

Evolution of Properties of Paver Blocks for Heavy Traffic with Human Hair

Shivnandan Sahai Shrivastava¹ Rajesh Joshi²

¹M.tech Scholar ²Assistant Professor

^{1,2}Rajiv Gandhi Prodyougiki Mahavidyalaya

Abstract— Now a day, Cement concrete paver blocks is used widely on roads. Demolish building waste is generally used in landfills. These demolish building waste which are of many types, from this waste concrete waste is separated, and this waste in construction industry is also known as recycle concrete aggregate which is increasing frequently. India could be a developing country and in varied developing countries like India economical construction in conjunction with economical construction material plays an important role within the development of country. material in construction will play tremendous role to create it economical and sturdy as a result of a number of its specific properties relevant to construction materials. This thesis shows comparative and experimental study on utilization of human hair as fiber reinforcement in concrete for paver blocks. Human hair could be a body waste and during this thesis human hair are added in the concrete of paver blocks by the weight of cement upto a pair of 2.5% at associate degree interval of 0.5% of variable length ten millimeter to forty millimeter for reinforcing the concrete, this project focus on heavy traffic areas for that paver blocks of M 50 grade of concrete is casted which is 100 mm. this project strictly follows recommendation given under IS 15658 : 2006 for paver blocks and properties like compressive strength and flexural strength is evaluated along with workability of the concrete, shape of the paver blocks used for research is zig-zag.

Key words: Compressive Strength, Flexural, Strength, Paver Blocks, Workability, Human Hair, Concrete

I. INTRODUCTION

Construction and demolitions are the approaches that work parallel. In India, the destroyed building rubble generally goes to waste in landfills. After few years building and demolition waste will be more than half of the National total waste in most nations of the world so recycling of these concrete waste materials like rubble from building demolition can provide a resolution to the current problem. Landfills are getting more and more difficult to find, are too far off from the demolition web site, or are overly high priced to defend. At the equal time assets of deliver of appropriate aggregate for making concrete are constantly getting used. The recycling of construction demolition waste substances into new buildings can provide a solution to those issues. Grinding bolstered concrete buildings can reduce the volume of land filled debris by means of more or less 80%. Whilst extent reduction itself is useful, recycling the waste creates a product that can be used for fill, bank stabilization, pavement for trails and other functions, thereby lowering in addition environmental burdens by substituting recycled aggregates for herbal aggregates. Reusing is the human movement of processing the used cloth for utilization in growing new products. Using herbal

combination is developing more and more excessive with the superior improvement within the base region. In parliamentary law to reduce down using natural combination, recycled concrete mixture may be carried out because the replacement substances. Recycled concrete mixture is made from damaged down, graded inorganic debris processed from the fabrics that have been carried out in the structures and demolition particles.

II. METHODOLOGY

Zigzag shaped pave block is casted for this project having dimension 120*200*100 mm, area of paver block is calculated as per the method given in IS 15658 : 2006, and calculated area is 29231 mm², for this project fly ash based PPC cement is used, along with natural sand as fine aggregate and natural stone as coarse aggregate, human hair is collected from local barber shops and from ladies parlor, these collected hair is cut in varying length of 20 to 40mm, then it is submerged in water and left for 24 hrs, then these human hair is mixed in concrete in wet form. Paver blocks is casted in rubber molds and cured in clean water. Mix design of concrete for paver is done as per the IS 10262:2009, mix designation is given in table 1. For heavy traffic M50 concrete is designed. To evaluated the properties of paver block compressive strength and flexural strength test is performed and workability of the fresh concrete is also evaluated by slump cone test.

Material	Content	Mix Name
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Human hair	0.50%	TH1
	1.00%	TH2
	1.50%	TH3
	2.00%	TH4
	2.50%	TH5

