



# USE OF PLASTIC MESH TO PREVENT SOIL EROSION

Vishal Singh (student,GNIOT) Shakshi Kumari(student,GNIOT)  
Sanghati Mutsuddi (assistant professor,GNIOT)  
Greater Noida Institute of technologyGautam Buddha Nagar

**ABSTRACT:** Soil erosion takes place naturally, this is a process in which soil displaces from one place to another naturally. There are multiple reasons behind erosion. Every type of erosion has a specific solution that depends on the severity of the problem, as a civil engineer our responsibility is to investigate areas near construction sites in this paper, we have tried to give a useful method that can control erosion effectively. Soil netting is one of the effective methods popular in construction sites in controlling erosion. The landfill areas and waste containment areas are very prone to erosion that can be controlled by providing drainage and preventing the clogging of drainage stems. By using soil nets proper water flow and leachate can be managed Among the various methods like Jute nets, mulch tackifiers, and Crimpers we have used waste plastic material like battles or Containers to make plastic mesh. By analyzing Laboratory in we found the strength and durability and rest resistance to chemicals are better than regular Jute nets.

## 1. INTRODUCTION:

Soil expansion is a natural process that occurs in the action of some natural means such as winds, running cooter, glaciers, and coastal waves. In the passing days, it has become a serious problem due to the increased rate of erosion all over the world. Soil erosion is a process in which soil particles get detached from one place and transported to the other one by some geomorphic agents. Now a day it has become a serious problem to survive, It may occur anywhere like arid or semiarid. Formation of soil is a very slow process that takes thousands of years & to form soil naturally but the process of erosion is very fast, which causes landslides in hilly areas and settles on roadways sides.

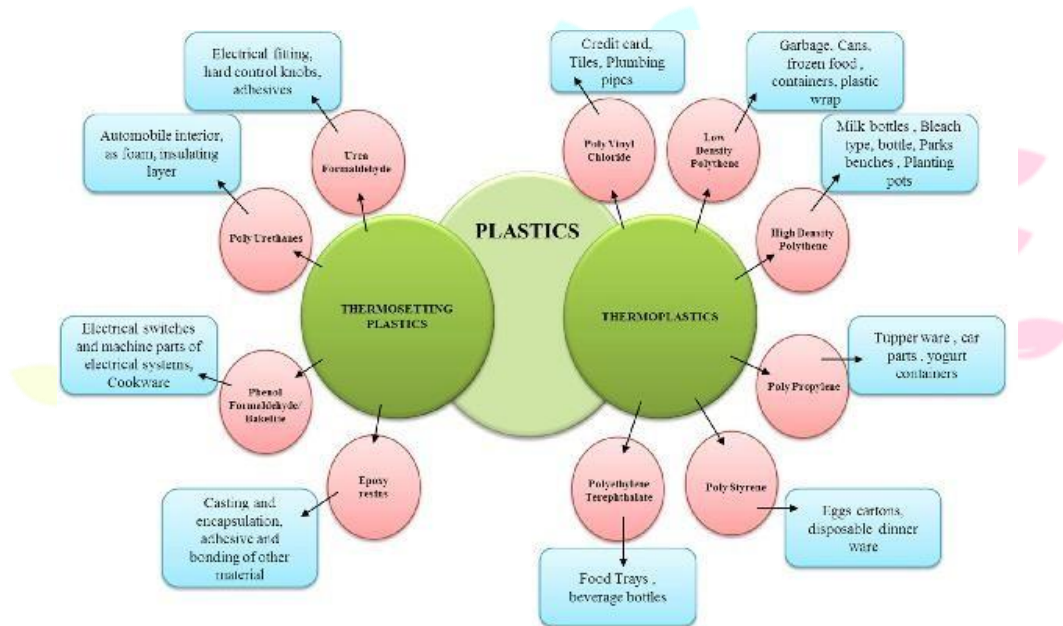


## 2. MATERIAL USED:

Post-Consumer PET (Polyethylene terephthalate)

Bottles, commonly used for beverage Packaging, can be recycled and processed into plastic mesh. PET mesh is known for its

- Strength.
- Durability
- Insect protection
- Cost effective
- Resistance to UV radiation, making it suitable for this Application. And
- Aesthetic view.



