

The SustainAsphalt project aims to develop an innovative asphalt mixture concept for road transport infrastructure pavements, creating a differentiated product produced by a new process that integrates sustainability concepts throughout the value chain. The concept covers the valorisation and reuse, as secondary raw materials, of asphalt pavement waste at the end of life (RAP) and lignin waste obtained in the biodiesel manufacturing process from forest biomass waste (Figure 1). Combining these wastes as secondary raw materials makes it possible to create a more economical and eco-efficient paving material compared to conventional solutions for asphalt pavement layers, guaranteeing adequate durability for most road infrastructures, from a life cycle perspective and establishing industrial symbioses where a waste product from one industry is transformed into a secondary raw material.

Adding lignin wastes reduces the amount of virgin bitumen and energy consumption because the manufacturing temperature of the asphalt mixture can be 30 to 40 degrees lower than usual, which not only brings advantages in terms of minimising natural resources, but also in terms of pollutant emissions and greenhouse gas (GHG) emissions, namely carbon dioxide (CO₂). In addition, lignin also improves the material's properties to be developed, making it more durable. The modification of the production plant will allow the addition of 40% of asphalt mixtures at the end of life (RAP) and lignin residues at room temperature to produce the warm asphalt mixture to be developed.

The innovative concept aims to establish a commercial and environmentally competitive technology (new product and new process, Figure 2) that valorises and reuses asphalt waste from demolishing layers of existing pavements (RAP) and reduces landfilling as well as the extraction of virgin raw materials. In addition, it also uses lignin waste from the biodiesel production industry to replace part of the necessary fresh bitumen, produce warm mixtures (with a lower manufacturing temperature) and improve the final material's properties, from a circular economy perspective, promoting industrial symbioses, with a view to sustainability.

The project is a joint initiative of Submerci, Lda (a material production and construction company) and three entities of the scientific and technological system (IPC-ISEC, IST and CTCV), which possess technological and scientific competencies for the realisation of all the project's planned tasks.



Figure 1. Appearance of different types of lignin.

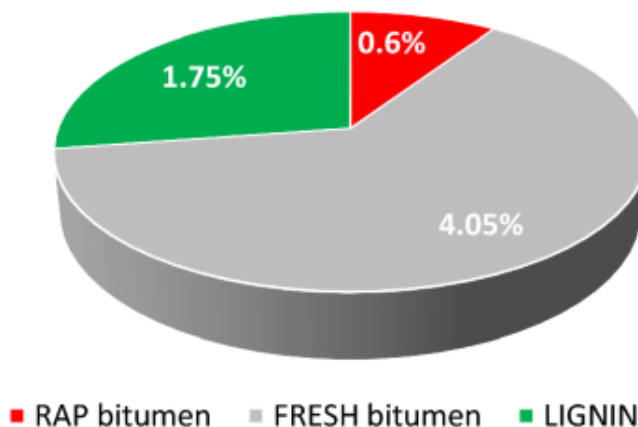


Figure 2. Typical proportions of bitumen coming from RAP added, fresh bitumen and lignin.

Project Reference

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Leading Institution

Submerci – Construção e Urbanizações Lda. (Portugal)

Partners

CTCV – Centro Tecnológico da Cerâmica e do Vidro (Portugal), IST – Instituto Superior Técnico (Portugal), IPC – Instituto Politécnico de Coimbra (Portugal)

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1 275 928.48€

CERIS

139 980.29€

Project website

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