International Engineering Journal For Research & Development
Vol.5
Issue 5
E-ISSN NO:-2349-0721
Impact factor : 6.549

REUSE WASTE MATERIAL IN ROAD FOR MAKING OF RIGID PAVEMENT

[1]Mr. Abhishek J. Bobade, [2]Prof. A.P. Dange
Department of Civil Engineering, School of Engineering and Technology G H Raisoni University, Amravati – 444701 (M.S.), Assistant Professor, Department of Civil Engineering, School of Engineering and Technology G H Raisoni University, Amravati – 444701 (M.S.)
abhishekbobade300@gmail.com

ABSTRACT

The project presents the actual stage of analysis and laboratory studies, undertaken in the frame of Post graduation program "Develop and Support Multidisciplinary Programs in Primordial technical Areas of National Strategy of the Research–Development–Innovation" aiming to produce to produce recycled aggregates with physical-mechanical characteristics suitable for use in rigid pavement construction. Recycled aggregates under investigation are obtained by crushing of cement concrete from the demolition of buildings in municipality. The main objective of the research is to achieve a higher economic value of the cement concrete resulted from demolitions by recycling and use in the construction of conventional cement concrete pavements(PCC – plain cement concrete) and roller compacted concrete pavements (RCC).An important benefit resulting by using recycled aggregates in pavement engineering is the reduction of the impact construction works on the environment by both limiting the exploitation of natural aggregates and the useof landfill construction and demolition wastes. Finally, a technical evaluation of the investigated recycled aggregates quality, in accordance with existing standards and norms, will be considered.

Keywords: Recycled aggregate ,Mix Design, Various tests

INTRODUCTION

This project concluded with the result which include cost objective on the basic of recycled material .in this project thesis first chapter including present introduction of research shows general, objectives, and scope of work research work. It describe effectiveness of recycled material helps in mode of transportation.

In developing countries like India nearly12million tons of Construction and Demolition wastes are producedper annum. The use of recycled C&D material would greatly reduce the demand for landfill sites and for virgin resource materials by re-using what would be normally regarded as a waste material. In manycountries, particularly as populations in urban areas continue to grow, the natural resources are exploited at rapid rate in view of escalating construction activities. The use of quarry materials is furthermore unsustainable from an environmental perspective manner.

The most ambitious recycling construction target is, using waste aggregates, to create a new product with similar properties to the original. This is to make new concrete with old concrete, for this purpose it is needed recycled aggregates with high quality. The demolition of concrete structures, after having completed their useful life or having suffered collapse, could be an excellent source of recycled aggregate, provided that there is a quality control in the recycling process. In recent years certain countries have considered the reutilization of

construction and demolition waste as a new construction material as being one of the main objectives with respect to sustainable construction activities.

OBJECTIVES

The objectives are as follows:

1. To optimize the cost of transportation facilities.
2. To reduce the natural resources consumption
3. To reduce the natural resources consumption

REVIEW OFLITERATURE

MARIUS-TEODOR MUSCALU and RADU ANDREI (2011),says that The experimental study shows that with minimum effort, appropriate aggregates can be obtained by cement concrete recycling which may compensate the consumption of needed natural crushed aggregates in pavement engineering. The performed laboratory tests have proved that recycled aggregates had similar performance characteristics with crushed gravel as chippings used in rigid pavement construction

Appiah,J.K.,Berko-Boateng,V.N.andTagbor,T.A.,2017.giventheThe choice of moodier for a particular project can depend on many factors including construction ability, availability, cost, and expected performance. Modification is achieved by two main procedures; Dry process involves direct incorporation of ccc waste plastic, which is blended with aggregate before adding in bitumen, to prepare a plastic modified bituminous concr mix and the Wet process which involves, simultaneous blending of bitumen and waste plastic.

Ashish DK., 2018. Use of waste & byproducts as aggregates has greater potential because 75% of concrete is composed of aggregates. The physical and chemical properties of marble dust are suitable for its proposed use. None of the mineral constituents in waste is in undesirable concentration. Test results show that these industrial wastes are capable of improving hardened concrete performance.