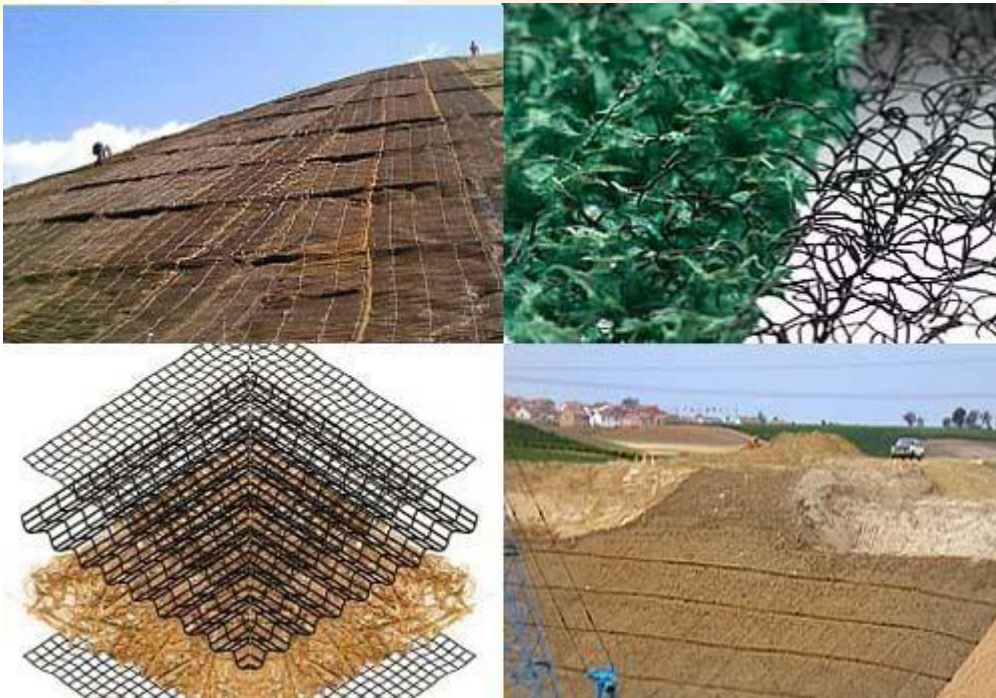
## 3. LITERATURE REVIEW

SL NO	NAME OF PAPER	FINDINGS
1	Utilization of Recycled Plastic Waste for the Production of Plastic Mesh; Authors: Smith, J., Johnson, A., Anderson, B. Published in: Journal of Sustainable Materials and Technology, 2019	The potential for waste plastic utilization in mesh production, highlighting its environmental and economic benefits.
2	Characterization and Performance Evaluation of Plastic Mesh Produced from Post-Consumer Plastic Waste; Authors: Lee, C., Wang, L., Chen, H. Published in: Polymer Engineering & Science, 2020	The viability of utilizing waste plastic for mesh production while addressing its performance and suitability for various applications

#### 4. EXPERIMENT:

- i. We have collected a sufficient number of empty PET bottles. Make sure they are clean and free from any residue or labels.
- ii. Using a pair of scissors or utility knife, cut off the bottom and the top parts of each PET bottle. Make a horizontal cut near the base of the bottle and another near the top, leaving you with a cylinder-shaped section.
- iii. Cut the cylinder-shaped sections lengthwise to create long strips. The width of the strips can vary depending on your preference, but aim for a width of around 1 to 2 inches (2.5 to 5 cm).
- iv. Cleared away any debris, rocks, or plants that may hinder the installation of the plastic mesh.
- v. Dug a shallow trench at the area where soil erosion is likely to occurs. The depth of the trench was 4 feet and width were 3 feet.
- vi. Placed the PET bottles strips horizontally in the trench, slightly overlapping each strip to create a continuous plastic mesh. Pressed the strips into the soil. Continue it until the area is covered.
- vii. Secured the plastic mesh by using garden stakes or small wooden pegs to secure the plastic mesh strips in place.

