

# Experimental Study on Sansevieria Cylindrica Paver Blocks



M. Vijayakumar, M. Athipathy, M. Clement, P. Krishnakumar

**Abstract:** Concrete paver blocks in road pavement are used in the parking, hill road construction for soil strength lower areas. As per Indian standard, interlocking concrete paver blocks are used with M 35 grade concrete. This paper deals combination of sansevieria cylindrica fiber with normal concrete for making of new paver block. Here fibers are added in the proportions of 0.25% to 1.75% in the volume of cement mortar. The compressive strength was determined 28 days. The compressive strength of 0.75% sansevieria cylindrica fiber mix having more strength. While increasing percentage of fiber value the concrete strength is reduced.

**Keywords:** Fiber, Sansevieria cylindrical fiber, Paver blocks

## I. INTRODUCTION

The natural fibers have low cost, easily available and give more adequate strength, durability for achieving more strength to making eco friendly concrete. Example of natural fibers are banana, hemp jute palm have been studied in various research activity. Cylindrica fiber is one such plant based leaf fiber which has not been explored to greater extent by the research fraternity. Solid unreinforced pre casted paver blocks are aesthetically attractive, functional and cost effective if they are correctly manufactured and placed. Interlocking concrete pavement are special dry mix precast concrete and it is used in parking areas, slope regions, hill roads, pedestrian foot path and temporary road construction.. These types of fiber are mixed with concrete for increasing strength and more life type. This new type paver block gives more durability and good aesthetic view. This type of paver blocks are also used in heavy traffic areas to carrying heavy loads. Fiber paver block is having more tensile strength and crack formation is reduced.

## II. METHODOLOGY

- Investigation and collection of raw materials
- Testing of material
- Cement, coarse aggregate, Fine aggregate, water

Revised Manuscript Received on August 15, 2020.

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- M35 grade of concrete
- Natural fibre material-Test -Properties of material
- Casting of concrete
- Curing of concrete
- Testing on concrete

## III. MATERIALS FOR MAKING PAVER BLOCK

### A. Sansevieria Cylindrica

This fiber is called as African spear or spear cylindrica. It have striped, elongated smooth greenish-gray leaves. They having 3cm in diameter and grow up to 2 m above ground. It grows fan shaped, with its stiff leaves growing from a base. The elongation of fiber is 3.6%. It has a length of 117 cm. The fineness of this fiber is 9.0.

### B. Cement

Ordinary Portland cement of 53- grade with 32% consistency used.

### C. Coarse aggregate

Aggregate is retained on 4.75mm IS sieve is termed as coarse aggregate. Here 20 mm size irregular crushed aggregate is used.

### D. Fine aggregate or sand

In this project M sand is used. M-sand have specific gravity of 2.65. The bulk density of sand is 1440 kg/m<sup>3</sup>.

### E. Water

Portable water is used, pH value between 6-7.

### F. Chemical Admixtures

For improving workability sp 420 conplast chemical admixtures is used.

### G. Sansevieria fiber

Aspect ratio = length of fiber/ diameter of fiber  
= 0.1/0.0002 = 50



Fig 1. Sansevieria fiber



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### IV. PHYSICAL PROPERTIES OF MATERIALS

**Cement:** As per IS:8112, OPC of 53 grade cement is used.

**Table- I: Property of cement**

S.No	Properties	
1	Consistency test	33%
2	Fineness modulus	10%
3	Setting time Initial Final	30 minutes 570 minutes

**Coarse aggregate:** Based on IS:383 locally available coarse aggregate of nominal size 20 mm is used.

**Table- II: Property of Coarse aggregate**

S.No	Properties	
1	Sieve analysis	3.44%
2	Aggregate impact value	19.87%

**Fine aggregate:** Based on IS:183 – M Sand

**Table- III: Property of M sand**

S.No	Properties	
1	Specific gravity	2.65 %
2	Sieve analysis	2.58

Impact test value of coarse aggregate is 19.87 %, and have fineness modulus of CA is 3.44%.

### V. MIX DESIGN

M 35 grade concrete with 0.25% - 1.75% fiber were used.

Area of paver block mould is 0.5 sq.ft.

Cement: 350 kg/m<sup>3</sup>

M- Sand: 8664 Kg/m<sup>3</sup>

Coarse aggregate: 1111 kg/m<sup>3</sup>

Water: 140 kg/m<sup>3</sup>

Chemical admixture: 7 kg/m<sup>3</sup>

W/C: 0.4



**Fig 2. Concrete Mixing**



**Fig 3. Paver block mould**

### VI. COMPRESSIVE STRENGTH OF PAVER BLOCK

The test is performed after 28 days curing. The sample paver blocks are prepared about 24 nos.

#### A. Test Procedure

Paver blocks are remolded and kept 24hours normal drying and weight is taken.

The adjustment was made in compression test machine with 140 kg/m<sup>2</sup> load.

After loading, failure and crack patterns of different paver blocks were observed and maximum resisting load is calculated.

### VII. TEST RESULTS

**Table- IV: Compressive strength of Paver block- 28 days**

S.No	Mix	% of fiber	Strength in MPa
1	M1	0	34.58
2	M2	0.25	36.25
3	M3	0.5	37.78
4	M4	0.75	30.45
5	M5	1.00	28.12
6	M6	1.25	25.75
7	M7	1.50	24.40
8	M8	1.75	23.65

VIII. CONCLUSION

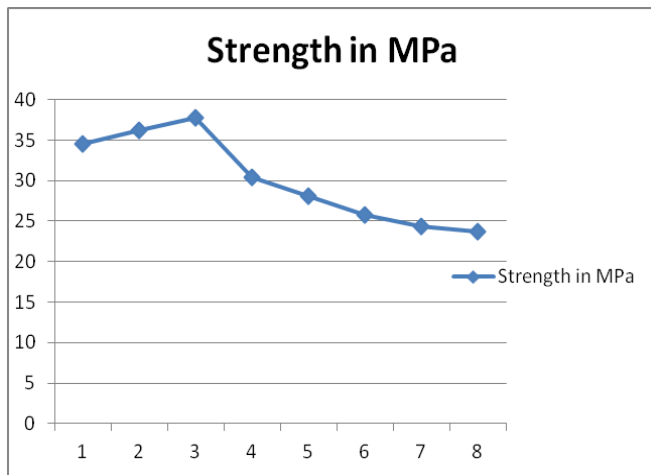


Fig 3. Compressive strength of Paver block

- As per above test result, the compressive strength of paver block was found.
- The optimum mix is M3, because after this mix the strength of concrete will be reduced.
- The strength of concrete is decreased due to be increasing the percentage of fiber.
- Using cylindrical fiber the compressive strength of paver block increased up to 2%.
- Based on above results, this paver block is suitable for road construction.

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