

The Eighth Article

Number (26) In The List of Total Publications

H. A. Abdel Gawwad^a, **S.Abd El-Aleem**^b, A. S. Ouda^a, “Preparation and Characterization of One-Part Non-Portland Cement”, *Ceramics International Journal* (Accepted for Publication on 20 August, 2015 and in Press).

^aHousing and Building National Research Center, 87 El Tahreer St. Dokki, Giza, Egypt.

^bChemistry Department, Faculty of Science, Fayoum University, Fayoum, Egypt.

Abstract

This work aims at enhancing the mass production and commercial viability of non-Portland cement (NPC) by preparing one-part-NPC (just add water). NPC is Eco-efficient material comparing to Portland cement (PC). It was prepared by mixing of blast-furnace slag (BFS) with 2, 4, 6, 8 and 10 % sodium hydroxide (SH) by total weight of BFS, and then mixed with water. The homogeneous slurry immediately dried in an oven at 80°C for 24h, followed by pulverization to a fixed particle size. Two main compositional factors were examined: the first is the increase of SH wt., %, while the amount of water to slag (W/BFS) ratio maintaining constant, and the second includes increasing W/BFS ratio at constant SH dosage. One-part NPC was mixed with water at W/NPC ratio of 0.25, and then cured. A conventional two-part NPC, containing SH solution (liquid part) and BFS (solid part), was made for comparison. The results showed that, the amount of NPC hydration products increases with SH wt., % and W/BFS ratio. The compressive strength values of hardened cements proved that, the activation of slag continues after the addition of water to NPC. At 90 days of curing, the compressive strength of one-part NPC mixture decreased by 10 % comparing to that of two-part-NPC containing

the same activator content. Some selected hardened pastes were analyzed using FTIR, TGA/DTG and SEM techniques. The results of the different analyses are in a good harmony with those of mechanical properties and prove that; one-part NPC can be beneficially used as alternative to PC.