

Optimization of steel slag aggregates for bituminous mixes in Saudi Arabia

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Abstract: Construction in Saudi Arabia, emanating from rapid development, has caused massive depletion of scarce construction resources. Crushed limestone and sandstone aggregates used in bituminous mixes lack the desirable qualities for proper mix performance. On the other hand, large amounts of steel slag aggregates with good qualities are being produced and put to waste in Jubail, Saudi Arabia. Laboratory evaluation of mixes from steel slag aggregates was done by reconstituting mixes based on Ministry of Communications, Saudi Arabia, and Strategic Highway Research Program specifications. Steel slag and limestone aggregates were proportioned in the sand and filler portions. Treatment was done using portland cement, lime, polymer, and amine additives. The mix properties tested include resilient modulus, split tensile strength, stability, fatigue, and permanent deformation. Analysis of the results showed that mixes with slag in the coarse portion and limestone in the sand and filler portions modified with polymer had high resistance to rutting and fatigue failure. Construction in Saudi Arabia, emanating from rapid development, has caused massive depletion of scarce construction resources. Crushed limestone and sandstone aggregates used in bituminous mixes lack the desirable qualities for proper mix performance. On the other hand, large amounts of steel slag aggregates with good qualities are being produced and put to waste in Jubail, Saudi Arabia. Laboratory evaluation of mixes from steel slag aggregates was done by reconstituting mixes based on Ministry of Communications, Saudi Arabia, and Strategic Highway Research Program specifications. Steel slag and limestone aggregates were proportioned in the sand and filler portions. Treatment was done using portland cement, lime, polymer, and amine additives. The mix properties tested include resilient modulus, split tensile strength, stability, fatigue, and permanent deformation. Analysis of the results showed that mixes with slag in the coarse portion and limestone in the sand and filler portions modified with polymer had high resistance to running and fatigue failure.