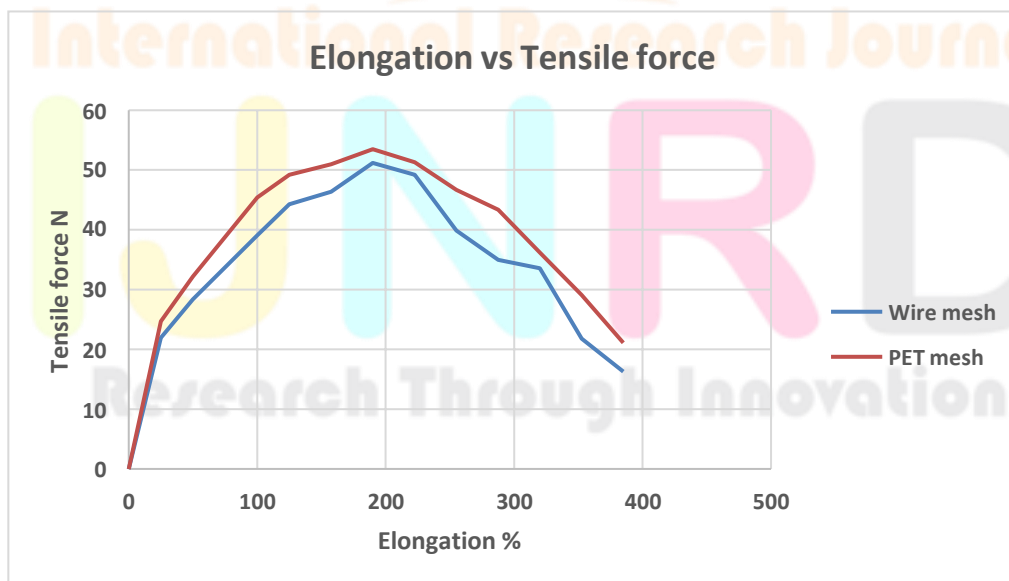
Gently backfill the trench with soil, covering the bottom portion of the plastic mesh. Compact the soil lightly to secure the plastic mesh.



**RESULT:**

We saw that Plastic mesh made from waste materials can retain the durability and strength characteristics of the original plastic. Depending on the specific type of plastic used, the resulting mesh can be resistant to weathering, corrosion, and wear. This makes it suitable for applications that require long-lasting and robust materials. Plastic mesh can be customized to various sizes, shapes, and configurations, depending on the intended purpose. Waste plastic can be melted, extruded, or molded into different mesh designs, such as square, diamond, or hexagonal patterns. This versatility allows for the production of mesh with specific properties to meet different needs.

Wire mesh and PET mesh		
Tensile force(N)	Elongation (%)	Elongation (%)
0	0	0
25	22	24.7
50	28.4	32.2
100	39.1	45.4
125	44.3	49.2
157.5	46.4	51
190	51.2	53.5
222.5	49.2	51.3
255	39.9	46.7
287.5	35	43.4
320	33.6	36.2
352.5	21.8	29.1
385	16.3	21.1



## 5. CONCLUSION:

Using waste plastic materials to use as plastic mesh helps in recycling and reducing the amount of waste that ends up being used. in landfills or goes to the ocean. This method minimizes the environmental impact caused for plastic disposal. Plastic mash is generally light in weight, this is a big-time advantage for applications that require a material with low density. Many of the plastics have excellent Chemical resistant properties these kinds of materials, retains their properties also after the formation of mesh. This type of mesh can be cost-effective compared to Virgin Plastic as we are not producing an extra amount of plastic so no cost of production, raw material, etc, we are only reusing the waste. These wastes are way cheaper than the new ones and Sometimes are for free depending on the infrastructure of recycling and also on the availability of materials. The process is economically viable.

## 6. REFERENCES:

- ❑ ResearchGate ([www.researchgate.net](http://www.researchgate.net))
- ❑ Scholarly Databases (such as PubMed, ScienceDirect, IEEE Xplore, etc.)
- ❑ Government Research Institutions and Agencies
- ❑ <https://link.springer.com/article/10.1007/s11356-021-16980-y#citeas>
- ❑ <https://www.sciencedirect.com/science/article/pii/S0048969721038468>

