Properties of Cement Mortars Made With Local Steel Slag

**Abstract —** As a way to reduce the impact of the cement industry and reduce its production cost, researchers have studied to use by product materials such as fly ash, silica fume and slag as a partial replacement for Portland cement in the making of concrete. In this study, the effect of partial cement replacement with Libyan electric arc furnace steel slag in different substitution levels (0, 10, 20 and 30% by weight) were investigated using cement mortars. Slag of 350 m2/kg Blaine fineness was used in this study. The mortar specimens were tested for compressive, flexural and direct tensile strengths at the ages of 3, 7, 28, 56 and 90 days. The effect of slag content on mortar workability was studied. Setting times and soundness of cement paste were also investigated.

The experimental results showed that replacement of cement by slag causes delay in cement setting times. Setting times increases as the slag content increases. The results also showed that compressive, direct tensile and flexural strength of mortar improves with time and the development in strengths is influenced by the slag content. The addition of 10% electrical arc furnace slag (EAFS) has positive effect on compressive, tensile and flexural strengths of mortar at late age.

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***Keywords:*** Cement mortar; Steel slag; Compressive strength; Direct tensile strength; Flexural

strength