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Construction Waste Recycling

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CONSTRUCTION WASTE RECYCLING

Abstract

The research aims to study the causes and magnitude of wastage of construction materials on construction projects . To achieve the research aim, the researcher had prepared a questionnaire form included questions about the causes of wastage and the estimated percentages of wastage of ten most popular kinds of materials used on construction. Prior to the final formulation of the questionnaire form, a pilot survey was conducted. The form was revised in accordance with the feedback received. The number of causes adopted was 60 distributed on the six major categories. The form was distributed to 240 participants (clients, contractors, and consultants). The study revealed that the most important causes of wastage of materials on construction sites are frequent design and client's changes; rework due to workers mistakes; poor contract documents; wrong and lack of storage of materials; poor strategy for waste minimization; shortage and lack of experience of skilled workers; poor site conditions; damage during transportation; theft and vandalism; and mistakes in quantity surveying and over allowance.

INTRODUCTION

Construction developments are on its peak in the 21st century around the globe. There are numerous sky-scapers, bridges, roads, underground tunnels, and deep-water structures all over the world. As well, there are many other types of structures being constructed every year, To accommodate new structures, many structure built in the past countries are being demolished and destroyed due to their limit of life span, unsuitable position in an ever-growing city, and damaged condition cause by natural disaster. The demolition of structures in generating concrete rubbles and causing environmental problems due to unplanned disposal and scarcity of landfill site. A large portion of the potentially useful demolition waste is disposed of in landfill site. The transport disposal of this waste are economically and environmentally not sustainable. The similar problems are caused by the tested field cast and excess concretes, which can be categorized under construction waste. In addition , the harvesting of aggregates for construction in depleting the natural sources and damaging the ecological balance, The quarrying activities and processes involved in the harvesting of virgin aggregates are also polluting the environment. To alleviate these

problems, nowadays alternative aggregates are drawing more interest in the construction industry. In recent years the rubbles generated from the demolition of old concrete structures l , the unused concrete returned from construction site2, and the concrete tested in laboratory or field3 ,4 have been recycled as aggregate and reused for new construction in many regions of the world. The aggregates processed from concrete rubbles returned and tested concrete are well known as recycled concrete aggregate (RCA).

RECYCLING AND REUSE OF CONSTRUCTION & DEMOLITION WASTES IN CONCRETE

The recycling and reuse of construction & demolition wastes seems feasible solution in rehabilitation and new constructions after the natural disaster or demolition of old structures, This becomes very important especially for especially for those countries where national and local policies are stringent for disposal of construction and demolition wastes with guidance, penalties, levies etc. A typical lay out plan of recycling plant for construction waste has been shown in the properties of recycled aggregate concrete obtained by various authors are given.

There is severe shortage of infrastructural facilities like houses, hospitals, roads etc. in India and large quantities of construction materials for creating these facilities are needed. The planning commission allocated approximately 50% if capital outlay for infrastructure development in successive 10th & 11th five year plans. Rapid infrastructural development such highways, airports etc. and growing demand for housing has led to scarcity & rise in cost of construction materials. Most of waste materials produced by demolished structures disposed off by dumping them as land fill. Dumping of wastes on land is causing shortage of dumping place in urban areas. Therefore, it is necessary to start recycling and re-use of demolition concrete waste to save environment cost and energy.

Central Pollution Control Board has estimated current quantum of solid waste generation in India to the tune of 48 million tons per annum out of which, waste from construction industry only accounts for more than 25 % . Management of such high quantum of waste.

In view of significant role of recycled construction material oand technology in the development of urban , TIFAC has conducted a techno-market survey on “Utilization of Waste from Construction Industry” targeting housing/building and road segment.

