ABSTRACT

Concrete is a staple material in the construction of buildings, pavements, bridges, and other structures. It is valued for its high compressive strength, although it is weak in tension and flexure. The experiment performed herein partially replaces the coarse aggregates found in concrete mixture with waste steel slag aggregate collected from the steelmaking process, in an effort to investigate possible beneficial changes to the concrete strength.

By replacing 50% of the volume of coarse aggregate with steel slag aggregate, the final compressive strength was increased by roughly 30% (from approximately 1900 to 2500 psi). However, the unit weight of concrete increased from 145 pcf to 155 pcf. The tensile strength increased substantially, but should not be considered conclusive (and is elaborated within this dissertation). The modulus of elasticity also improved from 2.5×10^6 psi to 3.2×10^6 psi.

The use of steel slag aggregate appears to be a viable partial substitute for coarse aggregate in situations where an increase in structural strength is preferred and the self-weight of the concrete itself is not an issue. In addition, its abundance and inexpensiveness provides a competitive, value-added bonus to its already-feasible status.