E-ISSN NO:2349-0721

Sura Jagadeesh1 J.Venkateswara Rao., In essence use of recycled aggregate in concrete results in some negative influence on the mechanical properties however by considering the whole structural member it can be still used for producing structural concrete. The performance of the concrete produced from recycled aggregates is within the standard specifications, hence reuse of recycled aggregates in rigid pavements as well as other structural works is highly recommended. Reuse of recycled aggregate addresses the dual goals of disposal problems associated with demolition waste and sustainability of construction material

METHODOLOGY

The reuse waste material in road in terms of collecting waste material inroad firstly collected from site. Then the recycling procedure recycling procedure out on it. The various tests are to be carried out on aggregate, carried out mix design for it and finally cross checking the results with permissible limits, so that it confirms that whether the recycled material should be used for making of Rigid Pavement

1) .Figure 3.1 Flow Diagram of Project

Fig. 3.2 – Demolition process and crushing of demolished material

PRESENTATION OF COMPRESSION / IMPACT CEMENT CONCRETE RECYCLING EQUIPMENT

This equipment used in recycling for cement concrete, so that the waste material as a waste concrete should recycled with the helps of cement concrete recycling equipment. The main material included in CDW is the cement concrete from which, by application of appropriate recycling technologies, recycled aggregates result ,they can successfully substitute crushed/quarry natural aggregates to the construction of rigid pavements

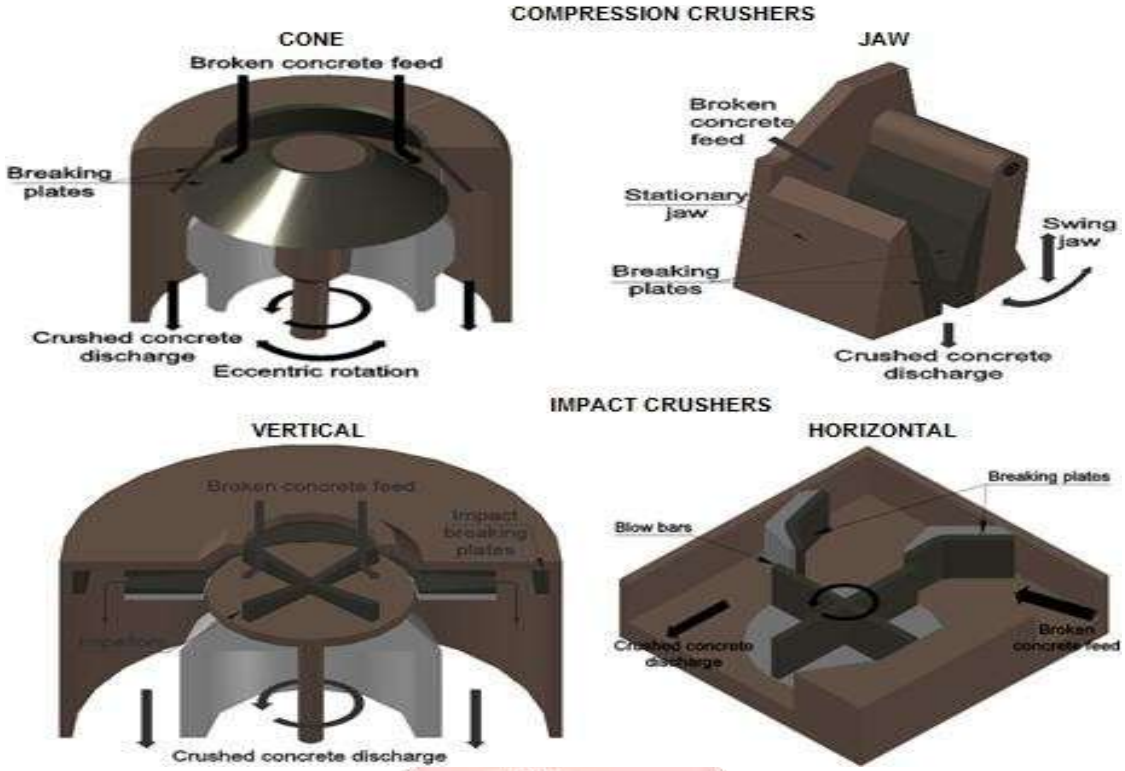

Fig. 3.3 – Presentation of compression/impact cement concrete recycling equipment.

