GOVERNMENT POLYTECHNIC VALSAD

PROJECT TITLE:-

PARTIAL REPLACEMENT OF CEMENT WITH WASTEPLASTIC FOR SUSTAINABLE CONCRETE PRACTICES

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ABSTRACT

Plastic waste is silent threat to the environment and their disposal is a serious issue for waste managers. Nowadays society does not have any alternative to plastic products like plastic bags, plastic bottles, and plastic sheets etc. In spite of all efforts made to limit its use but unfortunately its utility is increasing day by day. To circumvent this issue many efforts were made in the past to reuse the plastic waste but no significant results were achieved. Various attempts were made through experimentation to check the feasibility of plastic waste to be used in concrete with respect to various properties of strength, workability, durability and ductility of concrete. Since plastic is non biodegradable, landfills do not provide an environment friendly solution. Hence, there is strong need to re-utilize waste plastic. Many efforts have been made to use waste plastic in concrete industry as a replacement of coarse aggregate fine aggregate. In this study the waste plastic is used in molten form as a filling material by partially replacing cement in different proportions of 5%, 7%, 10% and 12% to check the strength parameter in compression for concrete with M15, M20 and M25 grade of concrete. The results show that plastic in molten form can be used as a partial replacement of cement in restricted proportions.

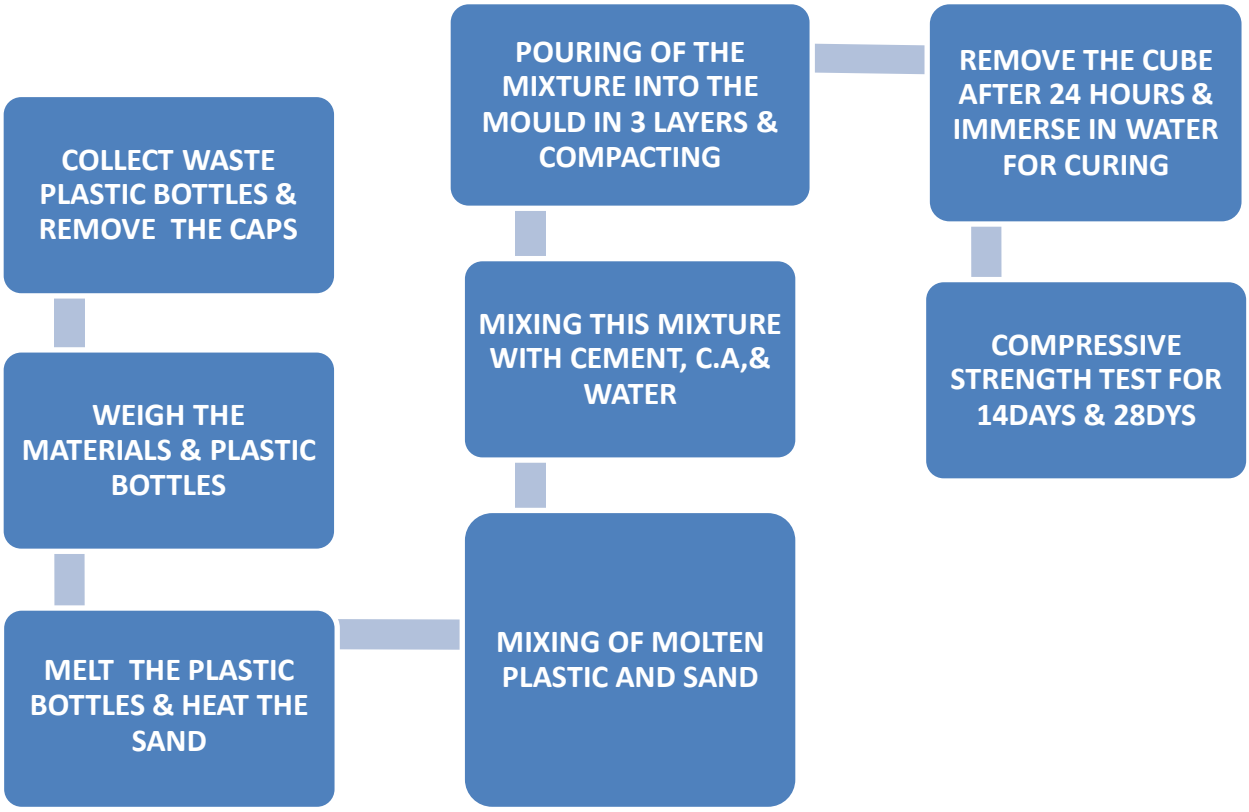
Project overview:

- In this project there will be a parametric study of concrete by partially replacing cement with waste plastic bottle for sustainable concrete practice.
- Plastic becomes a waste if it is disposed as landfills which are unsustainable as this does not decomposed in the environment.

