

EXPERIMENTAL INVESTIGATION ON CONCRETE WITH PARTIAL REPLACEMENT OF CEMENT BY USING AZADIRACHTA INDICA (NEEM REFUSE)

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ABSTRACT: *One of the major challenges of our present society is the protection of environment. The use of yard waste from the environment preserves the natural resources and reduces the space required for disposal. This paper represents the experimental results of partial replacement of cement by using yard waste (neem refuse) with 2%, 4%, 6% in order to increase the strength of concrete.*

Keywords: *Neem Refuse, Cement, Compressive Strength,*

I. INTRODUCTION

The current cement production rate of the world, which is approximately 1.2 billion tons per year, is expected to grow exponentially to about 3.5 billion tons per day. Replacing natural raw materials with wastes may offer a much opportunity to mitigate today's waste management problems. In this project the cement is partially replaced by neem powder (i.e. 2%, 4%, 6%, 8%, and 10%) to reduce the cement content and to use the environmental waste.

II. OBJECTIVE OF THE PROJECT

- To investigate effect of neem refuse in concrete
- To improve the compressive strength of concrete
- To improve the flexural strength (split tensile strength) of concrete

III. SCOPE OF THE PROJECT

- To investigate whether the yard waste can be partially replaced for cement in the concrete
- To improve effective utilization of environmental waste in concrete

IV. MATERIALS USED

CEMENT: 53 grade ordinary Portland cement conforming to IS 12269.

COARSE AGGREGATE: The nominal maximum size of aggregate should be 20mm.

FINE AGGREGATE: The nominal size of fine aggregate should be 2.36mm.

WATER: Portable water is generally considered satisfactory for mixing concrete.

NEEM: It is used as a partial replacement for cement.

V. PROPERTIES OF MATERIALS

CEMENT:

- Specific gravity = 3.15
- Fineness = 5%

NEEM:

- Specific gravity = 2.10
- Fineness = 4%

FINE AGGREGATE:

- Specific gravity = 2.74

COARSE AGGREGATE:

- Specific gravity = 2.74
- Impact strength value = 15.9%

VI. MIX DESIGN (M25 grade – 1:1:2)

Table: 1 mix design of M25 concrete

WATER	CEMENT	FINE AGGREGATE	COARSE AGGREGATE
191.58 Litres	478.9kg/cu .m	762.11kg/cu .m	1035.32kg/cu .m
0.4	1	1.59	2.16

VII. TESTING OF SPECIMEN

(A) COMPRESSIVE STRENGTH TEST

The Cubes of 150x150x150mm size are tested for compression test is done as per codes of Bureau of Indian Standards. The tests for Compressive Strength on cubes were measured at 7 and 14 days of curing.

(i) 7 DAYS TEST RESULT:

Table: 2 7 days test result

Conventional concrete	16.25 N/mm ²
2% neem replaced concrete	13.50 N/mm ²
4% neem replaced concrete	12N/mm ²