RESEARCH SIGNIFICANCE

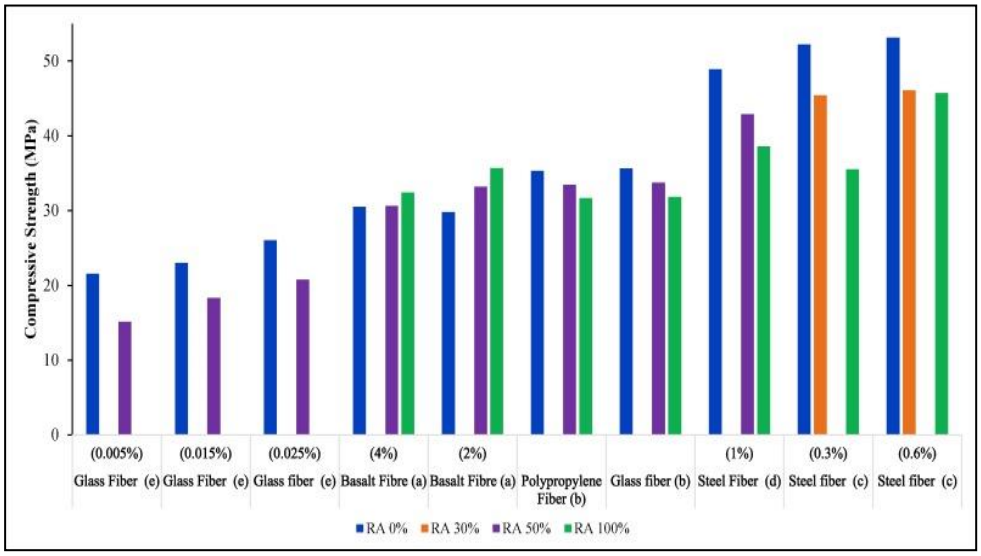
Construction and demolition wastes generated from demolished buildings and infrastructures form one of the largest waste streams in many developed countries.

The excess and tested concretes also constitute a considerable portion of construction wastes , particularly in developing countries, The recycling of construction and demolition wastes as RCA resolves disposal problem, reduces landfill space, conserves natural resources, decreases transport costs, diminishes environmental pollution, and protects ecological balance.

This study reports the use of RCA obtained from the tested field-cast concrete specimens to produce new concrete. The experimental research has emphasized the effects of coarse.

RCA on a range of fresh(slump, slump flow) mechanical (compressive , splitting tensile and flexural strengths, modulus of elasticity), and durability (permeable voids) properties, and thus assessed its suitability for use in high-workability concrete.

The research findings are expected to encourage the sustainable development by using RCA in structural and non-structural concretes.



Conclusion

Recycling and reuse of building wastes have been found to be an appropriate solution to the problems of dumping hundred of thousands tons of debris accompanied with shortage of natural aggregates. The use of recycled aggregates in concrete prove to be a valuable building materials in technical, environment and economical respect.

Recycled aggregate posses relatively lower bulk density, crushing and impact values and higher water absorption as compared to natural aggregate. The compressive strength of recycled aggregate concrete in relatively lower up to 15% than natural aggregate concrete. The variation also depends on the original concrete from which the aggregates have been obtained. The durability parameters studied at SERC(G) confirms suitability of RCA & RAC in making durable concrete structures of selected types.

There are several reliable applications for using recycled coarse aggregate in construction . However, more research and initiation of pilot project for application of RCA is needed for modifying our design codes, specifications and procedure for use of recycled aggregate concrete. The subject of use of RCA in construction works in India should be given impetus, because of big infrastructural projects are being commissioned including Common Wealth Games in 2010.

The trend towards urbanization in the United States has provided, and probably will continue to provide, a strong demand for high-volume, low-cost aggregates material for repair and development of additional infrastructure. The total demand for aggregates, driven by demographics urbanize-tion, and the economy, is expected to remain strong in the short term. (Tepordei 1997b)

Recycling of construction materials has grown along with demand for aggregates. Recycled aggregates compete favorably with natural aggregates in many local markets as recycled aggregates compete favorable with natural aggregates in many local markets as road base material. Recycling has the potential to reduce the amount of waste disposed of in landfill, preserve natural resources, and provide energy and cost saving while limiting environmental disturbance. Potential source for recycled material grow as maintenance or replacement of the Nation's infrastructure continues. Because of the finite life of such infrastructure , this "urban deposit" may be considered a renewable resource. The relative costs and charge (tipping fees) of recyclers, their competitors , and landfills determine the amount of material ultimately available for recycling. At approximately $0.13/ton/kilometer, the cost of transportation has a significant impact on the economics of construction operations. It is not surprising that mobile, job site recycling is becoming common for large construction projects, as a means of avoiding high transportations, disposal, and new material costs. Even so the amount of material available overall for recycling is

insufficient to meet present industry demand. On a national basis , it is unlikely that recycling will ever completely replace natural aggregates as road base in road construction.

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