USED OF JAW JAW CRUSHER AND RESULTING RECYCLED AGGREGATE

Recycled aggregates studied in this research are direct labor produced by crushing of 75…300 mm broken cement concrete from demolition wastes using a jaw breaker . The resulting recycled aggregates sorted by 0…4 mm, 4…8 mm, 8…16 mm and 16…25 mm particle size classes

Fig. 3.2 – Demolition process and crushing of demolished material.

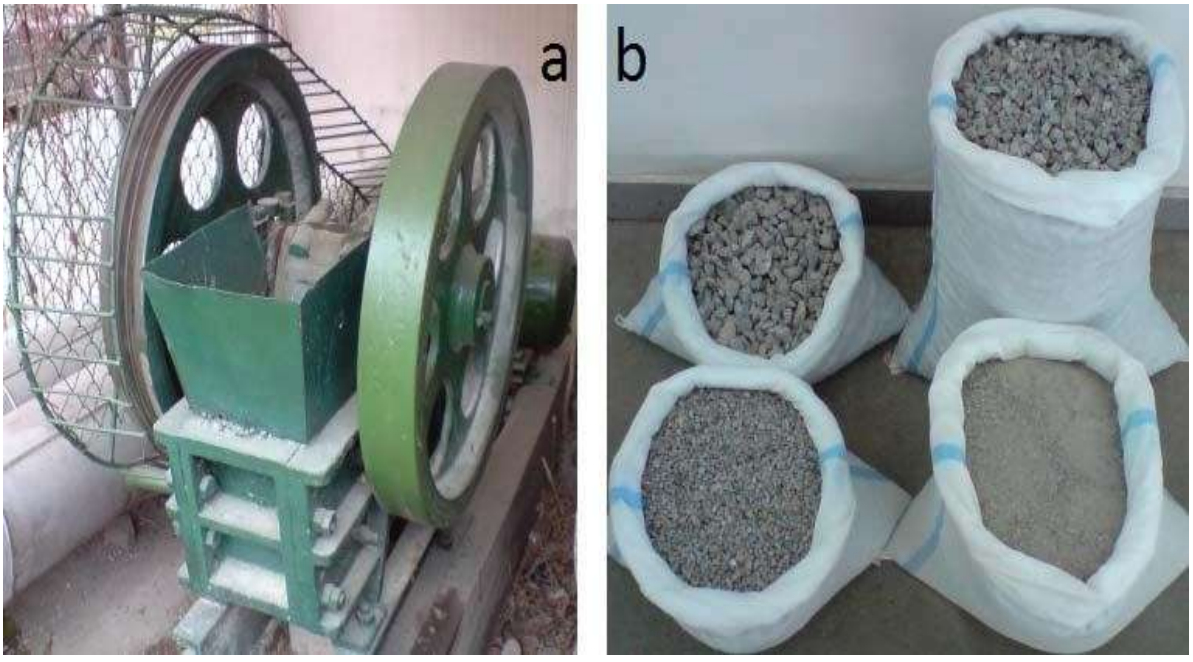

Fig. 3.4– Used jaw crusher and resulting recycled aggregates

Grading Curve of Recycled Aggregate

The Grading Curve Distribution of Obtained Recycled Aggregate

Table 3.1 Grading Curve Distribution of Obtained Recycled Aggregate

Sieve size mm	0.20	0.63	1	2	4	8	16	25	32
Passing %	2.59	6.34	8.54	13.63	22.88	43.37	87.84	98.29	100.00

To study the possibility of using recycled aggregated in rigid pavement construction emerged the need for a comparative analysis between their physical-mechanical characteristics and the performance characteristics imposed by standards and norms for natural crushed aggregates. In Table 3 the results of the undertaken laboratory tests are presented.

