



MODIFIED CONCRETE BY USING PEN PLASTIC: A CRITICAL LITERATURE REVIEW

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Abstract

Life has changes day by day due to demand of Construction concrete is very essentials and primary materials but construction work changes to green and sustainable concrete by using different plastics waste which is locally available in daily life. Plastic which is found in very large amount and very difficult to degrade only choice is to recycle reuse and used as alternative materials in construction site because which both physical and mechanical properties due to which make cost effective as replacing the aggregates and modified the concrete where different parameters like compressive strength, elastic strain, water absorption, abrasion and tear of concrete.

In this paper we have to identified that pen plastics that is using in different institutions, offices, schools, and everywhere for the written and calculation which is use and throw but this pen plastics will helps as filler materials if we converted in chips form and broken in small portion which acts as fine aggregates for concrete mixture by replacing the course aggregates in different proportion like 3% ,5%, 7% and 10% respectively of total weight of concrete mixture of different grades of concrete in experimental works.

Modified concrete samples are prepared as per Standard IS code all samples are tested as Per IS to know the results which are indicated as better performance than conventional Concrete which can be used in short-term structure low housing pedestal and repairing of walls as filler materials. The use of pen plastics as a modifier in concrete mixes is examined in this research study. In the study, the impacts of adding pen polymers to concrete are examined with regard to a number of qualities, including compressive strength, flexural strength, durability, workability, and environmental factors. The goal is to assess the viability and possible advantages of employing pen plastics as a cutting-edge, sustainable method of producing concrete. The review outlines the main benefits and difficulties of the modified concrete and summarizes the results of earlier research investigations.

Key words: Plastics, Composite-materials, Non-structural, Sustainability, Modified.

1. Introduction

In some instances, pen plastic can be utilized as a filler material. Typically, polystyrene or another thermoplastic substance is utilized as the plastic in pens. Here are a few typical instances of filler made from pen plastic. Cement and

concrete to add to concrete or cement mixers, pen plastic can be crushed or ground into minute particles. The plastic filler reduces the quantity of cement used while retaining the material's structural integrity. This method is frequently utilized in non-structural applications such

concrete walkways, pavements, and ornamental applications. Composite materials: To improve their qualities, pen plastic can be added to composite materials.

In order to produce a composite with better strength, impact resistance, or thermal qualities, the plastic particles can be combined with a matrix material, such as epoxy or polyester resin. 3D printing filament: Pen plastic that has been crushed or shredded may be melted and extruded into filaments for 3D printing. With the use of recycled plastic from used pens, new items may be made, decreasing waste and advancing sustainability. It is essential to remember that pen plastic's appropriateness as a filler material relies on a number of elements, including the particular application and the required qualities of the finished product. Additionally, it's important to make sure that the plastic is well cleaned and clear of pollutants before using it again as a pen.

Modified Concrete= Cement+ Sand+ Aggregate +Pen Plastics in different proportions.



Pen Plastics Properties- Pens that are meant to be used once and then thrown away are known as disposable or "use and throw" pens. Here are a few typical characteristics of use-and-throw pens:

Use and throw pens are lightweight, which makes them simple to hold and write with. Affordability: These pens are reasonably priced, making them an economical option for urgent and transient writing demands.

Plastic Construction: Use and throw pens are typically made from plastic materials, such as polystyrene or polypropylene. The plastic construction allows for easy mass production and contributes to their low cost.

Limited Lifespan: Due to their low-cost construction, use and throw pens are not designed for durability or long-term use. They are intended to be discarded after the ink runs out or when they become damaged or dysfunctional.

Widely Available: Use and throw pens are readily available in stationery stores, supermarkets, and other retail outlets. They are commonly found in bulk packages, further emphasizing their disposable nature.

Environmental Impact: One of the drawbacks of use and throw pens is their contribution to plastic waste. Given their short lifespan and disposability, they can add to the overall plastic pollution problem. It's worth noting that there has been a growing interest in reducing single-use plastic items, including disposable pens, in favor of more sustainable alternatives.

It's important to consider the environmental impact of disposable pens and explore more sustainable alternatives, such as refillable pens or those made from recycled materials, to reduce plastic waste.

Literature Review

1. Repurposing waste plastics into cleaner asphalt pavement materials: A critical literature review- This paper provides about the 7 major types of plastics used in pavement as binder in asphalt which mixes showed improvements in performance of pavement.

