

Macrocategoria: Materiali e Pavimentazioni

Titolo articolo: Performance Evaluation of in Situ Application of Anhydrous Calcium Sulphate in Pavement Layers

Autori: Rombi, J., Olianas, M., Salis, M., Serpi, A., Coni, M.

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Abstract: The following paper concerns the in situ application of Anhydrous Calcium Sulphate (ACS) in Cement Bound Granular Material (CBGM) pavement layers. The ACS used in this research derives from an industrial process. If no applications are found for this industrial by-product, ACS is discharged into landfills. The research aims to evaluate the mechanical performances in real working conditions in which ACS partially replaces Portland Cement (PC). In the last years, the annual cement production worldwide is increasing rapidly reaching approximately 4.0 billion tons, responsible for around 8% of the total CO₂ emitted into the atmosphere. A trial four layers pavement, divided into two sections, was constructed and subjected to heavy traffic. Each section had the same type of layers except for the CBGM one. The first section was constructed using ACS in partial replacement of PC, while for comparison a reference section incorporated only PC was created. Each section was subjected to the same traffic flow and loads. To evaluate the performances of the two sections, tests were performed during the construction of the single layers. Also, after that the sections were completed, periodic tests were conducted. To perform the test a FallingWeight Deflectometer (FWD) was used, capable of measuring the pavement layers moduli. The results are encouraging, after six months from construction, the section incorporating ACS showed higher values of layer moduli if compared with the reference section. If the results are confirmed, the potential use of ACS in partial replacement of PC could decrease not only CO₂ emissions but also construction costs, with higher mechanical performance.

Keywords: Anhydrous Calcium Sulphate · Cement Bound Granular Material · Portland Cement · Industrial by-product · Circular economy

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