

EFFICIENT AND ECONOMICAL DESIGN OF CONCRETE PAVEMENT

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Abstract— In this study pavers will be casted of M20, M25, M30, M40 & M50 grade of concrete and various tests will be conducted on the pavers and combination of pavers to find the most efficient and economical paver.

Keywords— concrete, mix design, pavement, pavers, footway, compressive strength, and test.

1. INTRODUCTION

Concrete, usually Portland cement concrete, is a composite material composed of fine and coarse aggregate bonded together with a fluid cement (cement paste) that hardens over time mostly used a lime-based cement and calcium aluminate cement. It is distinguished from other, non-cementations types of concrete all binding some form of aggregate, with asphalt concrete with a bitumen binder, which is used for road surfaces, and polymer concretes that use polymers as a binder.^[7,8]

When aggregate is mixed with Portland cement and water, the mixture forms a semi solids slurry that is easily poured and molded into shape. The cement reacts chemically with the water and other ingredients to form a hard matrix that binds the materials together into a durable stone-like material that has many uses Often, additives (such as pozzolana or super plasticizers) are included in the mixture to improve the physical properties of the wet mix or the finished material. Most concrete is poured with reinforcing materials to achieved maximum tensile strength.^[7,8]

2. OBJECTIVES

- 1) To study of current situation/design criteria of concrete pavement.
- 2) To give economical solution based on concrete mix design.
- 3) To design concrete pavement using various combination of concrete mixes to an increase strength and life of pavement.
- 4) To do cost analysis of concrete and propose this work to higher authority.

3. METHODOLOGY

- Design of M20,M25,M30,M40 & M50 grade of concrete

- Comparative study in terms of strength
- To decide Various combination of concrete mix for concrete pavement
- Testing of specimen by using Compressive testing machine.
- Keep the specimen in water tank for 7 days and 28 days.

4. COMBINATION OF VARIOUS CONCRETE

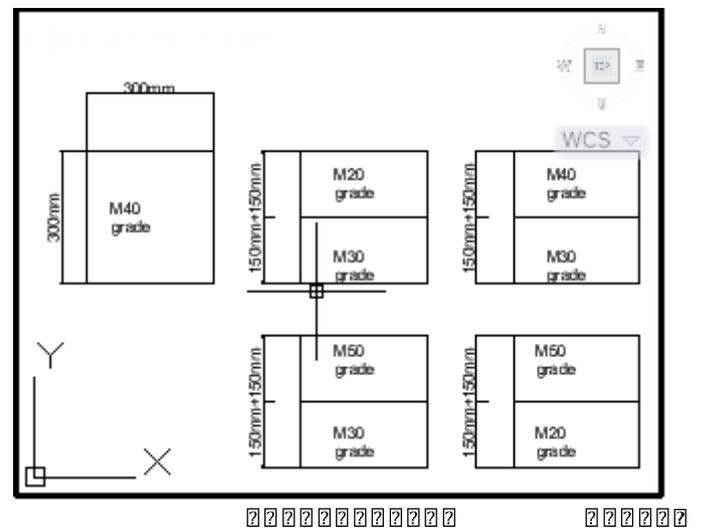
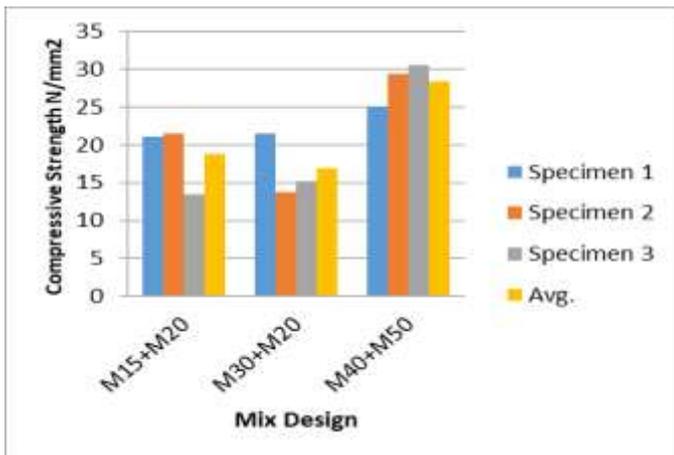


Figure 1:- Showing the cross-section of specimen

5. RESULTS AND ANALYSIS

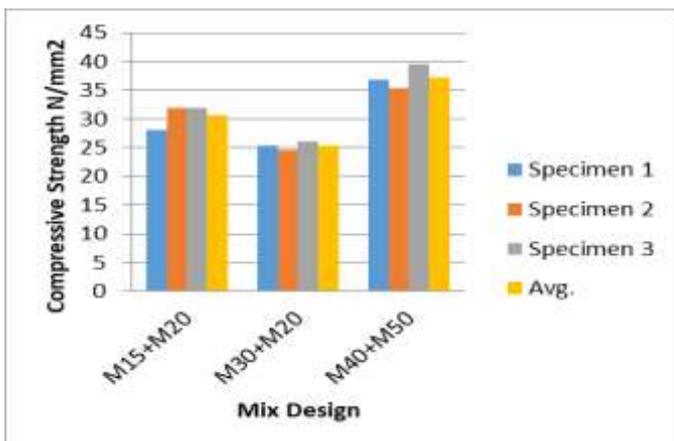
7 Days Strength (n/mm²)

Sr. No	Mix Design	Specime n 1	Specime n 2	Specime n 3	Avg.
1	M15+M20	21.14	21.55	13.51	18.73
2	M30+M20	21.55	13.68	15.24	16.85
3	M40+M50	25.16	29.47	30.56	28.39



28 Days Strength (n/mm²)

Sr. No	Mix Design	Specime n 1	Specime n 2	Specime n 3	Avg.
1	M15+M20	28	31.86	31.95	30.6
2	M30+M20	25.26	24.6	26.06	25.3
3	M40+M50	36.78	35.37	39.63	37.26



6. CONCLUSIONS

From the above compressive test results, it is evident that compressive strength of mixed grades cubes falls less than actual cubes. But as far as economy is concerned cost of concrete can be substantially reduced.

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