

Utilization of Fly Ash from Co-Combusting Coal and Waste-Derived Fuel in Blended Cement

Wei-Hsing Huang¹ and Min-Fu Wu²

¹Department of Civil Engineering, National Central University, Taoyuan, Taiwan.

²Taiwan Cement Ltd., Taipei, Taiwan.

The use of waste-derived fuel in industrial boilers benefit the reduction in carbon emissions from industrial boilers. However, the fly ashes produced by the co-combustion of coal and paper mill wastes exhibit distinct characteristics that are different than traditional fly ash obtained from boilers burning coal only. In this study, the properties of co-combustion fly ash (CCFA) derived from boilers burning paper-making wastes were investigated, with emphasis on potential applications of CCFAs as a constituent in blended cement. The CCFAs were characterized considering their physical and chemical composition. And they were used in partial replacement of cement in proportioning concrete. Then, the effects of CCFA utilization on the fresh and hardened properties of the prepared concrete were assessed and compared with concrete prepared using ordinary portland cement. Test results indicate that using waste-derived fuel from paper mill alters the characteristics of boiler fly ash. Also, the compressive strength of mortar mixed with 20% CCFA replacement of cement was found to be approximately 75% of the control mix. These findings demonstrated that fly ash from co-combustion of paper mill wastes and coal has the potential to be utilized as cementitious materials in partial replacement of cement for making concrete.