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# EXPERIMENTAL DETAILS OF PAVER BLOCKS FOR LOW VOLUME TRAFFIC WITH QUARRY FINES

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## ABSTRACT

Solid unreinforced pre-cast cement concrete paver blocks is a versatile, aesthetically attractive, functional, cost effective and requires little or no maintenance if correctly manufactured and laid. Paver blocks can be used for different traffic categories i.e. Non-traffic, Light-traffic, Medium-traffic, Heavy-traffic and Very heavy traffic. Concrete block paving is versatile, aesthetically attractive, functional, and cost effective and requires little or no maintenance if correctly manufactured and laid. Most concrete block paving constructed in South Africa has performed satisfactorily but there are two main areas of concern: occasional failure due to excessive surface wear, and variability in the strength of blocks. Paving block is a very common and popular method of hard landscaping that is suitable for various applications including: driveways, paths, patios, public utility areas, garage, forecourts and roads etc. IS 15658 : 2006 says that paver blocks can used in Low Volume Traffic Roads when it is casted by M 35 grade of concrete and 60 mm thick. In this project 60 mm thick and paver blocks of M 35 concrete grade is casted. quarry fines which is waste product of stone industry and generated as a waste during the process of cutting and crushing of stones are going to use as fine aggregate Fine aggregate is going to replace by quarry dust (which is retained on 4.75 mm IS sieve) upto 100% at an interval of 10% and test like compressive strength along with flexural strength is performed on paver blocks. Workability of the concrete is also checked.

**KEYWORDS**: Paver blocks, Low Volume Traffic, Quarry Dust, Compressive Strength, Flexural Strength, Worakbility.

## I. INTRODUCTION

Low Volume Traffic Road connectivity is a key component of Low Volume Traffic development, since it promotes access to economic and social services, thereby generating increased agricultural productivity, non-agriculture employment as well as non-agricultural productivity, which in turn expands Low Volume Traffic growth opportunities and real income through which poverty can be reduced. A study carried out by the International Food Policy Research Institute on linkages between government expenditure and poverty in Low Volume Traffic India has revealed that an investment of Rs 1 crore in roads lifts 1650 poor persons above the poverty line. Public investment on roads impacts Low Volume Traffic poverty through its effect on improved agricultural productivity, higher non-farm employment opportunities and increased Low Volume Traffic wages. Improvement in agricultural productivity not only reduces Low Volume Traffic poverty directly by increasing income of poor households, it also causes decline in poverty indirectly by raising agricultural wages and lowering food prices (since poor households are net buyers of foodgrains). Similarly, increased non-farm employment and higher Low Volume Traffic wages also enhance incomes of the Low Volume Traffic poor and consequently, reduce Low Volume Traffic poverty.

## II. OBJECTIVES

Then main objective of this study is to give a new technique for Low Volume Traffic. i.e paver blocks roads and also how to make paver blocks economic. Concrete paver blocks is casted by M35 grade of concrete and fine aggregate is replaced by quarry fines it varies from 0% to 100% at 10% interval i.e. 11 mix was prepared which contain 0%,10%,20%,30%,40%,50%,60%,70%,80%,90% and 100% quarry fines. These paver blocks is cured in water and on these paver blocks compressive strength and flexural strength tested is performed alon with

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workability of concrete. Properties which is evaluated from this study is checked by IS 15658:2006 for their use in Low Volume Traffic

**Cement**

Portland pozzolana cement (fly ash based) is used, conforming to specification given under IS 1489: 1991 (Part – I). Portland cement is the most well-known kind of concrete when all is said in done use. It is an essential element of concrete, mortar and numerous mortars. English stone work specialist Joseph Aspdin licensed Portland concrete in 1824. It was named due to the similitude of its shading to Portland limestone, quarried from the English Isle of Portland and utilized broadly as a part of London design. It comprises of a blend of calcium silicates (alite,belite), aluminates and ferrites - mixes which consolidate calcium, silicon, aluminum and iron in structures which will respond with water. Portland bond and comparative materials are made by warming limestone (a wellspring of calcium) with earth and/or shale (a wellspring of silicon, aluminum and iron) and granulating this item (called clinker) with a wellspring of sulfate (most normally gypsum)

