Experimental study on Copper slag as fine aggregates in concrete

Abstract

This paper reports the effect of concrete using copper slag as the aggregate replacement. In this project work, the concrete grade M40 was selected and IS method was used for mix design. The properties of material for cement, the aggregate, coarse aggregate and copper slag were studied for mix design. The various strength of concrete like compressive, flexural and split tensile were studied and non-destructive test such as rebound hammer test and ultrasonic pulse velocity measurement were studied for various replacements of the aggregate using copper slag that are 0%, 20%, 40%, 60%, 80% and 100%. The maximum compressive strength of concrete attained at 40%replacement of the aggregate at 7 and 28 days. The split tensile strength and the flexural strength were also obtained higher strength at 40% replacement level at 28 days. The rebound hammer test showed higher compressive strength that 40% the aggregate replacement, this is due to uniformity of concrete. The pulse wave velocity is higher for the 40%theaggregate replacement, it is understood that the density of the mix is high and free from pores.

Keywords: Copper slag; Waste material; Replacement of ﬁne aggregate; Concrete; Properties of materials; Workability; Compressive strength; Split tensile strength; Flexural strength