

**KARNATAKA STATE COUNCIL FOR SCIENCE AND
TECHNOLOGY
STUDENT PROJECT PROGRAM
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**“STUDIES ON FRESH AND HARDENED PROPERTIES OF
M-20 CONCRETE USING RECYCLED AGGREGATES
OBTAINED FROM READY MIXED CONCRETE WASTE”**

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ABSTRACT

The boom in construction sector and large-scale mechanization in concrete production has led to setting up of several ready-mixed-concrete (RMC) plants. Concrete is the most widely used material in the world and due to the advancement in the technology the ready mixed concrete (RMC) usage is increasing. At the same time, piles of concrete waste are accumulating in every RMC plant yard.

Rapid urbanization of Bangalore City has led to the growth of a robust construction industry. The number of RMC manufacturers in Bangalore are increasing day by day to cater to the increasing demands of the industry. But at the same time the wastage at every RMC plant is on the rise. Also the number of dumping sites is depleting. The transformation of this waste into recycled aggregates (RA) is an important step in the development of a more sustainable environment. Using RA in concrete is an alternative to dumping it and also helps in the sustainability of natural aggregates reserves.

The present investigation aimed at producing fine and coarse aggregates from the hardened concrete waste available at the RMC plant on the outskirts of Bangalore. The material characterization for both fine and coarse aggregates was carried out as per IS codal provisions. The possibility of arriving at an M-20 concrete mix using partial/completely recycled aggregates was attempted. Further the fresh and hardened properties of M-20 concrete mix with and without admixture has been carried out systematically.

Chapter 1 of the present study summarizes about the sustainability concepts, waste hierarchy, recycling plants, scope and objectives of the present investigation.

Chapter 2 reviews about the earlier studies and experimentations conducted by many researchers on the utilization of recycled construction wastes in the concrete mix.

Chapter 3 explains about the collection of hardened concrete waste from RMC plant then crushing, sieving them into recycled fine aggregates and recycled coarse aggregates and tests conducted on them to determine their physical properties.

Chapter 4 attempts a Mix design of M-20 concrete using recycled aggregates and its utilization in Batch-1, Batch-2 and Batch-3 mixes where in Batch-1 comprises of only recycled fine aggregate replacement, Batch-2 comprises of only recycled coarse aggregate replacement and Batch-3 consists of both comprises of both recycled fine aggregate and recycled coarse aggregate replacements.

Chapter 5 deals with the fresh and hardened properties of concrete with and without the usage of admixtures. The fresh property of concrete mix i.e., slump test and hardened properties of concrete specimens such as compressive strength, flexure strength and modulus of elasticity have been determined.

Chapter 6 briefs about the conclusions obtained from the present investigation on utilization of recycled aggregates (RA) in concrete mix.

Finally, Scope for the future work and references have been reported.