**Quarry Fines**

Quarry dust has been proposed as an alternative to river sand that gives additional benefits to concrete. Quarry dust is also known to increase the strength of concrete over concrete

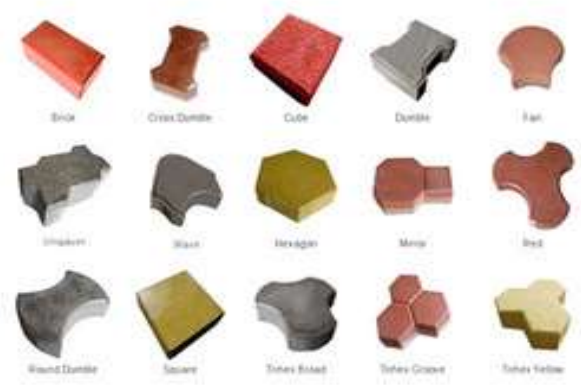

***Fig:1 Different types of paver blocks***

## III. RESULTS AND DISCUSSION

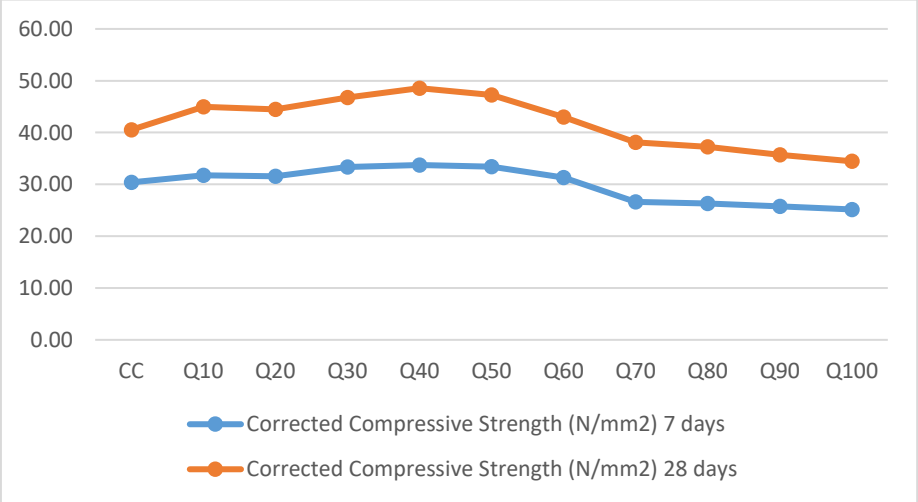


***fig:2 Corrected compressive strength of quarry fines paver blocks (Line Graph)***

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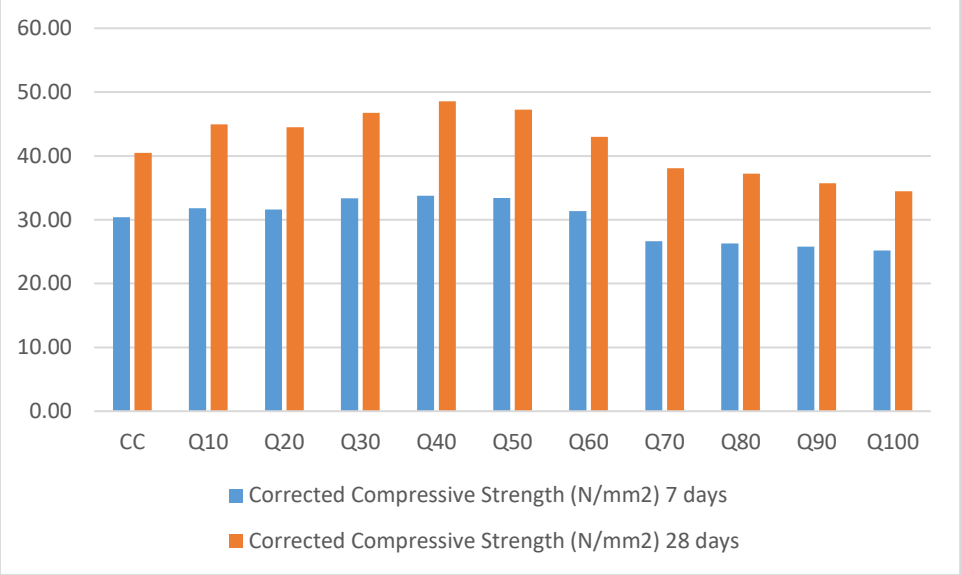