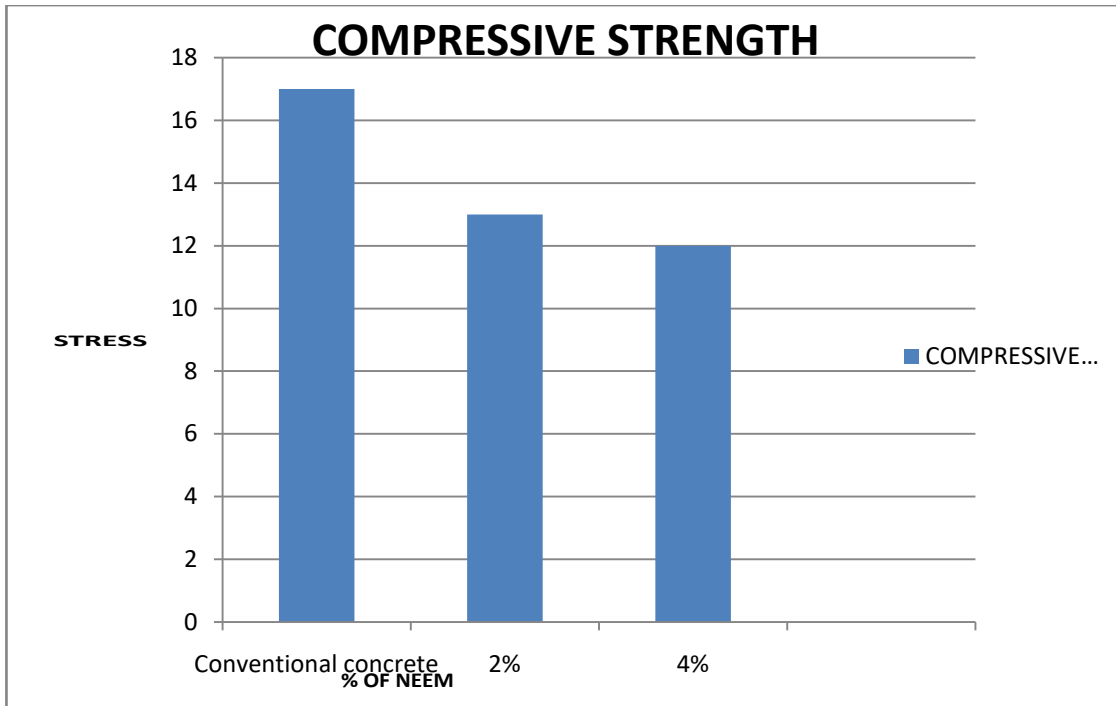


Fig.1 7 days test result comparison

(ii) 14 DAYS TEST RESULT:

Table: 3 14 days test result

Conventional concrete	23 N/mm ²
2% neem replaced concrete	19 N/mm ²
4% neem replaced concrete	18N/mm ²

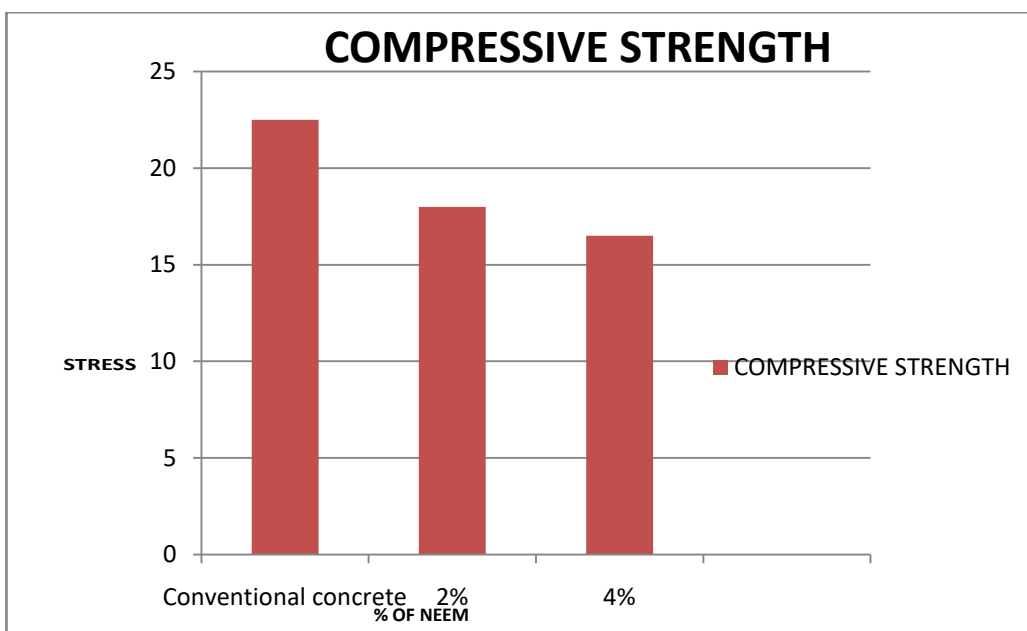


Fig.2 14 days test result comparison

VIII. CONCLUSION

Based on the present investigation, the following conclusions are drawn;

- Comparing the compressive strength of conventional concrete with the neem mixed concrete, the neem mixed concrete attains an average strength of 65% of the normal concrete.
- Based on the results, neem mixed concrete can be used in pavement laying.
- Neem mixed concrete is economical and environmental friendly, in places where available source of cement are inaccessible.

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