

Project Details

1. Project Title:

Development of Recycled Plastics Based Composite Roof Tiles with Used Face Mask, Phase Change Material and Bovine Waste

2. Funding Organisation: Dassault Systèmes Foundation

3. Project Team:

Dr. P. S. Rama Sreekanth (PI), Dr. S.V. Kota Reddy, Dr. Manikanta Ravindra, Ms. Krishna Satya, Mr. Ankan Narayan Biswas and Mr. Bharat Krishnan.

4. Scope:

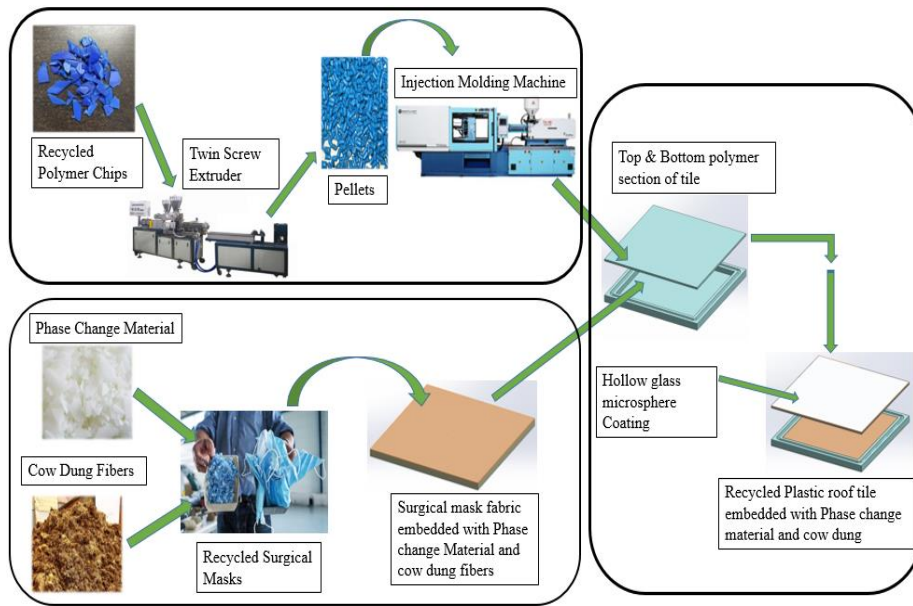
- Reducing the necessity of air cooling systems in the houses.
- Manufactured from households /industries plastic waste.
- Waste Face Mask fabric/Industrial cotton, which is a non-woven cloth is immersed into a mixture of dried cow dung and Phase change material and it is sandwiched between two plastic tiles.
- Reduce the indoor temperature to 20-24⁰C during hot summers.
- Provide thermal comfort without/ lesser usage of air conditioners. It also helps in improving GDP elasticity (employment) and personal income.

5. Details:

Plastic pollution has taken serious toll on existence of mankind and its consumption is all set to reach around 297.5 million tons by the end of 2030. On the other hand, one of the major issues faced by urban and rural parts of India is the thermal management due to rapid industrialization and soaring of the temperatures especially in Deccan plateau and northern Plains. To minimize these temperatures, it is obligatory to use air cooling systems, which increase the energy consumption and imposing undesirable cost on the people.

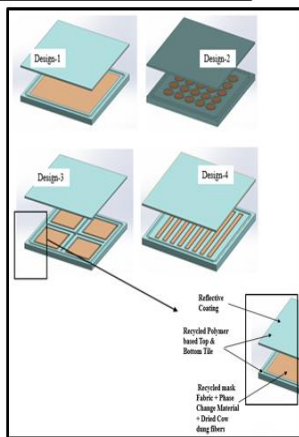
Apart from this, while India is battling with CoVID-19, it is plagued with another problem of disposing the used masks. The main scientific objective of this research proposal is to address the two discussed problems that are faced by India. The main idea is to fabricate a composite roof tile, with the recycled plastic, which is sandwiched with a phase change material, used mask fabric and Cow dung. Cow dung has been used in India Traditionally due to its exceptional property of keeping the area warmth in winters and cold in summers. In this present work, an attempt is made to utilise readily available bovine waste in thermal

insulation of the roof tile. The process involved in processing the roof tile is shown in pictorial representation.

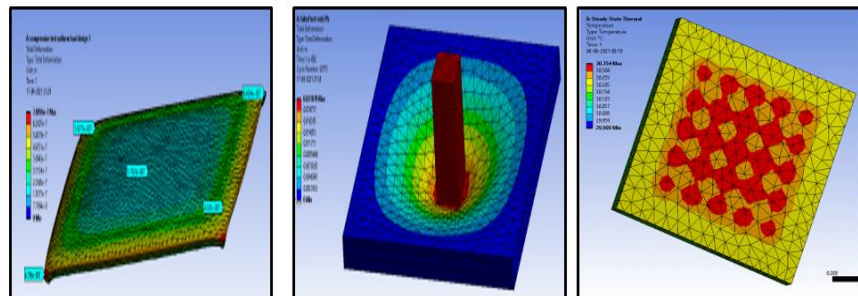


6. Relevant photographs/data:

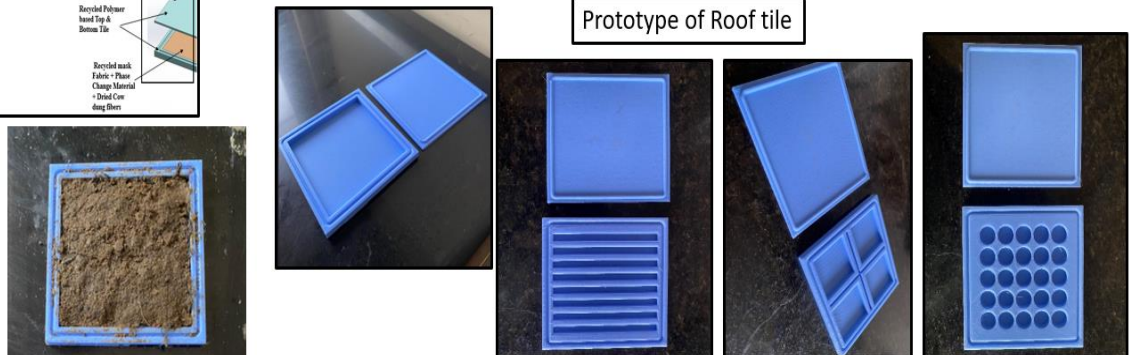
Design of Roof tile



Simulation Study on Roof tile



Prototype of Roof tile



7. Project current status:

The proposed project has completed the Simulation studies on the roof tile designs and based on the data and Prototype is developed and in next step, Fabrication work will be carried out.

8. Projected project plan:

- Designing top and bottom molds of roof tile.
- Fabrication of the roof tile
- Experimental work