LABORATORY TEST

TESTS TO BE PERMORMED

4.1 Tests on aggregate for DLC Pavement

4.1.1. Sampling aggregate

4.1.2. Indivisual gradation

4.1.3. Water Absorption & specific gravity

4.1.4 Aggregate impact value(AIV)

4.1.5. Flackiness & Elongtion Index:

4.1.6. Strength of cube:

- As perf Is516
- Minimum 10mpa in7days

4.1.7 The slump of Dlc : It should be 25+/-15mm as per morth specification.

4.2 Tests on aggregate for PQC Pavement

4.3 4.2.1.samplingaggr egate

2) **4.2.2.Indivisual gradation**

4.2.3 water absorption & specific gravity

4.2.4 Aggregate impact value(AIV

4.2.5 Flackiness & Elongtion Index: As per is -2386 (part-1) Maximum(FI+EI):-45%

4.2.6 Slump test:it should be 25+/-15mm as per morth specification.

Strength of cube :As per IS 416-19are presented.

MIX DESIGN

Summary of PQC Mix Design of recycling Aggregate

Summary of Pavement Quality Concrete - Mix Design M40										
Coarse aggregate	dudhalam									
Fine aggregate	(wardha River another Source)		Aggregate Size	40 mm	20 mm	10 mm	River sand			
Cement	Ultratech OPC 43 grade		Water Absorption	0.59	0.72	0.97	1.140			
Admixture	BASF Rheobuild-522 ND									
Water	Supply water									

Grade of concrete	Proportion Coarse aggregate (CA)			Fine aggregate (FA)	Cement comtent (kg/M³)	Water (Kg)	MDD	Water?cement ratio	Coarse aggregate (kg/M³)			Fine Aggregate (kg/M³)	Compressive strength (Mpa)= 49.870
									40 MM	20 MM	10 MM		Flexural strength (mpa)= 5.23 In 28 days
Dlc	62%				380	140.6	1.994 gm/cc	0.37 %	*392*	*389*	465	695	
	40mm=20%	20mm=20%	10mm=24%	36%									

Table 5.4 summary of Pavement Quality Concrete Mix Design after using recycle ling Aggregate

RESULTS AND DISCUSSION

The result show the the aggregate loose its property up to 13%.Concrete compressive and flexural strength reduced up to 16 to 17%.So with increasing admixture dose the recycle material should be used. So this material can be use for rigid pavement.

Also adequate economical value recovery of the cement concrete will be achieved by producing recycled aggregates which can be used in higher value construction works. The experimental study shows that with minimum effort, appropriate aggregates can be obtained by cement concrete recycling which may compensate the consumption of needed natural crushed aggregates in pavement engineering.

CONCLUSION

The cement concrete recycling from CDW leads to improvement of environmental pollution parameters by preserving natural resources and generating free space in landfills. Also adequate economical value recovery of the cement concrete will be achieved by producing recycled aggregates which can be used in higher value construction works.

The experimental study shows that with minimum effort, appropriate aggregates can be obtained by cement concrete recycling which may compensate the consumption of needed natural crushed aggregates in pavement engineering.

REFERENCES

1. Marius-Teodor Muscalu and Radu Andrei.use of Recycled aggregate rigid Pavement construction March 23,2011
2. Sura Jagadeesh1 J.Venkateswara Rao.Use of Recycled Concrete Aggregates in Rigid Pavements,7,July-2018
3. Appiah, J.K., Berko-Boateng, V.N. and Tagbor, T.A., 2017. Use of waste plastic materials for road construction in Ghana.Case studies in construction materials, 6, pp.1-
4. Ashish DK., 2018. Feasibility of waste marble powder in concrete as partial substitution of cement and sand amalgam for sustainable growth. Journal of Building Engineering. Jan31;15:236-42.
5. Visakh Suthan Pallath , G.Gangha , N.Ganapathy Ramasamy. Experimental study study on strength characteristics of concrete with recycled aggregate and analysis of its Performance and Efficacy of Industrial Waste Materials in Road Construction: Fly Ash and Bagasse Ash. Airfield and Heffective uses in road works: 03 |Mar-2015,
6. Anupam, A.K., Kumar, P., Ransinchung, G.D. and Shah, Y.U., 2017. Study on ighway Pavements 2017,p.45.

E-ISSN NO:2349-0721