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REUSABILITY OF CONSTRUCTION AND DEMOLITION WASTE IN BRICKS

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Abstract - *On a large scale the old building is being demolished to build modern one due to rapid urbanization.Due to this industry is also growing creating a large amount of demolished waste. However, very little demolished concrete is recycled or reused. The strict environmental laws and lack of dumping sites in urban areas on one hand are making the disposal of demolition wastes problematic while on the other hand the quarrying of raw materials is becoming difficult..The present study aims to develop C&D waste brick and compared with the conventional brick.Physical and mechanical test was carried out as per Indian Standards for the desired composition.*

Key Words: **Construction& Demolition waste, mechanical and physical test,environmental laws,recycle and reuse,rapid urbanization.**

INTRODUCTION

As population is increasing day by day and also there is a large movement of people towards urban areas.Also on a large scale the old building is being demolished to build modern one due to rapid urbanization.Due to this industry is also growing creating a large amount of demolished waste. Demolition wastes obtained from a structure predominantly consists of concrete, foreign matter such as various type of finishes, claddy materials, lumber, dirt, steel, hardwares, woods, plastics etc. The process of removal of impurities and crushing of rubble into suitable and desired aggregate particle size can be carried out in a continuous and sequential manner using appropriate mechanical devices such as jaw crushers, impact crushers, swing hammer crushers etc. The recycled concrete produced with coarse recycled aggregate and natural sand requires approximately 5% more free water than the control concrete produced with corresponding natural aggregate, in order to achieve the same slump.Waste materials are collected from various sources and sites.It is crushed to aggregate size using rammer,hammer. Water absorption of coarse and fine aggregates obtained from the demolition wastes must be determined in the laboratory before using them in any concrete mix design. The water demand of fresh concrete made using these aggregates is increased, the strength and probably the durability of hardened concrete is reduced. For this reason, it is not recommended to use recycled fine aggregate for production of quality concrete. Due to high water absorption of recycled aggregates, it is sometimes suggested to use pre-soaked aggregates for production of recycled concrete.

Materials & Machinery Used

Ordinary Portland cement and fly ash were used as a cementitious material. Construction and demolition waste is been used as replacement to aggregate.Compression testing machine,universal testing machine,slump cone,compaction factor testing machine is been utilised in carrying out this work.

Physical and mechanical tests

Physical and mechanical tests performed were hardness,water absorption and compressive strength were conducted to check the suitability of developed material. All tests were performed as per the Indian Standard codes for methods of tests of burnt clay. All test were performed on both natural and demolished concrete bricks.Slump cone test and compaction factor test are conducted to check workability of concrete.

Compacting Factor = (Weight of Partially Compacted Concrete)/ (Weight of Fully Compacted Concrete)

METHODOLOGY

First we have to make conventional concrete brick by mixing opc,water,aggregate,sand.Then we have to make concrete block with the help of demolition waste.In this we are using opc and flyash as cementious material,and we are using construction and demolition waste as replacement of aggregate. The demolished concrete was crushed and sieved on IS sieve to segregate the coarse, fine and powder fractions. After casting of block it is allowed for curing. Then several test are performed on both concrete after respective days.At last we are going to compare the strength of both bricks and its various properties.

OBJECTIVE OF THE STUDY

1.To reduce the pressure imposed on the environment resulting from the accumulation of construction waste.

2.It will be a good alternative in the case on unavailability of construction materials.

3.It is an economic option, since recycled materials are usually cheaper than new material.

4.Finally, Environmental benefits gained from using such materials can not be valued with money.

5.Get down the price because of less importing materials from out of the country. In small country, lack of space to landfill.

RESULT

After performing various tests it is found that compressive strength of demolished waste concrete have better strength upto certain extent than the conventional concrete. It is observed that recycled concrete made using 10% replacement of coarse aggregate gives the strength comparable to the strength of conventional concrete, and beyond this replacement level the strength decreases. Up to a replacement level of 30%, the M-25 grade concrete is obtained when waste material is used for replacement of regular coarse aggregate. The strength of recycled concrete is about 95, 92 and 87%, respectively of referral concrete at 28 days for 10, 20 and 30% replacement of coarse aggregate with demolition waste coarse aggregate respectively.Result of compressive strength and compaction factor are listed in below table.

Compressive Strength And Compaction Factor Test

S.No	Type Of Concrete	Type Of Specimen	%fibre	Compressive strength At 28 Days (N/mm2)	Compaction Factor
1	Normal Concrete	Cube	0	24.31	0.8726
2	Demolished Concrete	Cube	20	28.43	0.8693

CONCLUSIONS

The following conclusions are drawn from this study.

1. The water required for producing the same workability in recycled concrete increases with the increase in the percentage of use of demolition waste, irrespective of types of replacement viz., Cement, Fine Aggregate and Coarse Aggregate.

2. Replacement of regular coarse aggregate by demolition waste coarse aggregate up to 30% is possible, without much compromising the strength workability.

3. The replacement of coarse and fine aggregates by demolition waste is more suitable in respect of both strength and workability.

REFERENCE

1. Mukai T, Kikuchi M, Ishikawa N (1978) Study on the properties of concrete containing recycled concrete aggregate. Cement Association of Japan, 32nd review.
2. Hansen TC, Narud H (1983) Strength of recycled concrete coarse aggregate. Concrete Int –Design constr. 5(1):79-83.
3. Hansen, T.C, and Marga, M (1992), Strength of recycled concrete made from coarse and fine recycled concrete aggregate. Ibid 135, pp.605-612.
4. Karaa, T, (1986) Evalution techniques.

5. Fouad M. Khalaf and Alan S. DeVenny (2004)Performance of Brick Aggregate Concrete at High Temperatures,(ASCE)0899-1561 .
6. IS: 456-1978, "Code of practice for plain and reinforced concrete."Indian Standard Institute,New Delhi.
7. IS:6461-1973,"Properties of concrete", (part VIII), Indian Standard Institute, New Delhi.
8. IS:8112-1989,"43 Grade ordinary Portland cement", Indian Standard Institute, New Delhi.
9. IS: 6461 – 1973, "Glossary of terms relating to Cement concrete", Indian Standard Institute, New Delhi.

Testing Of cubes