

Utilization of Plastic Wastes in the Foundation of Bridges and Culverts in Seashore Areas

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Abstract:- The burning of plastics releases toxic gases like dioxins, furans, mercury and polychlorinated biphenyls into the atmosphere, and poses a threat to vegetation, human and animal health. Burning plastics also releases black carbon (soot) which contributes to climate change and air pollution. A solution regarding plastic waste reduction in the rural areas by providing under foundation in all civil work particularly in the seashore areas, and mixing with M.Sand or sand to form foundation as base concrete. Thus by non- entry the sea water (or) alkali reaction reduced by concrete using by OPC cement.

Keywords: Plastic wastes, Black carbon, Foundation, Seashore areas

1. INTRODUCTION

The Plastic waste (Management and Handling) Rules, 2016 can be used as guiding rules for the management of plastic waste in rural areas. A suitable Mechanism, for supporting the inclusion of plastic wastes in the construction of culverts& Bridges in the seashore areas and adoption of all schemes undertaking as a new innovation.

2. LITERATURE REVIEW

Plastic Wastes To Construction Products: Status, Limitations And Future Perspective

[P.O.Awoyera, A.Adesina (2020)]

The use of PW for construction applications will solve both the solid waste management problem and depleting deposits of raw materials used for construction purposes. In addition, the use of PW in different construction applications supports the sustainability trend of a circular economy. The use of PW for construction applications creates a pathway to use these wastes for long term applications compared to short term ones such as recycling into new products which will end up as waste within a short period of time. The possible use of PW as binder, aggregates and fibers makes it a viable replacement for all components in cementitious composites, with somewhat acceptable detrimental effects on the performance of the resulting composite. The use of PW for various construction application will lead to various revenue generation

Use Of Plastic Waste In Civil Constructions And Innovative Decorative Material (Eco-Friendly)

[Mohammed Jalaluddin (2017)]

The project elucidates about the use of plastic in civil construction. The components used include everything from plastic screws and hangers to bigger plastic parts that are used in decoration, electric wiring, flooring, wall

covering and waterproofing. Plastic use in road construction that have shown same hope in terms of using plastic waste in road construction. i.e. plastic roads. Plastic roads mainly use plastic carry bags, disposable cups and PET bottles that are collected from garbage dumps as important ingredients of the construction materials. By using plastic waste as modifier, we can reduce the quantity of cement and sand by their weight, hence decreasing the overall cost of construction. At 5% optimum modifier content, strength of modified concrete we found to see the times greater than the plain cement concrete. Using plastic poisons our food chain under the plastic affects human health. By the disposable plastics is the main source of plastic. For these plastic pollution is not only the ocean also in desert. Plastic will increase the melting point of the bitumen. Rain water will not seep through because of the plastic in the tar. So, this technology will result in lesser road repairs.

A Novel Concrete By Using Waste Plastic Aggregate As Partial Replacement Of Natural Coarse Aggregate

[Ansari Abu Usama , Asadullah , Vajed Shaikh (2020)]

Plastic waste is silent problem to the environment and their disposal is a very dangers issue for waste management. In past various attempts was made through experimentation to check the feasibility of plastic waste to be use partially in concrete. In this research work test were conducted to find out the properties of plastic aggregate such as crushing value, impact value, flakiness and elongation index, specific gravity, bulk density and voids. These properties of plastic aggregate were compared with the properties of natural aggregate. The compressive strength test, split tensile strength test and flexural strength test were performed. Effect of replacement of natural coarse aggregate with various percentages (0% to20%) of plastic aggregate was studied. Behavior of concrete of M20 grade was experimentally investigated and the optimum percentage replacement of natural coarse aggregate was found out. It is found that the use of plastic aggregate results in the formation of light weight concrete. The compressive, tensile and flexural strength of concrete reduces with the increase of percentage of replacement of plastic aggregate.

