

ABSTRACT

The emulative cost of different construction materials (e.g. Cement) has increased the demands for diminishing the Consumption of such materials to the minimal that ensure the stability; durability and safety of structure.

This study was conducted to investigate the possibility of using Iraq slag which bring from steel factory of Basrah/ Em-Qasher. After Crushing and Smoothing slag to cover a surface of ($350\text{m}^2/\text{Kg}$), and mixing it with cement or with the fine aggregate or with additor in stead of Cement. And then prepared three Mixes in addition to two reference mixes (A,E) as follows.

A- Mixes with slag instead of cement (B, C, D) with slag percentage (15%, 30%, 60%) which curing condition (water, air, oven) and then found the relation between the slag percentage and workability; density, strength (compression and Tensile); Modulus of elasticity; shrinkage; Thermal conductivity; Permability, Absorbition and effect of acids and Alkalies solution. The mixes gave result with a cording to word standards the best mix was (C) with 30% slag curing with water which has a good workability; and less shrinkage at earlier and delayed ages, and good strength, and good thermal esolation, best modulus of elasticity than another mixes and less effect with acids and alkalies solution, As for compressive strength reached ($34\text{-}36\text{ N/mm}_2$) at 28 days ages and gave thermal esolation three terms than normal mortar because of pores spaces content, As for lees permability for having closing pores. The acids losing for mix (C) reach (16%) at 60 days ages, and (4%) at 120 days.

B- Mixes substituting slag instead fine aggregate (sand) (F,G) with slag percentages (15%, 50%) curing with (water, air, oven), which gave low compressive strength at earlier ages but increased at delayed ages because of improvement of workability and formation (Eterinkit), the modulus of Elasticity increased at delayed ages with increasing of slag and density for improvement of workability the acid losing effect for (G) Mixe reached (15.7%) at 90 days and increase to (55.22%) at 120 days, ages. As for thermal conductivity was 3 terms than normal mortar.

C- Mixes substituting slag and additors instead of Cement (H,I,J,K) with Slag percentages (15%, 30%, 45%, 60%) and additors ($\text{CaCO}_3 = 10\%$, $\text{CaO} = 5\%$, Kieolen = 7%, Arabic glue = 10%) with curing (water, air, oven) . The average of workability and soundness

increased; which look like Iraqi standard Institution (5)- 1984. as for Compressive strength development which time and reached high compressive for (J) mixe which its compressive reached (17%) at (60) days ages. comparing to Referance Mixe (E). Though the tensile strength increase for (J) mixe and reached (3.7%) at (60) days ages comparing to reference mixe (E). As for shrinkage and extension less for earlies and delyed ages due to increasing density and improvement of workability and the beast mixe was (I). For Alkalies effect which low by interaction with Ca(OH)_2 and prevent to form CaSO_4 which form complex compostion which has large volum destroying past. As for thermal asolation all mixes with (11) sample have good thermal asolation compare with referenc mixes (A) and (E) which equal 3 terms than ordinary past due to containing of closed pores.

As for permeability decreas with substuting of slag because of increasing and form closed pores. The slag was used to produced bearing walls which reached good result by its bearing and stability and durability comparing with refernce walls (brick & block). The mixes substituting slag instead of (fine aggregate) was the bater results, though it's bearing reached (36.5 N/mm^2) and its Efficiently reached (70%).