

# Use of Sugarcane Bagasse Ash in Cement Concrete Paver Blocks for Medium Traffic

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**Abstract**— Cement concrete paver blocks is a versatile blocks, Now a days which is used widely for road construction. Cement concrete paver blocks roads are very easy to construct because these blocks are easily placed and easily removed. Sugarcane bagasse ash is by product of sugar industries. Residue which is left after juice taken out from sugarcane is known as sugarcane bagasse, when these sugarcane bagasse are dried and burnt then this residue are known as sugarcane bagasse ash. In this article sugarcane bagasse ash are partially replaced by cement in concrete paver blocks upto 50% with an interval of 10% and its compressive strength and workability is determined.

**Key words:** Paver Blocks, Sugarcane Bagasse Ash, Cement, Compressive Strength

## I. INTRODUCTION

Rural waste in India is by and large buns and its fiery remains is utilized for landfilling, however some way or another these cinder shows pozzolonic properties. These wastes are gathered from cultivating land and smolders then we can utilize it in concrete as a fractional substitution of bond. Supplanting conventional Portland bond by these waste additionally spare environment.

The main objective of this article is to enhanced compressive strength of the paver blocks and also the utilization of waste material like sugarcane bagasse ash. So in this article an experimental study is given in which sugarcane bagasse ash are partially replaced by cement in cement concrete paver blocks. Paver blocks are cased with 10,20,30,40 and 50% sugarcane bagasse ash and also controlled concrete paver blocks is also casted. And then these paver blocks are checked for its compressive strength and also workability of the concrete is also determined. Casing and experiment on paver blocks is done, Strictly as per IS 15658: 2006. For medium traffic road IS 15658 recommend that M40 concrete paver blocks of 80 mm thickness is used. So in this project I section paver block of length 200 mm, width 160 mm and 80 mm thick paver blocks is cased.

## II. METHODOLOGY

For this project sugarcane bagasse are collected from sugarcane industries and then this bagasse are dries in sun rays, then these bagasse are burnt. After burning of bagasse residue ash is collected having bigger particle size, because this particle size compressive strength of the paver blocks is decreased, so this collected sugarcane bagasse ash are grind, then the ash which is passes from 90 micron sieve are used for this project with specific gravity 2.45. Along with sugarcane bagasse ash Ordinary Portland cement of 43 grade is used of specific gravity 3.10 and fineness modulus 2.5%, natural river sand of Zone II with specific gravity 2.59, water absorption 0.6% and as per IS 15658 : 2006 fineness modulus of 4.45% and 20 mm maximum size

Natural crushed stone is used as a coarse aggregate with specific gravity 2.67, water absorption 0.5% and fineness modulus 3.9%. Mix design of M40 Concrete is done as per specification given under IS 10262: 2009 with water cement ratio 0.4. Paver blocks of I section paver block of length 200 mm, width 160 mm and 80 mm thick paver blocks is cased in rubber mould, with Aspect ratio (L/T) = 200/80 = 2.5 which is less than 4.0 (IS 15658). After 24 hours these paver blocks is demoulded and then left for curing in clear water at room temperature.

## III. EXPERIMENTS AND RESULTS

### A. Workability

Workability of concrete is done by slump cone test and result of workability is given in table 1 and Graph 1, and it has been observed that as percentage of sugarcane bagasse ash is increased in concrete, workability of the concrete of increase. Slump of Concrete mix of concrete is 65 mm whereas slump of 50% sugarcane bagasse mix is 145 mm.

S. No.	Percentage of Sugarcane Bagasse Ash	Mix Name	Slump (mm)
1	0%	A1	65
2	10%	A2	102
3	20%	A3	115
4	30%	A4	135
5	40%	A5	140
6	50%	A6	145

Table 1: Result of Workability of the Concrete.

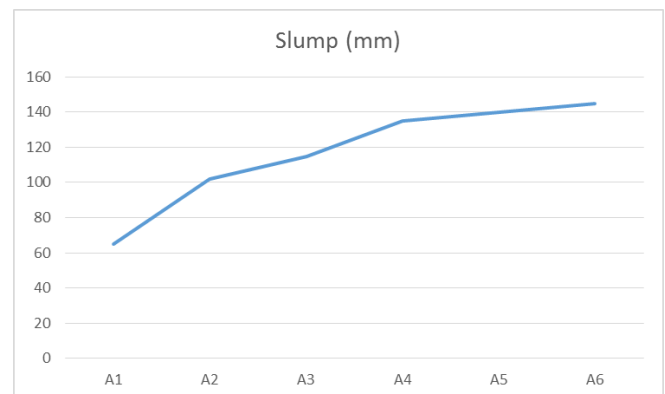


Fig. 1: Graph 1: Result of Workability of the Concrete.

### B. Compressive Strength Test

Results Compressive strength of the paver blocks is shown in table 2, and it has been observed that sugar cane bagasse ash decreases the compressive strength of the paver blocks. As per IS 15658 : 2006 to get the corrected compressive strength of arried or chamfered paver blocks, multiplication of 1.18 is done in the result of compressive strength, and corrected result of compressive strength is given in table 3 and graph 2.

S. No.	Percentage of Sugarcane Bagasse Ash	Mix Name	Compressive Strength (MPa)	
			7 Days	28 Days
1	0	A1	35.9	46.52
2	10	A2	35.83	49.5
3	20	A3	32.33	44.7
4	30	A4	28.79	39.32
5	40	A5	28.3	38.85
6	50	A6	27.55	37.73

Table 2: Compressive Strength result of paver blocks

S.No.	Percentage of Sugarcane Bagasse Ash	Mix Name	Corrected Compressive Strength (MPa)	
			7 Days	28 Days
1	0	A1	42.362	54.8936
2	10	A2	42.2794	58.41
3	20	A3	38.1494	52.746
4	30	A4	33.9722	46.3976
5	40	A5	33.394	45.843
6	50	A6	32.509	44.5214

Table 3: Corrected Compressive Strength of Paver Blocks

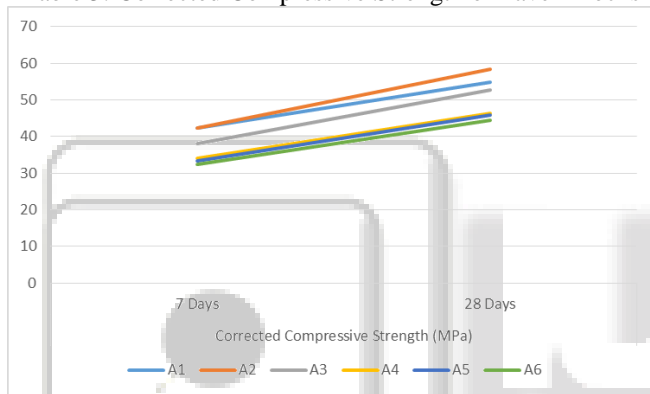


Fig. 2: Graph 2: Corrected compressive strength of paver blocks

Above table 3 shows corrected compressive strength of the paver blocks and it has been observed that compressive strength decreases when we further increase the sugarcane bagasse ash percentage by 10%. All the mix which includes sugarcane bagasse ash upto 50% is useable and gives good compressive strength, and optimum percentage is 10%.

#### IV. CONCLUSION

By this experimental study it has been observed that, sugarcane bagasse ash decreases compressive strength of the paver blocks, but its 10% mix gives maximum compressive strength, i.e. 10% is the optimum percentage. Sugarcane bagasse ash also increases the workability of the concrete, as we increase the sugarcane content in concrete workability of the concrete also increases.

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