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# Review on Partial Replacement of Sand with Quarry Dust and Coarse Aggregate by Demolished Concrete

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**ABSTRACT:** Concrete is the main component of construction. The demand for the construction aggregates has increased. So to catch up with demand natural resources are substituted with some recycled resources that are used such as demolished concrete and quarry dust. There is a large amount of demolished waste generated every year in India and other developing countries. Out of which very small amount is recycled or reused. The experimental investigations are carried out to evaluate the effect of partial replacement of coarse aggregate by demolished waste and sand with quarry dust on compressive strength and workability of concrete. In this work we partially replaced material in concrete within the range of 0%, 5%, 15% and 20% using M20 grade concrete. The prepared concrete mix is compared and would be tested in terms of compressive strength, workability test. The test is going to be performed at 7, 14, and 28 days to gauge the strength properties. Therefore, the test results obtained are found to be comparable with standard or conventional concrete.

**KEYWORDS:** Compressive strength, Slump cone test, recycled demolished concrete, Quarry dust, Natural aggregate.

## I. INTRODUCTION

As there is a very rapid development in the industries and urban areas, waste generation for concrete has been increasing which is unfavourably damaging the environment. Recycling of concrete is needed from the viewpoint of environmental Preservation and effective utilization of resources. At present, utilization of recycled aggregate is limited mainly to sub bases of roads and backfill works. A large portion of Concrete waste ends up at disposal sites. It is anticipated that there will be an increase in the amount of Concrete waste, a shortage of disposal sites, and depletion in natural resources especially. These lead to the use of recycled aggregate in new Concrete production, which is deemed to be a more effective utilization of Concrete waste.

River sand has been the most popular choice for the fine aggregate component of concrete in the past, but overuse of the material has led to environmental concerns. Quarry dust has been proposed as an alternative to river sand that gives additional benefit to concrete. Quarry dust is known to increase the strength of concrete over concrete made with equal quantities of river sand.

## II. LITERATURE REVIEW

**Jeyaprabha et al. (2016)**-In this research work investigated the effect of incorporation of granite dust as a replacement of natural sand on compressive strength of mortar. They investigated the effect of 15% replacement of natural sand with granite dust at an age of 3, 7, 14 and 28 days of curing. They observed that there is an appreciable increase in compressive strength of mortar with incorporation of granite dust as replacement of natural sand at all ages. the enhancement of compressive strength of granite dust mortar as compared to river sand mortar for curing period of 3, 7, 14 and 28 days is 48%, 57%, 61% and 43%, respectively. They concluded that the enhancement of compressive strength of mortar with addition of granite dust as replacement of natural sand may be due to the filling effect of granite dust due to its high fineness as compared to natural sand.

**T. Subramani et al, (May 2015)**- In This work was carried out to study on concrete which incorporate Over Burnt Brick Ballast and concrete waste partially due to their abundance. 25%, 50% (M15, M25) incorporation was used



as partial replacement of natural coarse aggregate in concrete. As the percentage of crushed concrete coarse aggregates and crushed brick fine aggregates is increased, Coarse aggregate is replacement level of 25% & 50 % brick waste in concrete mixes was found to be the level to obtain higher value of the strength and durability at the age of 28 days. 25% & 50 % concrete waste in concrete mixes was found higher value of the strength compared with brick waste used in concrete. Finally conclude the compressive strength, flexural & split tensile strength was high when containing concrete waste 50 % in concrete compared with M15 and brick waste used in concrete.

**Rahul Mahla, et al, (August 2015)-** In this study an attempt has been made to identify the various properties necessary for the design of concrete mix with the coarse tyre rubber chips as aggregate in a systematic manner. In the present this experimental investigation, the M20 grade concrete has been chosen as the reference concrete specimen. The test results shows that the addition of rubber aggregate to concrete at a lower percentages of 10 and 25 % enhanced the impact resistance of the concrete greatly and hence the application of rubberized concrete can be of great help in structures which are exposed to vibrations and impact loads.

**Shivakumar et al, (June 2014)-** In this experimental work, the utilization of building demolished waste in the manufacturing of Porous concrete as a replacement of coarse aggregate. By the disquisition it's plant that the pervious concrete results are encouraging to use as a pervious material for the drain- capability and has been plant to be similar to the conventional concrete. Pervious concrete may be an volition to the conventional concrete because of low viscosity and high porosity.

