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# Evaluation of Performance of Tyres in Cement Concrete Pavement

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**Abstract -**As the population in the world are continuously increasing day by day demands for necessity of extensive road networks also increases in that view the natural resources as to be required a lot and use of recycled materials shall be done for construction to reduce the scarcity of construction materials.60% of waste tyres is disposed in and around the world and creates environmental pollution. Burning these kind of waste creates a lot of air pollution or leaving them at dump yards leads to lot of soil pollution. The aim of this project is increase the strength of concrete pavement by adding tyres in cement concrete pavement. The concrete cubes of size 15×15×15 cm are casted for 7 and 14 days. Compressive strength is determined for 7 and 14 days for concrete pavement with tyres and normal cement concrete pavement. The results obtained are plotted in graphs showing the variation of strength for wheel concrete pavement and rigid pavement.

***Key Words***: compressive strength, tyres, waste, cement concrete pavement

## 1.INTRODUCTION

Pavement, in civil engineering, durable surfacing of a road, airstrip, or similar area. The primary function of a pavement is to transmit loads to the sub-base and underlying soil. Modern flexible pavements contain sand and gravel or crushed stone compacted with a binder of bituminous material, such as asphalt, tar, or asphaltic oil. Such a pavement has enough plasticity to absorb shock. Rigid pavements are made of concrete, composed of coarse and fine aggregate and Portland cement, and usually reinforced with steel rod or mesh.

## 2.OBJECTIVES

1. To determine the compressive strength of the wheel pavement and normal concrete pavement at the end of 7 and 28 days.

2. To determine the percentage increase in strength when a wheel pavement is used instead of a normal cement concrete pavement

3. To understand the behavior of tyres in a cement concrete pavement.

## 3. METHODOLOGY

Compressive strength of a concrete cube of dimensions 15X15X15 cm is found out. The cubes are casted with and without tyres for 7 and 14 days. The results are compared and graphs are plotted for 7 and 14 days to determine the increase in compressive strength of the cube. The concrete is designed for M 30. From mix design approximately 3Tyres are required for the cubes.

## 4.MIX DESIGN


Fig:1 Layers on rigid pavement

FOR 1M LENGTH

Volume of concrete = 0.16$m^3$

GRADE M-25 (1:1:2)

Volume of dry concrete = 1.54times of wet concrete

CEMENT

Volume of cement required (V) = 0.385$m^3$

Quantity of cement required = 554.4Kgs

Number of bags required = 11.09 bags say 12 bags

FINE AGGREGATE

Volume of sand required = 0.385$m^3$

Quantity of cement required = 616kgs

COARSE AGGREGATE

Volume of aggregate required = 0.77$m^3$

Quantity of aggregate required = 1116.5kgs

TYRES

Number of tyres required (N) = Volume/Area

= 2.515 tyres say 3tyres

Number of tyres required = 3Tyres

## 5. RESULTS

NORMAL CONCRTE CUBE FOR 7 & 14 DAYS

For 7 days normal concrete cube strength is 7.56 N/mm$^2$

For 14 days normal concrete cube strength is 14.81 N/mm$^2$

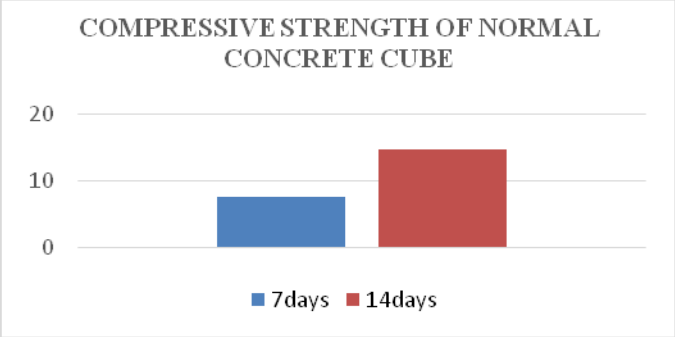


Fig 2: Compressive strength of a normal concrete cube

CONCRTE CUBE WITH TYRES FOR 7 & 14 DAYS

For 7 days concrete cube with tyres strength is 9.26 N/mm$^2$

For 14 days concrete cube with tyres strength is 17.32 N/mm$^2$

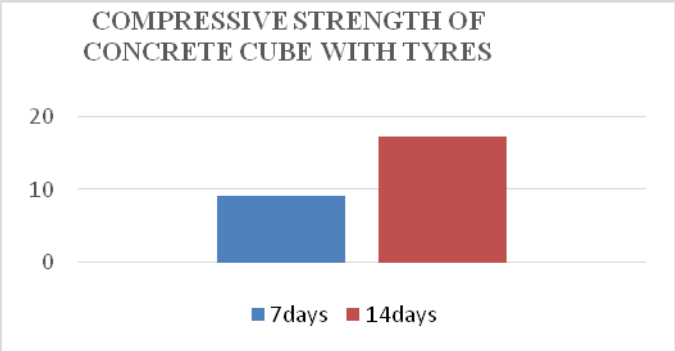


Fig 3: Compressive strength of a concrete cube with tyres

## 5. CONCLUSIONS

1. The compressive strength of normal concrete cube with tyres for 7days is 7.56N/mm$^2$.

2. The compressive strength of normal concrete cube with tyres for 14days is 14.81N/mm$^2$.

3. The compressive strength of cube with tyres for 7days is 9.26 N/mm$^2$.

4. The compressive strength of cube with tyres for 14days is 17.32 N/mm$^2$.

5. The percentage of compressive strength of cube with tyres is 18.36% more than normal cube 0for 7days.

6. The percentage of compressive strength of cube with tyres is 14.50% more than normal cube for 14days.

7. The utilization of tyres in the pavement construction reduces the environmental pollution.

8. The usage of tyres in the pavement can resist wear and tear due to abrasion.

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## 6.REFERENCES

1. Baldonado, M., Chang, C.-C.K., Gravano, L., Paepcke, A.: The Stanford Digital Library Metadata Architecture. Int. J. Digit. Libr. 1 (1997) 108–121
2. Bruce, K.B., Cardelli, L., Pierce, B.C.: Comparing Object Encodings. In: Abadi, M., Ito, T. (eds.): Theoretical Aspects of Computer Software. Lecture Notes in Computer Science, Vol. 1281. Springer-Verlag, BerlinHeidelbergNew York (1997) 415–438
3. van Leeuwen, J. (ed.): Computer Science Today. Recent Trends and Developments. Lecture Notes in Computer Science, Vol. 1000. Springer-Verlag, BerlinHeidelbergNew York (1995)
4. Michalewicz, Z.: Genetic Algorithms + Data Structures = Evolution Programs. 3rd edn. Springer-Verlag, BerlinHeidelbergNew York (1996)