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Research Article

MANSION FROM MENACE – A NEW PERSPECTIVE

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ABSTRACT

Plastics have transformed everyday life; usage is increasing and annual production is likely to exceed 400 million tonnes by 2020. It is evident that plastics bring many societal benefits and offer future technological and medical advances. However, concerns about usage and disposal are diverse and include accumulation of waste in landfills and in natural habitats, physical problems for wildlife resulting from ingestion or entanglement in plastic, the leaching of chemicals from plastic products and the potential for plastics to transfer chemicals to wildlife and humans. There are solutions, including material reduction, design for end-of-life recyclability, increased recycling capacity, development of bio-based feedstocks, strategies to reduce littering, the application of green chemistry life-cycle analyses and revised risk assessment approaches. Such measures will be most effective through the combined actions of the public, industry, scientists and policymakers. There is some urgency, as the quantity of plastics produced in the first 10 years of the current century is likely to approach the quantity produced in the entire century that preceded. The present study is a collaborative work with Samarpan Foundation, an NGO which aims in converting this menace into a useful material and thereby reduce its hazardous impact on the environment.

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INTRODUCTION

Plastics have been with us for more than a century, and by now they're everywhere, for good and for ill (Anastas P. T. and Beach E. S., 2007). Plastic containers and coatings help keep food fresh, but they can also leave behind neurotoxins such as BPA in the human body (Hopewell J, et. al., 2009). PVC is used for everything from pipes and flooring to furniture and clothes, but it contains compounds called phthalates that have been implicated in male reproductive disorders (Koch H. M. and Calafat A. M., 2009). Studies have also shown that childhood exposure to environmental pollutants can have significant negative effects later in life, including reduced labour force participation and even earnings (Andrady A. L. and Neal M. A., 2009). To reduce plastic waste and negative effects, recycling programs have been implemented in many parts of the World, but remain underutilized (Barnes D. K. A. et. al., 2009). Much is due to the nature of plastic itself, which often can only be "downcycled" rather than recycled — a torn plastic bag might eventually be transformed into a lunch tray, but it will never be a plastic bag again. Many cities and states have begun more serious efforts to restrict their use, but the subject remains a matter of considerable debate (Teuten E. L., et. al., 2007). While plastics also contain substantial energy, the vast majority ends up in landfills. Immense quantities of plastic are also sent to the developing world together with e-waste,

where "recycling" frequently involves open-air burning (North, et. al., 2014). What do we do with this mounting non – biodegradable Menace?

Samarpan Foundation

Samarpan Foundation a non - profit charitable trust is run entirely by volunteers and was first established in Delhi in 2006. It carries out activities in 16 cities across the country and has started its branches in Dubai, America, Italy and in Chennai from 2010. Their vision is to expand network globally and to provide help and assistance of any kind when there is a humanitarian, ecological or environmental need and strive to restore our environment. Samarpan Foundation has chosen to transform and repurpose this overlooked and environmentally harmful plastic bottle considered as a menace into one that is a useful resource.

Pet Bottle Benches

Discarded PET (Polyethylene Terephthalate) bottles can be collected, manually sorted by size, compactly filled with mud and sealed. Then these bottle bricks can be cemented together to construct the floor, walls and roof of the dwelling. The idea was conceived by Patrick San Francesco, founder of the organisation. A mud-filled bottle is as strong as a brick and has many other advantages.

- It forms a valuable alternate building material.

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- Low cost and maintenance, along with its long life, make it an excellent value for money.
- PET provides very good alcohol and oil barrier properties and generally good chemical resistance.
- The orienting process of PET serves to improve its gas and moisture barrier properties.
- PET bottles are nonbiodegradable. Therefore any structure made with it can last a couple of hundred years or more. And then at the end of its life, the structure may be recycled and reused once more!
- Plastic has high tensile strength to weight ratio which makes it strong, durable and versatile.



Samarpan Foundation has used this concept to reinforce walls of dams and wells in Goa. Mud filled PET bottles are non-brittle and can, therefore, withstand heavy shock loads without fatigue or failure. In earthquake prone and flood affected areas plastic bricks structures with its high impact resistance can prevent large scale damage to properties and washing away of homes. Thus replacing conventional bricks with plastic bottles will help the environment in many ways. Waste creation will be greatly reduced as bottles become a resource and attract value. Furthermore improved sustainable management of plastic bottle waste will greatly reduce pollution of land and water bodies. It will help reduce carbon emissions during baking of bricks and also considerably lower the demand for conventional construction materials. These innovative bricks are easy to use and build. In rural areas, this can lead to the creation of new jobs especially for women and youth (www.samarpanfoundation.org).

Women's Christian College community was privileged to partner with Samarpan in constructing Green Benches using these PET Bottles through a Project sanctioned by the United Board for Christian Higher Education in Asia.

Success Story

Samarpan's first PET bottle project was a school made of 6,000 bottles in Delhi instead of conventional bricks.

CONCLUSION

Samarpan Foundation (SF) a global Charitable Trust registered in New Delhi is carrying out activities nationwide, wherever there is a humanitarian, ecological or environmental need.

Step by step process for PET Bottle Bench Construction Building the Foundation



1. Level one layer of gravel in one foot deep pit
2. Place the foundation layer
3. 150 bottles are made to stand on a cement layer
4. Bottles are packed with concrete on the outside and mud in between.

Building of the Bench



5. The Mould is set
6. First of five layers are laid with 500ml bottles
7. The bottle bricks are laid in mortar
8. The second layer is interlocked

Plastering and Finishing coat with Red Cement and Water Proofing



Pet Bottle Benches In Women's Christian College



Their other facets include orphanages, aged homes, tree planting drives, rainwater harvesting, eradication of mosquitoes, food kitchens for the poor, free schools for slum children, housing for victims of natural disasters, building free hospitals, rehabilitation of bonded labourers, revival of tribal arts and cultures and vocational training centres among other social causes. Unique to the Foundation, is its Waste Management Programme, where a school building has been constructed in New Delhi using PET water bottles and PET Bottle benches in Women's Christian College, Chennai. Thus it is possible to foresee a growing role for industrial process biotechnology in the near future as the implementation of bio-innovative and eco-friendly approaches is the need of the hour. ***We are at a crossroads with the future in our hands. The decisions taken today will redefine the kind of environment the present and future generations will enjoy.***

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