

# Re-Use of Polyethylene Plastic Waste in Concrete with Plasticizer

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**Abstract** - From plastic containers, bottles, bags to plastic toys; everywhere we look, we see most of the plastic items made of polyethylene. Polyethylene Plastic are not so easy to degrade, they takes 100s & even 1000s of years in environment for its complete breakdown so the environmental damage is long lasting. The proposed concrete which is made up by introducing Polyethylene tetraphthalate in varying percentages and admixture called plasticizer in concrete, & it may help to improve the certain properties of concrete & can be a helping hand towards environment. The properties of concrete of grade M25 containing varying percentages of plastic were tested for compressive strength and Split tensile strength and the comparison is made between conventional concrete & proposed concrete.

**Key Words:** Compressive strength, Environmental damage, Polyethylene tetraphthalate, Split Tensile Strength, Admixture, Plasticizer.

## 1. INTRODUCTION

Due to rapid industrialization and urbanization in the country lots of infrastructure developments are taking place. Generation of plastic waste is one of the fastest growing areas. Polyethylene Plastic Waste in known percentages is introduced in concrete mix with plasticizer and properties are tested, the optimum percentage at which higher strength is obtained is calculated. Considerable researches were carried out in some countries like USA, UK on this topic however there have been very limited studies on plastics in India.

## 2. OBJECTIVE

The objectives of the research proposal are to study the feasibility and influence of various percentage of Polyethylene tetraphthalate as a constituent material of concrete on mechanical properties of concrete to establish the optimum percentage of Polyethylene tetraphthalate.

Evaluating and studying the effect of varying percentages of Polyethylene Plastic and comparing the results with normal concrete. It will also be a great gesture towards environment

## 3. LITERATURE REVIEW

### 3.1 Raghatate Atul M.,

Paper presented by Raghatate Atul M. on USE OF PLASTIC IN A CONCRETE TO IMPROVE ITS PROPERTIES in International Journal of Advanced Engineering Research and Studies April-June, 2012. By observing test results following conclusions are made:

- Compressive strength of concrete is affected by addition of plastic pieces and it goes on decreasing as the percentage of plastic increases addition of 1 % of plastic in concrete causes about 20% reduction in strength after 28 days curing.
- The splitting tensile strength observation shows the improvement of tensile strength of concrete. Up to 0.8 % of plastic improvement of strength recorded after that addition of strength of concrete decreases with addition of plastic.
- Thus it is conclude that the use plastic can be possible to increase the tensile strength of concrete.

### 3.2 Malek Batayneh \*, Iqbal Marie, Ibrahim Asi,

Paper Presented by Malek Batayneh \*, Iqbal Marie, Ibrahim Asi, "Use of selected waste materials in concrete mixes" in International Journal of Integrated Waste Management, Science and Technology, Waste Management 27 (2007) 1870-1876. Carried out an investigation on effects of using waste materials like glass, plastic & demolished concrete. Ground plastics and glass were used to replace up to 20% of fine aggregates in concrete mixes, while crushed concrete was used to replace up to 20% of coarse aggregates. Based on the test results and on the physical observations, it is concluded that when up to 20% of plastic and crushed concrete was used in concrete, the strength of the concrete exhibited lower compressive and splitting-tensile strength than that of normal concrete using natural aggregates. Therefore, it is recommended that concrete with recycled materials of lower strength be used in certain civil engineering applications, especially in non-structural applications, where lower strength up to 25 MPa is required. This will contribute to cutting down the cost of using non-structural concrete.

### 3.3 M Mahesh, B Venkat Narsimha, Rao,CH. Satya

Paper presented by M Mahesh, B Venkat Narsimha, Rao,CH. Satya Sri, "Re-Use of Polyethylene Plastic Waste" In International Journal of Engineering Development and Research Volume 4, Issue 4 2016, This project in particular deals with the possibility of using the waste polyethylene as partial replacement of fine or coarse aggregate in concrete. Concrete with 2%, 4%, 6% pulverized/non pulverized polyethylene material is prepared after doing the mix design. Various tests on cement like specific gravity, fineness, setting time, etc., tests on coarse and fine aggregates like sieve analysis, fineness modulus, specific gravity, etc. are performed. Mix design using IS Code method is done and cubes and cylinders are cast for M25 grade concrete with and without plastics and tests on concrete like slump, cube tests and cylinder tests are performed to understand their behaviour and usefulness as replacement. The standard mechanical properties of concrete like compressive strength, split tensile strength are tested and compared with the results of standard specimen. After observation following conclusions are drawn:

1. Waste plastic can be effectively re-used without affecting the mechanical properties considerably (5-10%).
2. It is observed that for more percentage addition of plastics i.e. 6% in the present case, the 7 day strength has been decreased by --- when compared with conventional concrete.
3. For less percentage addition (2-4%) of plastic, there is no considerable variation in 7 day, 14 day, and 28 day compression strength and split tensile strength.
4. Concrete with plastic waste can be used for less important works where concrete is not going to bear more loads.

#### 4. CONCLUSIONS

It can be concluded that Type of Plastic named Polyethylene tetraphthalate can be effectively re-used in construction work to improve certain properties of concrete. It will also be an aid towards environment. Only disadvantage of using plastic is that it is not favourable to use for the works where there is a requirement of higher strength, this drawback is also tried to cover by incorporation of Plasticizer an admixture.

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