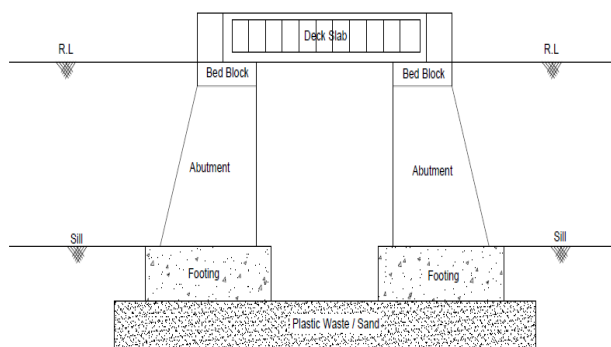
3. EXPERIMENTAL PROCEDURE

The following process, innovative measure can hereby introduced in the construction of RCC Slab culverts, Bridges and Bathing Ghats and construction of all civil works nearby seashores and other places also using plastic wastes collected in rural areas.

1. By digging foundation for a depth of 1.5m and above.
2. Removing earth nearby foundation.
3. Collected plastic wastes of bags from the respective panchayats and nearby panchayats are stacked by volume of 1/5 of M.sand (or) sand volume of drainage layer prior to the P.C.C.
4. Place the plastic wastes into the foundation roughly and equally.
5. Over that plastic wastes, M.Sand (or) sand shall be poured in the foundation.
6. By ramming the plastic wastes M-Sand& sand mix, the surface is ready for providing plain cement concrete.
7. Over that P.C.C 1:4:8 shall be laid as usual methods.
8. From the above procedure, plastic wastes can be used.

1.50 M SPAN RCC SLAB CULVERT

CROSS SECTION



4. FIELD WORK PROGRESSION



Fig-1: Pattukkottai Municipality garbage godown at Mudalcheri Panchayat



Fig2: Road side Garbage collection



Fig-3: Plastic wastes are Spreading in the foundation



Fig-4: Mixing M- sand with Plastic wastes



Fig-5: Body wall Centering progress



Fig-6: Culvert Body wall



Fig-7: Side wall Concreting



Fig-8: Deck slab Steel Fabrication

5. ADVANTAGES

1. Concrete using Ordinary Portland cement easily corrode structure but this plastic using concrete will not deteriorate as mentioned in the IS Code.
2. Hence, plastic wastes can be minimized and destroyed in the rural areas.

3. All foundation of civil works can be prepared by putting plastic wastes by Non intrusion of sea water or salt water agencies.
4. Fluorescent of salt matter can be minimized in the structures.

6. EXPOSURE TO SULPHATE ATTACK AS PER IS CODE: 456-2000 CL.8.2.2.4.

For the very high sulphate concentrations in some form of lining such as polyethylene or polychloroprene sheet; or surface coating based on asphalt, chlorinated rubber, epoxy; or polyurethane materials should also be used to prevent access by the sulphate solution.

The plastic waste reduction in the rural areas by burying into the foundation in all civil work particularly in the seashore areas, and mixing with M.Sand or sand to form foundation as base concrete. Thus by non- entry the sea water (or) alkali reaction reduced by concrete using by OPC cement. It acts as a cover to structure.

The burning of plastics releases toxic gases like **dioxins**, furans, mercury and polychlorinated biphenyls (better known as BCPs) into the atmosphere, and poses a threat to vegetation, human and animal health.

Burning plastics also releases black carbon (soot) which contributes to climate change and air pollution. Burning of plastic will lead to carcinogenic effects. Dioxins and Styrene gases and some of the most dangerous chemicals leading to lung cancer. This should be totally banned by the government. The most common hydrocarbons are hexopyrene and poly hydro carbon. Garbage burning can cause cancer should be banned. Recycling and reuse of plastic wastes is become 8% of the total volume.

7. COMPARISON TO OTHER METHODS

1. This method requires no extra process needed.
2. Directly it may be poured into the foundation.
3. Cutting, shredding of plastic wastes is not required in this method.
4. Addition of plastic wastes in the road making under proper temperature will be cumbersome hence no heating required in this method
5. No separation of screening is required as other conventional methods.
6. No extra land is required like incineration.
7. Only segregation is needed by the garbage collectors (Thooimaikavalars) and it should be collected at source.
8. Plastic waste can be decomposing in seashore areas in course of time.
9. Using special cement is uneconomical.

8. CONCLUSION

This process may be initiated as R & D work for destroying plastic wastes from the rural areas of the country. Concrete is more vulnerable to deterioration due to chemical or sea water attack, the life of the structure can be lengthened by providing extra cover to concrete as surface coating of plastic wastes in the beneath of foundation and sides.

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