Concrete is the most versatile man-made construction material, extensively used for most types of activities in the construction industry worldwide. This highly complex mixture, which may comprise several binders, admixtures, aggregates of different types and sizes are used in modern construction and is all derived from natural sources and have distinct roll in damaging the environment due to their continuous exploitation. To safeguard the environment, efforts are being made to recycle different wastes and utilise them in value-added applications. The use of industrial wastes, which are pozzolanic in character, minimizes the use of cement. The other mineral constituent, aggregates, which makes up 70% of the concrete volume, is one of the main constituent materials in concrete production. A major challenge for the aggregate and the construction industries is to find alternative aggregate source to overcome this shortage.

Copper Slag possesses mechanical and chemical characteristics that qualify the material to be used in concrete as a partial replacement for Portland cement or as a substitute for aggregates. A study has been done to investigate application of copper slag as fine aggregate in High Strength Concrete. Mix proportions were arrived for M40, M60, and M80 grades of HSC trial mixes by replacing 0, 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100 percent of the mass of sand with copper slag. The investigation shows that the strength characteristics such as compressive strength, tensile strength and flexural strength increase and the durability indicators such as saturated water
absorption (28%, 33% and 42% less than the control concrete of M40, M60 and M80 grade respectively) and permeability found decrease with increase in copper slag proportion. The mix without sand and fine aggregate consist of only copper slag is found better in all the strength and durability parameters.

The experimental investigations were conducted to examine the suitability of copper Slag as fine aggregate in High Strength Concrete flexural members (Beams). The parameter considered for this research was the replacement to natural sand by Copper Slag at 25%, 50%, 75% and 100%, in M40, M60 and M80 grades. Reinforced concrete beams of rectangular cross section were cast five beams in each grade with similar reinforcement and of same sizes, tested under uniformly increasing static applied load at 1/3\textsuperscript{rd} points. The load–deflection curve at mid-span and Moment–Curvature based on deflection under the loads and at mid-span were analysed. The load carrying capacity of the beams made of 100% copper slag as fine aggregate performed well when compared with the control concrete beam.

The experiments conducted to find the shear behaviour of High Strength Copper Slag Concrete Beams of M40 indicated 20% reduction in ultimate load carrying capacity when compared with the control concrete beam under monotonic loadings and 9% increase in load carrying capacity of M60 and M80 grade concrete. The main reason for this capacity declination is due to non-confinement of concrete, however at higher grades, the load carrying capacity has improved.

The CSHSC reinforced concrete beams of M40, M60 and M80 grade concrete were tested under positive cycle repeated loadings. The energy
absorption capacity of control beam and CSHSC beams were compared and found that, with increase in strength and increase in copper slag content the energy absorption of the beams found increased.

From the studies conducted, it was observed that the copper slag could be used as fine aggregate in High Strength Concrete. The mechanical, durable studies conducted ensure its applicability in the high strength concrete. The flexural, shear and repeated load test on CSHSC beams also ensure the effective response of copper slag in reinforced concrete beams.