Table 1: Mix designation of concrete

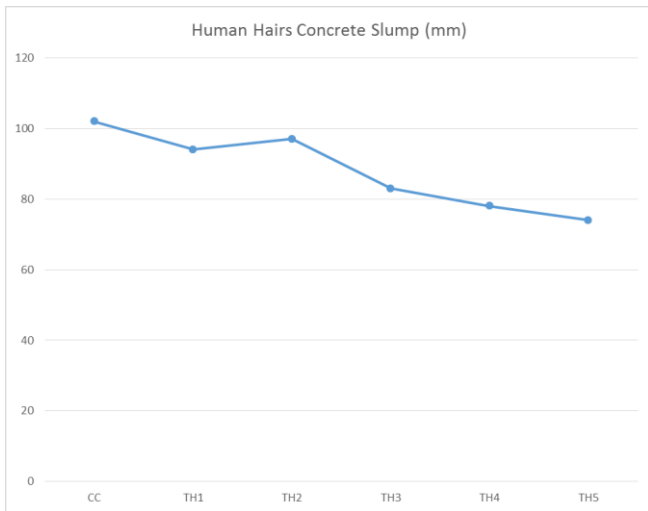
III. RESULT AND DISCUSSION

A. Workability

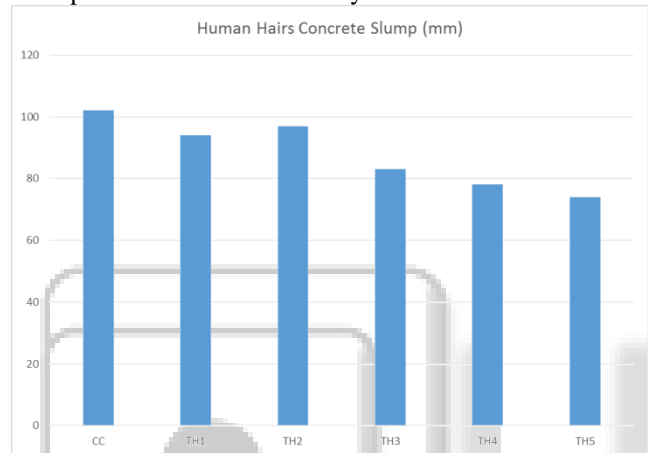
Table 2 and graph 1.-2 shows workability of the human hair concrete, here workability of the concrete is checked by slump cone test, result shows addition of human hair in concrete gives deduction in workability of concrete, control concrete mix concrete possess 102 mm slump and which continues to decreasing and reach to 74 mm when 2.5% human hair is added in it.

Mix Name	Human hair Concrete Slump (mm)
CC	102
TH1	94
TH2	97
TH3	83
TH4	78
TH5	74

Table 2: Result of Workability of Human hair Concrete



Graph 1: Result of Workability of Human hair Concrete



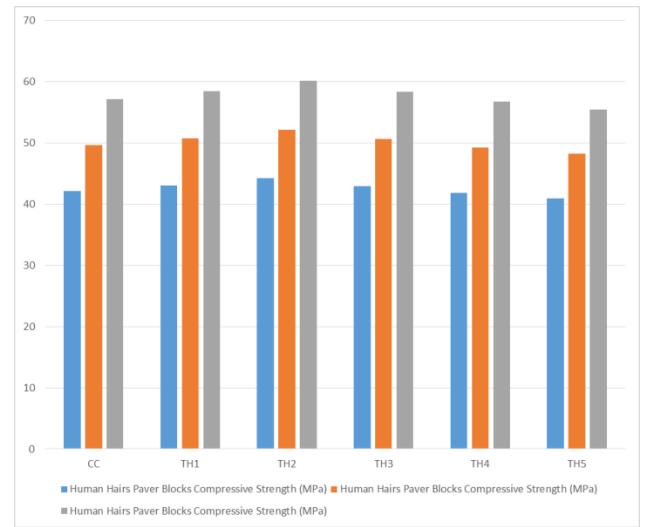
Graph 2: Result of Workability of Human hair Concrete

B. Compressive strength test:

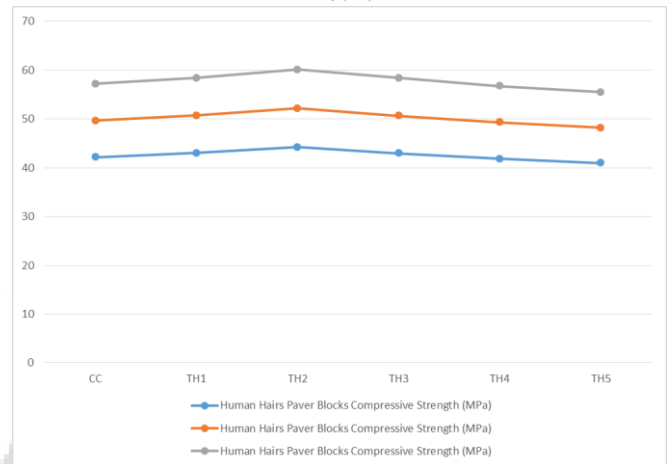
When human hair is added in composition of human hair paver blocks, its compressive strength is evaluated and their result is given in table 3 and graph 3-4. Paver blocks made of control mix possess 57.21 MPa compressive strength after 28 days of curing and then it decreases to 55.52 when 2.5% human is added in composition of paver blocks by the weight of cement. Correction in compressive strength is done as per the IS 15658.

