Sustainable approach on reuse of waste materials in construction by means of project management

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Abstract:- *Research has done for safe as well as economic disposal of waste materials. Re using waste material saves natural resources and spaces where garbage is dumped, and maintains clean environment. The construction of concrete practice is unsustainable and consume enormous amount stone, water and sand, it also use 2 billion tons cement, which releases unhealthy greenhouse gases. Recycle plants for Construction waste materials are raised, but they aren't solution for holistic problem.*

Key Words **: Waste, Green House, Sustainable approach, Reuse of Materials.**

1. INTRODUCTION

Concrete is widely used for construction and it is second most utilized substance after water. It is necessary to reduce destruction of our planet and to protect environment. Damage to environment and nature can lead to natural disasters. Years of ignorance towards environment, has created this catastrophe. This challenge which we face are measured on global scale rather than national level. Environmental damage occurs by activities like, mining, deforestation, Ozone reduction, toxic waste, pollution in sea and rivers this affects planate.

1.1 Considering this aim, it is appropriate to examine the various possibilities of reuse of waste materials, more so, in civil engineering construction.(Batayneh M, Marie I, Ibrahim A, waste management, 2007)

1.2 Waste Materials Collected

- Fly ash from cooking burning wood
- Broken bricks
- Burn soil
- Crushed demolished concrete
- Broken glass piece
- Reinforcing grass
- Waste polymer sports netting
- Waste polythene covers and bags
- Waste garden fencing net
- Flood washed sand erosion material
- Broken sanitary ceramic aggregates

Any construction activity which need materials such as glass, clay, mud, wood, concrete, steel, brick, stone, etc. where, cement stays as the main construction material used in construction industries

Research & Development activities have been taken up all over the world for proving its feasibility, economic viability and cost effectiveness. The utilization of recycled aggregate is particularly very promising as 75 per cent of concrete is made of aggregates. In that case, the aggregates considered are slag, power plant wastes, recycled concrete, mining and quarrying wastes, waste glass, incinerator residue, red mud, burnt clay, sawdust, combustor ash and foundry sand. The enormous quantities of demolished concrete are available at various construction sites, which are now posing a serious problem of disposal in urban areas. This can easily be recycled as aggregate and used in concrete.

The main reasons for increase of volume of demolition concrete / masonry waste are as follows:-

- Many old buildings, concrete pavements, bridges and other structures have overcome their age and limit of use due to structural deterioration beyond repairs and need to be demolished;
- The structures, even adequate to use are under demolition because they are not serving the needs in present scenario;
- New construction for better economic growth;
- Structures are turned into debris resulting from natural disasters like earthquake, cyclone and floods etc.
- Creation of building waste resulting from manmade disaster/war.

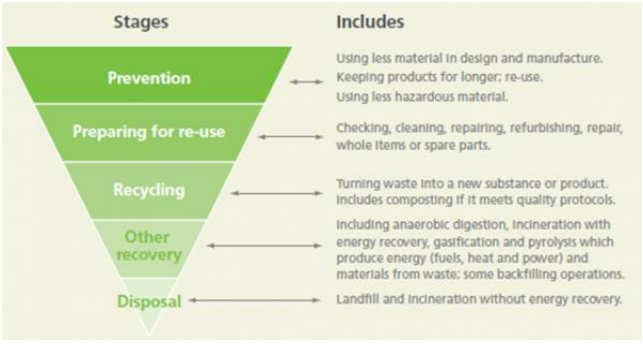

Fig -1: Hierarchy of reusing and recycling construction waste

2. CONCLUSION

- Most of the work was carried out in convectional concrete by introducing plastics as shredded pieces and in fine pellets as a substitute of fine aggregate.
- Mostly Polypropylene, polyethylene type of plastic waste has been used.
- Incorporation of plastic can lower the density of resulting concrete.
- Strength parameters has reduced when replacement level of plastic increases due to the poor bonding effect.
- Properties like toughness and abrasion are enhanced by using plastic aggregate.
- Durability properties are enhanced by the replacement of plastic aggregate.
- No work is carried out using thermoplastic waste as coarse aggregate replacement in concrete.
- Therefore in this work I am going to use Plastic aggregate as coarse aggregate replacement in concrete.

Recycling and reuse of building wastes have been found to be an appropriate solution to the problems of dumping hundreds of thousands tons of debris accompanied with shortage of natural aggregates. The use of recycled aggregates in concrete proves to be valuable building materials in technical, environment and economical respect.

1. Plastics can be used to replace some of the aggregates in a concrete mixture. This contributes to reducing the unit weight of the concrete. This is useful in applications requiring non bearing lightweight concrete.
2. Introduction of plastics in concrete tends to make concrete ductile, hence increasing the ability of concrete to significantly deform before failure. This characteristic makes the concrete useful in situations where it will be subjected to harsh weather such as expansion and contraction, or freeze and thaw.
3. The inclusion of plastic aggregates in the concrete of the building under investigation has been shown to be advantageous from an energy point of view. The use of plastic aggregates helped the interior cooler, when the outside temperature is raised, as compared to the corresponding conventional concrete. There are several reliable applications for using recycled coarse aggregate in construction.

However, more research and initiation of pilot project for application of RCA is needed for modifying our design codes, specifications and procedure for use of recycled aggregate concrete. The subject of use of RCA in construction works in India should be given impetus, because of big infrastructural projects are being commissioned including Common Wealth Games in 2010 We want to carried out the project with many more trials, such that our work will become full proof accepted by engineers department and government, for recommendation, public use; hence we need the fund to do the project expectedly.

2.1 Recommendations For Future Work

It is recommended that any future work on the beneficial re-use of waste materials as lightweight coarse aggregate should continue with the same materials used in this study, as these are some of the most widely available materials in Tanzania, and would make the application of this method in Kilwa the most feasible. In addition, the results obtained during this project suggest that there are several research questions with respect to these materials that are worth pursuing further. In particular, it is recommended that finetuning the proportions for a concrete misusing waste coconut shells as an aggregate would be beneficial. For example, the data obtained in this study suggest that using one or both of the other two materials from this study could potentially solve some of the problems observed with the coconut shell mixes.

Notably, sisal fiber almost completely eliminated the spalling and scaling typically observed in concrete specimens. The fact that this was the most noticeable weakness of the coconut shell mixes makes the idea of testing the addition of sisal fiber to the coconut shell mixes intriguing. This would also address the lack of strength that the sisal fiber mixes exhibited.

Thus, by combining the coconut shells and sisal fibers into one concrete mix, the strengths of one material could potentially make up for the weaknesses in the other. Beyond the possibilities of mixing coconut shells and sisal fibers, the abilities of sisal fiber as an airentraining admixture are also worth pursuing. The air contents produced in this study using sisal fibers are higher than recommended, but with additional research,a mix with the proportions needed to produce a beneficial percentage could potentially lead to a decrease in the amount of necessary mixing water and segregation in plastic concrete. In hardened concrete, an improved sisal mix could reduce scaling and enhance durability to weather related distresses. The development of this technology for developing countries could allow access to a lowcost air-entraining admixture and, along with it, the benefits provided by such an amendment .Finally, in addition to efforts to work with different concrete mixes, it is recommended that the effect of different curing conditions also be explored. According a long term study on compressive and bond strength of coconut shell aggregate by, Finding the curing method that will produce the highest strength for these mixes and then adapting the method for use in Tanzania would also help with the application and feasibility of beneficially re-using common solid waste materials as lightweight coarse aggregate.

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