

## Design and Construction of Synthetic Box

**Nimase Sujata Bhaga,**  
Student , Department of Civil  
Engineering,  
SCSMCOE, Nepti, Ahmednagar,  
Maharashtra, India  
**Shelake Pratiksha Bhagvat,**  
Student , Department of Civil  
Engineering,  
SCSMCOE, Nepti, Ahmednagar,  
Maharashtra, India

**Bende Sayali Panditrao,**  
Student , Department of Civil  
Engineering,  
SCSMCOE, Nepti, Ahmednagar,  
Maharashtra, India  
**Sangale Kirti Machhindra,**  
Student , Department of Civil  
Engineering,  
SCSMCOE, Nepti, Ahmednagar,  
Maharashtra, India

**Dhavale Swapnil Namdeo,**  
Student , Department of Civil  
Engineering,  
SCSMCOE, Nepti, Ahmednagar,  
Maharashtra, India  
**Lande Ankita Manoj**  
Student , Department of Civil  
Engineering,  
SCSMCOE, Nepti, Ahmednagar,  
Maharashtra, India

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**Abstract** - Plastic bottles are generally used for the consumption purpose may be it is solid, liquid, or gaseous material. We all know that the plastic is non-decomposable material and if it gets decompose it takes 1000 of years. While bio-degradation it releases toxic fumes which is very harmful to the environment. So we are using plastic bottles in our construction. We are filling these plastic bottles by the fly ash with very proper compaction and replacing bricks in the construction by these bottles.

**Key Words:** Plastic bottles, fly-ash, compaction, non-decomposable, toxic fumes.

### INTRODUCTION

Our project name is 'Design and construction of synthetic box' here synthetic refers to the plastic and box refers to the four walled structure. We have constructed toilet by using the plastic bottles and fly ash and therefore we named this structure as 'Synthetic Box'

#### 1.1 General

Plastic bottles and fly ash these both are the waste products and we are using these in our construction very effectively and efficiently in our project. Plastic material is gets decomposed under very few circumstances. It may get recycled but only upto 30% and remaining 70% goes under the landfill and affect the subsoil very badly. So in our project by using plastic bottles we are trying to keep 100% of the waste out of the landfill. This construction of toilet by using plastic bottles and fly ash is also called as 'Plastic bottles green house' or 'Plastic bottles green building'. We are not just solving the environmental problem but also trying to reduce the pollution.

### 2. METHODOLOGY

In this project we are trying to use 3R principle. As we all knows what is 3R principle. Reduce, Reuse and Recycle. In this project we used recyclable material like PET bottles and industrial waste as a filling material to reduce demand of natural resources. In a traditional construction bricks are use which required more quantity of natural resources and at the process of manufacturing of brick high emission of carbon dioxide are produce which is more hazardous to environment. To face this problem we determine solution by using PET bottles and fly ash as filling material.

#### Construction of synthetic box -

1. Selection of project site.
2. Site clearance.

3. Collection of materials.
4. Filling of bottles.
5. Material testing.
6. Excavation soak pit and footing.
7. Construction of synthetic box.

#### Cost Estimation –

##### Compressive strength of materials –

We have tested various sample on CTM the result are as below. From result we have concluded that fly ash have efficient compressive strength. So we have closed fly ash as a construction material.

**Table -1:** Compressive Strength Of Materials

Sr. no	Materials	Compressive strength(N/mm <sup>2</sup> )
1	Natural sand	12
2	Soil	10
3	Artificial sand	9
4	Brick crush	11
5	Fly ash	10
6	Brick	15

#### Comparison of different types of construction-

Here we have given the cost required for the construction of toilet by using various construction material and we have found that brick construction is much more costlier than the hollow block construction and bottle construction. We have use bottles as construction material because it reduces cost 50% than the brick construction.

**Table -2:** Cost Comparison

Sr. no	Materials	Approximately cost
1	Brick construction	25000
2	Hollow block construction	21000
3	Bottles construction	12420

#### Advantages –

1. Low cost
2. Non brittle
3. Absorb abrupt shock loads
4. Bio-climatic

5. Less construction material
6. Easy to build
7. Green construction

**Disadvantage –**

1. When it is melted is released a compound gas which is very harmful to health of an environment
2. It weakens the ozone layer.
3. The threatening disadvantages is pollution.

**Conclusion –**

The application of plastic bottles filled with fly ash as a wall structure to replace brick in construction in industry is acceptable as the strength is over the minimum permissible strength in synthetic box. We are using plastic bottles and filling them with fly ash with proper compaction. We can reduce river pollution due to plastic bottles. By using non degradable material like plastic we can balance environmental pollution. We can provide low cost toilet box for economically backward family of India. This can be very well applicable to rural area where those can not affordable for the same.

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