***fig:3: Corrected compressive strength of quarry fines paver blocks (Bar Chart)***

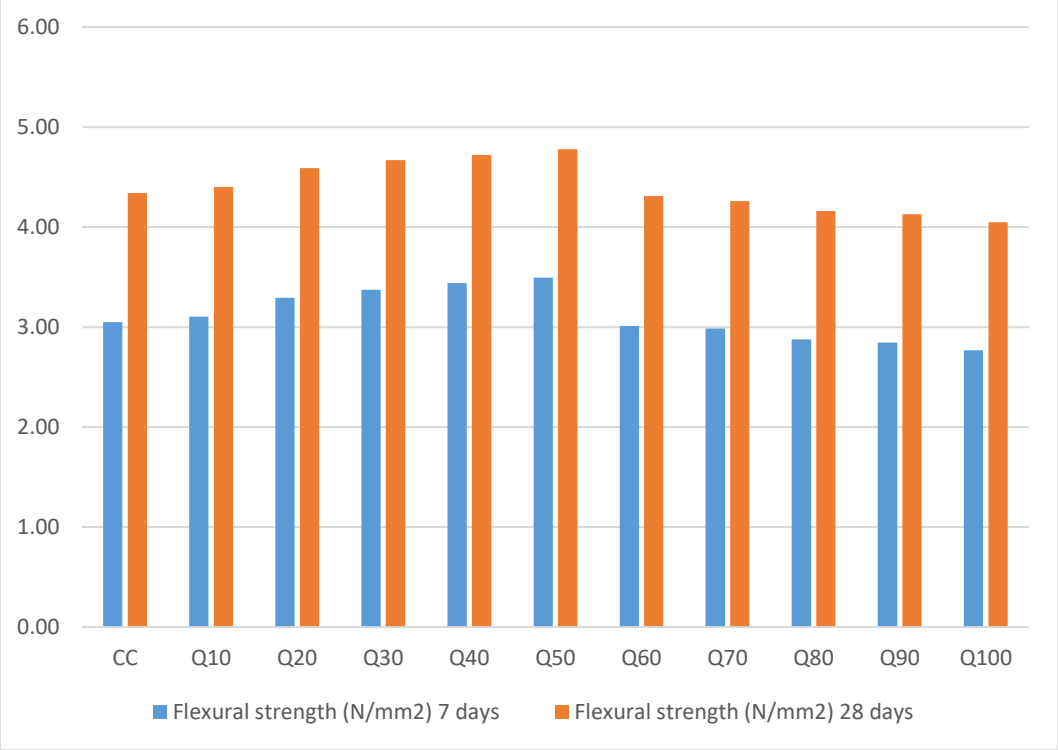


*fig*:***4 Result of flexural strength of quarry fines paver blocks (Bar Chart)***