Mix Name	Human hair Paver Blocks Compressive Strength (MPa)		
	7 Days	14 Days	28 Days
CC	42.147	49.6785	57.21
TH1	43.015	50.7325	58.45
TH2	44.219	52.1945	60.17
TH3	42.973	50.6815	58.39
TH4	41.846	49.313	56.78
TH5	40.964	48.242	55.52

Table 3: Result of Compressive Strength of Human hair Paver Blocks



Graph 3: Result of Compressive Strength of Jute Fiber Paver Blocks



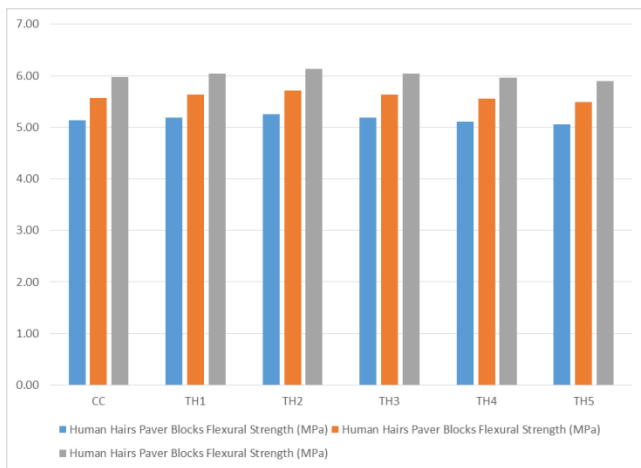
Graph 4: Result of Compressive Strength of Jute Fiber Paver Blocks

C. Flexural Strength Test:

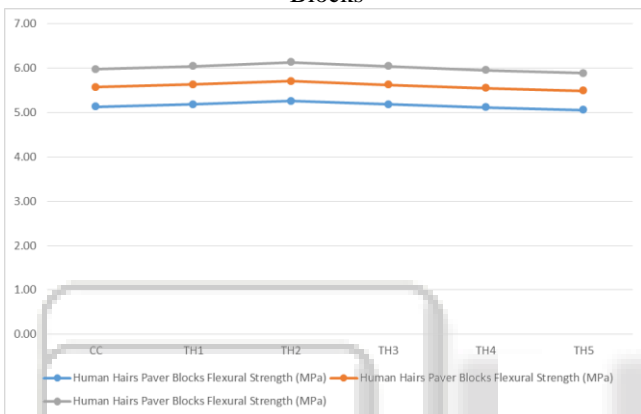
When human hair are added in composition of human hair paver blocks, its flexural strength is evaluated and their result is given in table 4 and graph 5-6. Paver blocks made of control mix possess 5.98 MPa flexural strength after 28 days of curing and then it decreases to 5.89 when 2.5% human is added in composition of paver blocks by the weight of cement.

Mix Name	Human hair Paver Blocks Flexural Strength (MPa)		
	7 Days	14 Days	28 Days
CC	5.13	5.57	5.98
TH1	5.19	5.63	6.04
TH2	5.26	5.71	6.13
TH3	5.18	5.63	6.04
TH4	5.11	5.55	5.96
TH5	5.06	5.49	5.89

Table 4: Result of Flexural Strength of Human hair Paver Blocks



Graph 5: Result of Flexural Strength of Human hair Paver Blocks



Graph 6: Result of Flexural Strength of Human hair Paver Blocks

IV. CONCLUSION

Study is conducted on the paver block which is reinforced by human hair as a fiber reinforcement, objective of the this study is to develop a paver block for heavy traffic which contain human hair, human hair is added in the mix of paver blocks upto 2.5% at regular interval of 0.5%, to evaluate the properties of paver blocks for heavy traffic test like workability, compressive strength and flexural strength is performed, study is conducted as per IS 15658 : 2009, workability of the fresh concrete is evaluated by slump cone test and result of the test shows that addition of human hairs in concrete gives deduction in workability of concrete, control concrete mix concrete possess 102 mm slump and which continues to decreasing and reach to 74 mm when 2.5% human hairs is added in it, approximately 27.45% deduction in concrete is studied when 2.5% human hairs are added in concrete. Compressive strength of the paver blocks is checked by crushing strength testing machine and result of compressive strength of the paver blocks containing human hair shows that paver blocks made of control mix possess 57.21 MPa compressive strength after 28 days of curing and then it decreases to 55.52 when 2.5% human is added in composition of paver blocks by the weight of cement. Variation in compressive strength of human hairs paver blocks is varied from 2.16% to -2.95%, its initial mixes up to 1.5% (i.e. T3) posses better compressive strength than control concrete mix and its 2% and 2.5% mix (i.e. T4 & T5) gives the lesser value of compressive strength

when it is compared to control mix. Flexural of the human hair paver blocks is tested in three point loading machine and result of flexural strength shows that paver blocks made of control mix possess 5.98 MPa flexural strength after 28 days of curing and then it decreases to 5.89 when 2.5% human is added in composition of paver blocks by the weight of cement. Variation in compressive strength of human hairs paver blocks is varied from 1.08% to -1.49%, initial three human hair mix give greater flexural strength value than conventional concrete mix and when percentage of the human hair is increased after 1.5% in the mix, flexure strength decreased.

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