2. Asphalt concrete mixtures modified with polymeric waste by the wet and dry processes: A literature review- The incorporation of post-consumer plastic into asphalt concrete (AC) mixtures using dry and wet processes has been demonstrated in recent studies to improve the performance of asphalt pavements and help mitigate the main distresses of permanent deformation, fatigue cracking, and thermal cracking.

3. The goal of this paper is to give the reader a thorough overview of the use of polymeric waste in AC mixtures made using the wet process. It will discuss the polymers most frequently used to modify asphalt binders, the variables that affect the properties of polymer-modified asphalts, and the methods to reduce or eliminate the negative effects of adding polymers.

Background on the need for sustainable construction materials- Overview of the issue of plastic trash and its effects on the

environment Justification for looking at pen polymers' potential as a concrete modifier. Types of pen plastics appropriate for modifying concrete. Concrete compositions that use pen plastics in various ways Pen plastics and cement compatibility and chemical reactions.

An intriguing idea that attempts to improve the qualities of concrete and lessen the environmental impact of plastic waste is to modify concrete by inserting plastic pens. Plastic pens may be used in concrete mixtures, but there are a few things to bear in mind.

Picking the Right Plastic: Not all plastic pens are appropriate for this use. The plastic that is employed must be able to impart the appropriate qualities and be compatible with the concrete mix. Due to their flexibility, durability, and chemical resistance, low-density polyethylene (LDPE) or high-density polyethylene (HDPE) plastics are typically better suited. Cleaning, shredding, and grinding the plastic pens into little pieces will make it easier to include them into the concrete mix. Processes involving mechanical grinding or shredding can accomplish this.

Plastic pens will change the concrete mix design, for better or worse. To account for the plastic component, the ratios of cement, aggregates (such sand and gravel), water, and any other additives should be changed. Depending on the desired qualities, the plastic should be thought of as a partial replacement for either fine or coarse aggregates.

Performance: It's important that the plastic and cementations matrix work together harmoniously. The concrete shouldn't be adversely affected by the plastic in terms of setting time, strength development, or durability. The performance of the amended concrete should be thoroughly tested, including for workability, durability (such as freeze-

thaw resistance), compressive strength, and flexural strength.

Environmental Considerations: The use of plastic pens in concrete can be considered as a way to recycle or reuse plastic waste, which can help lessen environmental pollution and landfill waste. However, it is crucial to take into account the modified concrete's total life cycle impact, including the energy used in the plastic preparation process and the material's long-term durability.

In conclusion, incorporating plastic pens in concrete mixtures can be a potential way to recycle plastic waste and enhance the properties of concrete. However, it requires careful consideration of plastic selection, mix design adjustments, compatibility, performance evaluation, and environmental impact assessment.

Effects on Concrete Properties

- Improvements in flexural strength and ductility behavior;
- Workability changes and effects on the characteristics of freshly-poured concrete;
- Compressive strength improvement with pen plastic integration;
- Permeability, carbonation, and chloride resistance concerns for durability;
- Thermal qualities and their impact on energy efficiency;
- Environmental and sustainability issues
- Reduction of plastic waste through concrete modification
- Life cycle assessment and carbon footprint of pen plastic-modified concrete
- Potential for improved energy efficiency and resource conservation

Challenges and Limitations

- Adverse effects on long-term durability and aging properties
- Potential impact on concrete's fire resistance
- Compatibility with other concrete additives or admixtures
- Practical considerations and limitations for large-scale implementation
- Future Directions and Research Needs
- Areas for further investigation and optimization
- Innovative techniques for pen plastic incorporation
- Standardization and regulatory aspects for plastic-modified concrete.

Conclusion

Summary of key findings from the literature review Potential benefits and challenges of using pen plastics in concrete Recommendations for future research and practical implementation this study gives an overview of the present state of knowledge on the use of pen plastics as a modifier in concrete mixtures by completing an extensive literature review. It provides information on the possible advantages, difficulties, and next research areas in this developing sector. The results help advance environmentally friendly practices in the building sector and deal with the problem of plastic waste. Developmental and Research: As a relatively novel idea, the use of plastic pens in concrete requires additional study and development to improve mix design and comprehend the long-term performance of the modified concrete. To ensure the viability and sustainability of the modified concrete, it is essential to work with experts in the fields of concrete technology and material science.

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