In this study following is investigated

- Checking the possibility of partially replacing cement by waste plastic bottle.
- Performing parametric study for concrete with different % composition of waste plastic bottle along with cement.
- Check the compressive strength of different % of waste plastic bottle.

CASTING PROCESS



APPENDIX-1 PHOTOGRAPHS

FIG-1: Collection of waste plastic bottles and other concrete ingredients

FIG-2: Melting of waste Plastic bottles

FIG-3: Mixing of sand cement aggregate and molten plastic

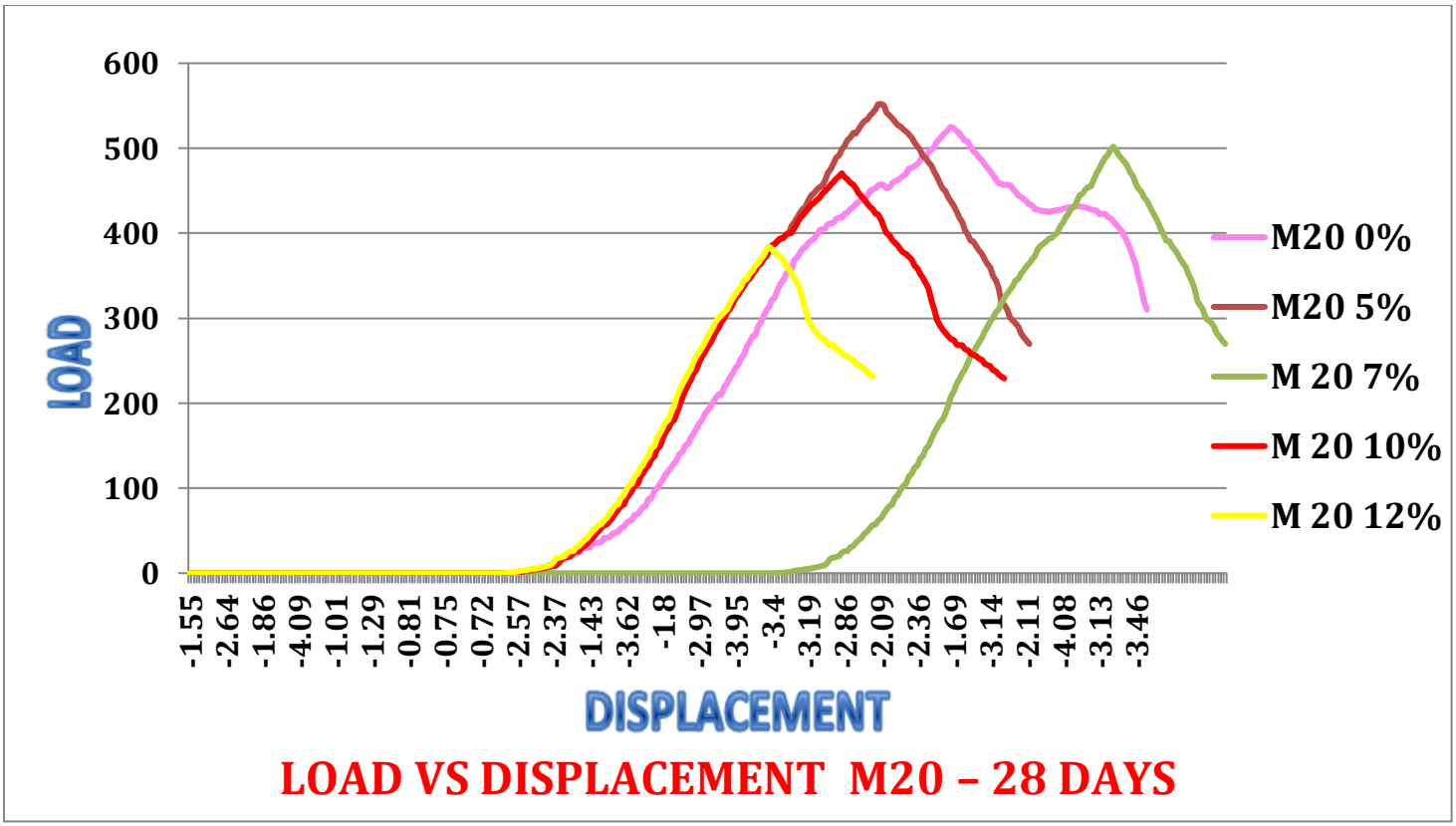
FIG-4: Casting of cubes

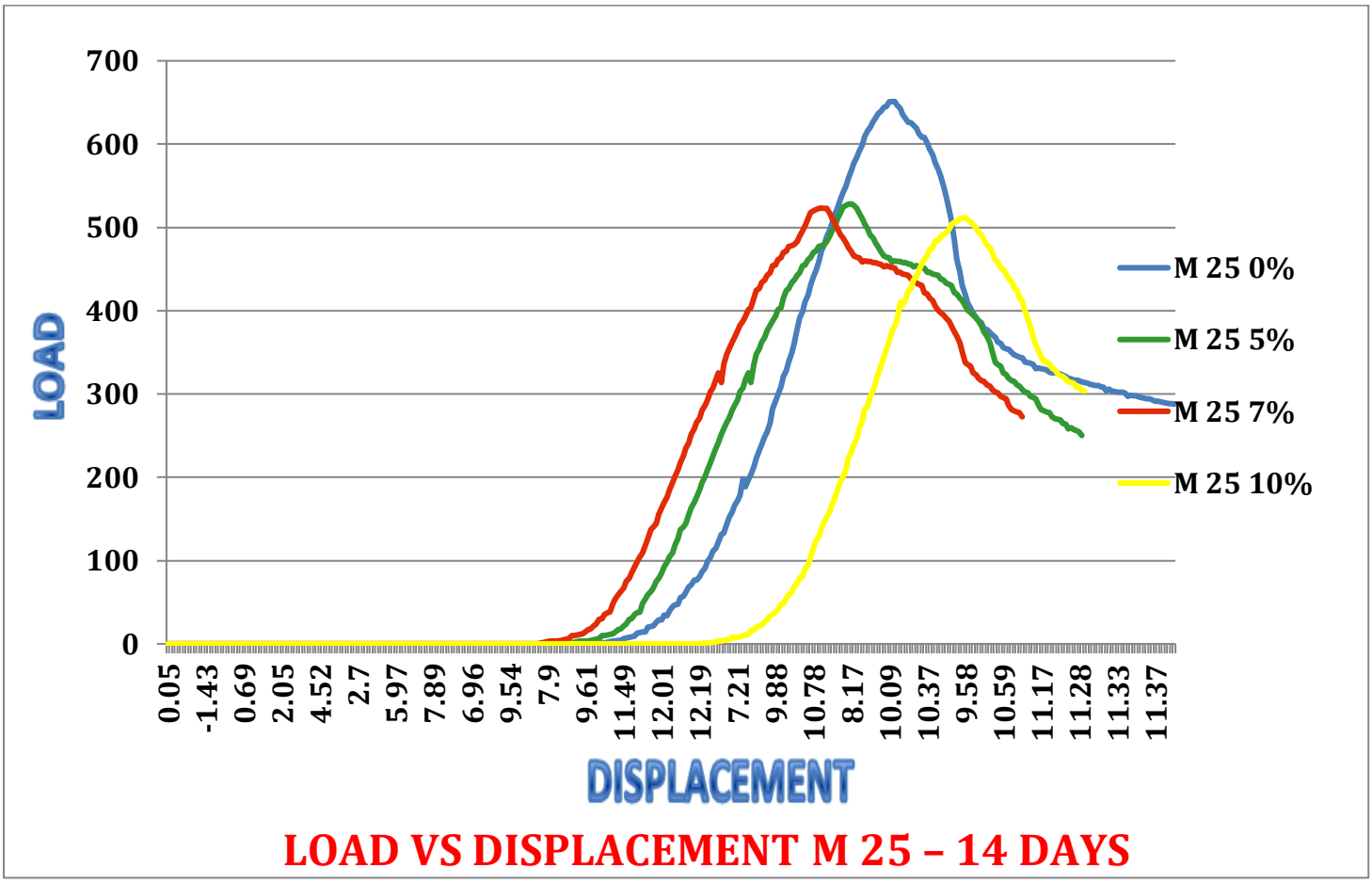
FIG-5: Testing of Cubes using compressive testing machine