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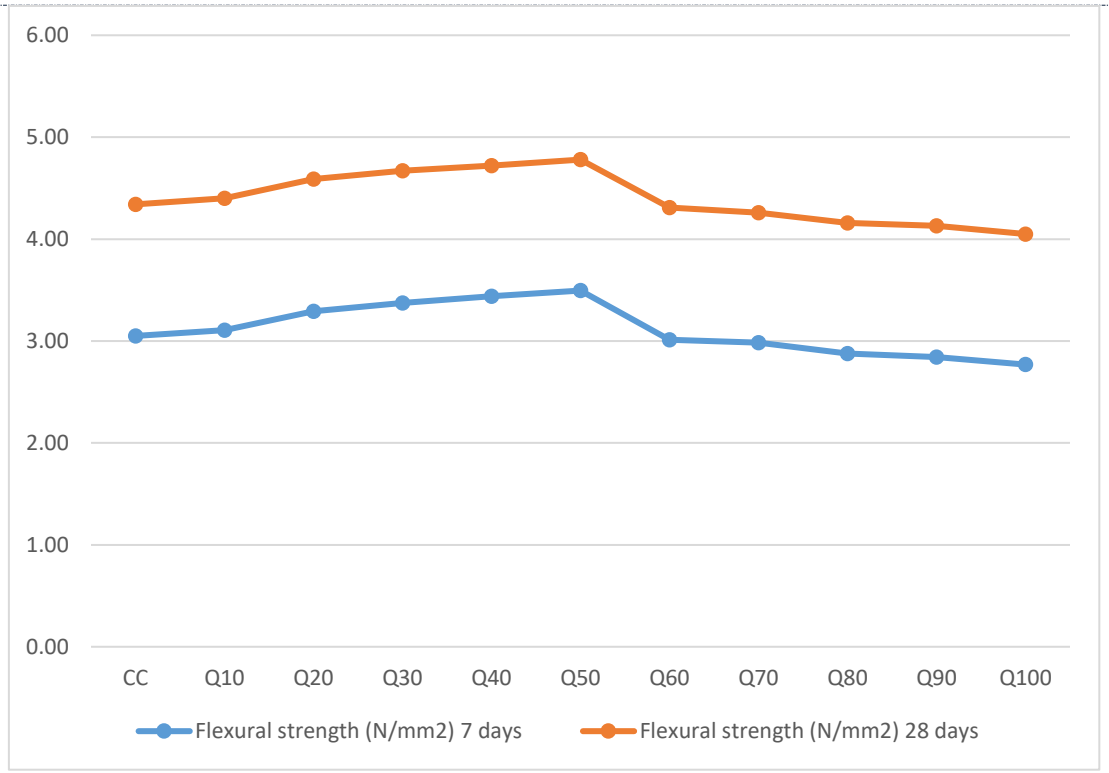


***fig:5: Result of flexural strength of quarry fines paver blocks (Line Graph)***

## IV. CONCLUION

Conclusion drawn from this study is given below

- Workability of the concrete is checked by slump cone test; it has been observed that replacement of quarry fine with sand gives decrement to slump value of concrete, for this project concrete is designed for 100 mm slump and its control concrete mix (CC) gives slump value of 92 mm which goes on decreasing with the percentage of increases quarry fines in the composition of concrete. It shows decrement of 48 mm slump i.e. approximately 47%.
- Compressive strength of the quarry fine paver blocks, results shows that compressive strength quarry fines paver blocks increases when quarry fines is replaced by sand in the composition of paver blocks and after correction as per IS 15658 recommendation gives optimum value of 50%. Concrete mix gives compressive strength of 40.50 N/mm$^2$, when 50% quarry fines is added by the weight of the sand, it attains maximum compressive i.e. 47.24 N/mm$^2$, gives optimum value of quarry fines 50%, further quarry fines added in the composition compressive strength goes down to 34.26 N/mm$^2$, as whole it is concluded that for M35 characteristic mean strength is 35 N/mm$^2$ and as per IS 15658 : 2009, minimum average 28 days compressive strength should be $F_{ck}$ + 0.825 * 0.5 (standard deviation), so minimum compressive strength required for paver blocks is 35.41 N/mm$^2$, in this case 90% of the quarry fines can be replaced by sand in the composition of paver blocks.
- Flexural strength of the blocks increases when quarry fines is added in paver blocks composition and gives optimum value of 50%. Concrete mix gives compressive strength of 4.34 N/mm$^2$, when 50% quarry fines is added by the weight of the sand, it attains maximum compressive i.e. 4.78 N/mm$^2$, gives optimum value of quarry fines 50%, further quarry fines added in the composition compressive strength goes down to 4.05N/mm$^2$. As per IS 15658 : 2006 minimum breaking load is 3 kNand flexural came out from this breaking load is 0.625 N/mm$^2$, so all the mix is acceptable.

From above points, flexural strength and compressive strength it is clear that 90% of sand in concrete of paver blocks will be replaced by quarry fines.

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