

Influence of Ground Granulated Blast Furnace Slag on Geotechnical Characteristics of Jarosite Waste

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Abstract : The quick evolution of industrialization causes the scarcity of precious land. Thus, it is vital need to influence the R&D societies to achieve sustainable, economic and social benefits from huge utilization of waste for universal aids. The current study promotes the influence of steel industries waste i.e. ground granulated blast furnace slag (GGBS) in geotechnical properties of jarosite waste (solid waste residues produced from hydrometallurgy operations involved in extraction of Zinc). Numerous strengths tests (unconfined compression (q_u) and splitting tensile strength (q_t)) are conducted on jarosite-GGBS blends (GGBS, 10-30%) with different curing periods (7, 28 & 90 days). The results indicate that both q_u and q_t increase with the increase in GGBS content along with curing periods. The increased strength with the addition of GGBS is also observed from microstructural study, which illustrates the occurrence of larger agglomeration of jarosite-GGBS blend particles. The Freezing-Thawing (F-T) durability analysis is also conducted for all the jarosite-GGBS blends and found that the reduction in unconfined compressive strength after five successive F-T cycles enhanced from 62% (natural jarosite) to 48, 42 and 34% at 7, 14 and 28 days curing periods respectively for stabilized jarosite-GGBS samples containing 30% GGBS content. It can be concluded from this study that blending of cementing additives (GGBS) with jarosite waste resulted in a significant improvement in geotechnical characteristics.

Keywords : jarosite, GGBS, strength characteristics, microstructural study, durability analysis

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