

THE INVESTIGATION OF THE POTENTIAL OF MUNICIPAL SOLID WASTE INCINERATION (MSWI) FLY ASH AS A MINERAL RESOURCE

Farnaz Aghabeyk, Microlab, Section Materials and Environment, Faculty of Civil Engineering and Geosciences, Delft University of Technology, Stevinweg 1, 2628 CN Delft, The Netherlands

F.Aghabeyk@tudelft.nl

Boyu Chen, Microlab, Section Materials and Environment, Faculty of Civil Engineering and Geosciences, Delft University of Technology, Stevinweg 1, 2628 CN Delft, The Netherlands

Guang Ye, Microlab, Section Materials and Environment, Faculty of Civil Engineering and Geosciences, Delft University of Technology, Stevinweg 1, 2628 CN Delft, The Netherlands

Key Words: Alkali-activated materials, reactive content, MSWI fly ash, precursor

The annual production and landfill disposal of municipal solid waste incineration fly ash (MSWI FA) have become one of the most important global environmental challenges. Considering the Si, Al, and Ca contents in this residue, its reuse as a precursor in the manufacture of alkali-activated concrete is one of the effective approaches to address the problems caused by the MSWI FA landfill. In this study, the physical and chemical properties of the MSWI FA, collected from eight different plants within the Netherlands, were investigated to assess the potential application of the MSWI FA as a precursor in the alkali-activated system. The chemical characteristics were determined by Loss on Ignition (LOI), X-ray fluorescence (XRF), and X-ray diffraction (XRD) analyses. The physical properties were studied using density and particle size distribution measurements. In addition, the reactive content and the reactive Si/Al ratio of the ashes were investigated and compared. Based on the experimental results, the MSWI fly ashes, which showed the highest potential, were selected for the alkali-activated concrete mix design.