**Ravi Patelet al,(2013)-** In this paper used to study availability of demolished concrete for use as recycled concrete aggregate (RCA) is increasing. Using the waste concrete as RCA conserves natural total, reduces the impacton tips, decreases energy consumption and can give cost savings. The operation of recycled total has been started in numerous countries for construction systems. This Research Paper works on the introductory parcels of recycled coarse total. It also compares these parcels with natural summations. Introductory changes in all aggregate parcels were determined. Introductory concrete parcels like compressive strength, plasticity etc. are explained here for different combinations of recycled course aggregate with natural aggregate. Ingeneral, present status & utilization of recycled coarse aggregate in India with their future need of Indian region.

**Monish, et al., (2013)-**In this experimental study have been carried out to assess the effect of partial replacement of coarse aggregate by demolished waste on workability and compressive strength of recycled concrete for the study at 7 and 28 d. Demolished waste was collected from IIT building near Jhalwa, Allahabad. For this study, cubes of 100mm size were cast replacing coarse aggregate by 10%, 20%, and 30% with demolished concrete. Compressive strength of this recycled concrete was observed with respect to conventional concrete. Results showed that up to 30% of coarse aggregate replaced by demolished waste gave strength closer to the strength of plain concrete cubes and strength retention is in the range of 86.84-94.74% as compared to conventional concrete.

**G.Murali et al, (March 2012)-**In the study on effects of shahabad (a variety of cudappah) stone and the chemical admixture (supaflo) on concrete were investigated. Natural aggregate had been replaced with the waste shahabad stone in four different percentages namely 10, 20, 30 & 40 %. A comparison was made between the specimens of partially replaced coarse aggregate and the same set of specimens admixed with supaflo. The effects on compressive strength, split tensile strength and modulus of rupture were reported. Test results indicated that the replacement of coarse aggregate by 30% had attained a good strength.

**Gandhi, et al., (2011)-**In this study recycled coarse aggregate have been used to replace normal coarse aggregate. Natural aggregate had been replaced with demolished waste in varying percentages of 20%, 40%, and 60% 80% and 100%. Then the tests were carried out which include compression strength test to evaluate the strength of concrete. On comparing it was observed that the compressive strength first increased with the increase in percentage of recycled aggregate up to 60%. With further increase in recycled aggregate, the compressive strength decreased. Maximum compressive strength of 28.96 Mpa after 3 days of curing was achieved at 60% of recycled aggregate and maximum compressive strength of 33.92 Mpa after 7 days of curing was achieved at 60% of recycled aggregate.

**Raman et. al. (2011)-** In this study investigated the effect of replacement of natural sand with quarry dust on workability of high strength rice hush ash concrete. Two series of concrete, C60 and C70, were made to achieve target strength of 60MPa and 70MPa, respectively. In each series, the replacement of natural sand with quarry dust was 10%, 20%, 30% and 40%, while for all mixes, 10% cement was replaced with rice hush ash. Due to the incorporation of superplasticizer, all concrete mixes of both the series exhibited very good workability and



achieved the target minimum slump of 150mm. They observed that there was a decline in the workability of concrete mixes with the incorporation of quarry dust as partial replacement for sand in both of the series, C60 and C70. They concluded that the decline in workability is due to the presence of higher silt and fines content in quarry dust, which increase the specific surface area and consequently increases the water demand.

**Felekoglu et al.-** In this exploration work observed that the objectification of chase waste at the same cement content generally reduced the super plasticizer demand and bettered the 28 days' compressive strength of SCC. Normal strength SCC fusions that contain roughly 300 – 310 Kg of cement per boxy cadence can be successfully prepared by employing high quantum of chase waste.

### III. CONCLUSION

From the above literature review it can be concluded that there the concept of partially replacement of demolished concrete and quarry dust it is a good alternative to the conventional concrete. It also helps to protect environment from waste deposits and reduce some extent of cost.

1. This can be a good option for Sustainable and ecofriendly recycling technique for the utilizing demolition waste into construction project
2. When demolished waste is used in concrete, the cost of production will be economical. Hence, overall cost of project will come down.
3. The utilization of waste materials for construction materials are looking forwards to give benefits in term of durability of the concrete as well as conserving the environment.

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