

A Prototype for Plastic Recycling



PERIDOT PAVER TILES

Peridot paver tiles are produced by using rock dust and plastic as a binding agent. It helps in recycling plastic waste in an effective manner.

The context

Plastic wastes have become a major threat to our environment. It is the major element of municipal and industrial waste in cities as well as in rural areas. The rural areas are producing more waste materials due to the practice of consuming goods/appliances using plastic as the major component. An acceptable, realistic and resourceful method of solving this problem is, to use these plastic wastes in construction field. There is a necessity to sustain construction sector by inventive technology. The large volume of materials required for construction is potentially a major area for the reuse of waste materials.

The activity

The undergraduate students of Marian College have come up with an experiment for recycling the plastic waste generated in the campus. This experiment was conducted under guidance of teachers. The idea was the production of paver blocks by using plastic bottles. The application of plastic waste in the production of paver block is an innovative way of disposing plastic waste littered all over the place, thereby cleaning the environment. The cost of plastic waste paver block when compared with concrete paver block is cheaper. Equalled to concrete paver blocks peridot paver blocks are stronger, tougher, more resistant to heat, corrosion and economical.

The Project

In this project, the experiment team initiallyconducted a feasibility study of recycling of plastic wastes which are galling in our environment, as a binding agent as in pavement block production. Plastic wastes (PET type) were melted at temperatures between 150°C-200°C in a closed system and mixed in different proportions (70:30, 60:40 and 50:50) with rock-dust (*parappodi*), to produce sample paver blocks.

Outcome

> Develop technological skills to make paver blocks from waste bottles.

- Attain knowledge to study the properties of paver blocks manufactured by PET bottles, an ordinary plastic waste.
- Learn how to assess the mechanical and physical properties of paver blocks prepared from waste plastic.
- > Be able to produce cost effective products from waste.
- > Get readiness to reduce land and water pollution.
- Enrich the environmental awareness.
- Scoop out the plastic pollutants and rejuvenates earth's resources.

The Process



The various plastic waste types were processed in various steps as follows:

1. **Plastic collection:** The plastics wastes for recycling were collected in and around the Cafeteria.

- 2. **Manual sorting:** Each plastic waste type were separated from each other and unwanted materials were removed from the waste, like in waste plastic bottles, the plastics normally attached on the skin of bottles and the bottle caps were removed.
- 3. Chipping: PET bottle waste sorted was then chopped into smaller pieces.
- 4. **Washing:** The chips were then washed to remove glue, paper labels, dirt and any remnants of the product they once contained
- 5. **Melting of Plastic Material:** The selected waste plastic from different elements is weighed, crushed and then melted in a container at its melting point (150-170°C).
- 6. **Mixing of Materials:** After the waste plastic is melted, the rock powder shall be added little by little in quantity to the melted plastic and stirred until getting a homogeneous mixture.
- 7. **Placing of resin (plastic + rock powder) into mold:** Once the homogenous mixture of melted waste plastic and rock powder is formed, the mixture is fed into a mold of 15cm x 15cm x 2.5cm. Wooden molds are coated with oil for easy demolding, before placing the mixture.
- 8. **Demolding:**Oncecompletely prepared, the mold is cooled either by air cooling or by placing it in water. After the mold is cooled, the tile is removed from the mold. The floor tile is now ready with a good surface finish at the top.

Sand is mixed with plastic and tests such as hardness test, soundness test, impact test, compressive strength test, water absorption test and fire resistance test is done with the newly prepared product.



Students engaged in the process of production of paver block tiles



A finished unit of Period paver block tile