Extended Abstract

Research Regarding Use the Condensed Water from Thermo-Baric Treatment of Municipal Solid Waste in Cement Mortars [†]

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Municipal solid waste management is an important environmental concern around the world. Solid wastes are constantly produced in mega-cities, small towns, and large villages, and if residues do not receive the right management, they can cause several affections on the environment and human health. These affections include greenhouse gas emissions, soil contamination, bad odors, underwater contamination, and the spread of diseases, among others. The rapid increase in volume and types of solid municipal waste as a result of continuous economic growth, urbanization, and industrialization, is becoming a burgeoning problem for national and local governments to ensure effective and sustainable management of waste [1]. Nowadays, the treatment of these wastes is a major environmental issue. A solution for municipal waste treatment is thermobaric treatment. After this type of treatment, the main product (solid product) and a collateral product (condensed water) are produced.

Experimental works were carried out to investigate the feasibility of integrating condensed water from the thermobaric treatment of municipal solid waste into road binders. The water of standard consistency, setting time, soundness, flexural and compressive strength were tested.

A municipal solid waste sample, collected from a Romania historical disposal site, was thermobaric treated at different temperatures and pressure. After this treatment resulted in a solid product and condensed water. The quality indices (such as pH, the total amount of suspended matter, chlorine, heavy metals, and petroleum products) of the condensed water were determined. The determination of the heavy metal content was performed using graphite oven atomic absorption spectrometry, and NovAA 400 hydride generator. Water pH was determined using ORION pH-meter. The quality indices of the condensed water were determined by wet chemistry and atomic absorption spectrometry. For investigating the feasibility of integrating condensed water from the thermobaric treatment of municipal solid waste into road binders was used the following materials: Portland cement type CEM I 42,5R, polygranular quartz sand, condensed water. For this investigation was used methods according to SR EN 196-1, SR EN 196-3 [2,3].

The results obtained show that physical (standard consistency, setting time, and soundness) and mechanical characteristics (flexural and compressive strength) prepared with condensed water are comparable with reference mortars performed with water from the national distribution network.

Based on the investigations carried out regarding the possibility to use condensed water from the thermobaric treatment of municipal solid waste into road binders it can be concluded that condensed water could be used to perform this type of binder.

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