FIG-6: Failure pattern of Plastic concrete cubes

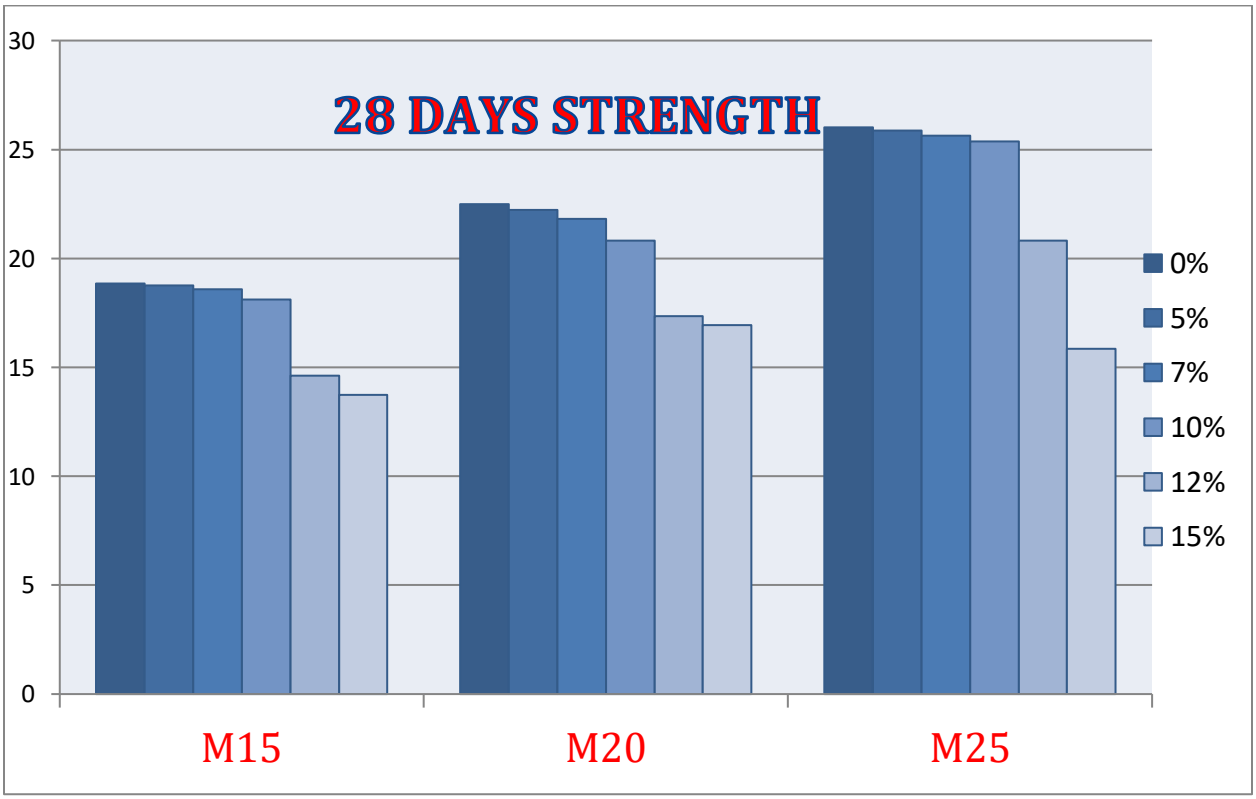
FIG-7: Internal structural matrix of plastic concrete cubes

Results





LOAD VS DISPLACEMENT M 25 – 14 DAYS



STRENGTH COMPARISION GRAPH

CONCLUSION

Plastic bottles being used extensively, for various purposes also create a huge amount of non-degradable and inorganic. Therefore in a country like India where infrastructure development and construction going at very high rate, use of waste plastic bottle as a partial replacement of cement can prove to be environmental friendly and is a very cost effective method of sustainable construction practice.

In this study, from the literature review and the investigation carried up till now we can state that waste plastic bottles may be a suitable replacement of cement and can be used as a concrete ingredient in small structures like Ground floor and Ground floor + 1, Road pavement.

The test results of this study indicate that there is great potential for utilization of waste plastic bottles in concrete mixes up to 10%.

With the utilization of waste plastic bottles in construction industry the waste disposal problem can be solved.

THANK YOU