

**HAPPY LOO Toilet**

# HAPPY LOO- AFFORDABLE TOILET

## **Brief description about the solution:**

Happy Loo is a well-engineered, easy to erect designed toilet that can deliver a quality, durable and effective solution for a family.

Rigid foam filled in between the PVC sheet acts as wall structure for both superstructure and containment. Structural stability is ensured by providing locally available material like bamboo/casuarina pole which reduces the cost of the solution.

The PVC sheets are fused to provide folding edges without any hinges. Door is provided with extra hinges for durability.

SATO pan and SATO I trap are used for clean interface with water saving

Hard board are fused in the PVC sheet itself for screwing the hooks for latch, SATO hand wash, solid waste disposable bag

A single carton box containing all the accessories (except support pole and concrete) shall be provided. The complete installation of all the structure is possible within a day. Support pole considered in our solution is locally available, cost effective bamboo or casuarina pole.

Instruction manual for installation is also provided along with this solution. Detailed drawing with different view of our solution is attached.

## **Part A: Containment:**

### **Details of material**

- a) Double layer 100 micron PVC sheet with partition for each side of the containment
- b) Rigid polyurethane foam pouch for each containment.
- c) PVC tie
- d) Bamboo/casuarina pole

### **PVC sheet:**

Two layers of 100 micron PVC sheet are fused to a dimension of 1.25 x1.25 meter with provision for filling the polyurethane foam liquid. The edges are provided with holes (25 mm dia) for tying the PU foam filled PVC sheet to the Bamboo/casuarina pole

The PVC sheet acts as a containment for the rigid PU foam to expand and produce a stiff wall.

### **Rigid polyurethane foam:**

Rigid polyurethane foam with Free rise density (ASTM D 1622-63) of 25 kg/m<sup>3</sup> are considered in our design. The two component PU foam liquid is added in the ratio of 100: 120.

Each side of the containment (1.25mx1.25mx 15mm) will be provided with a PU foam pouch (Component A: component B – 290 gm: 350 gm). Detailed calculation for foam attached in excel

PVC tie - 16” length- PVC ties are used to locking the poles in position and tying the containment to the bamboo/casuarina pole

PVC tie - 6” length - PVC ties is used for tying the bamboo/casuarina pole support on top of the roof for safety purposes.





### **Part B: Interface**

SATO pan and SATO I trap have been used for our toilet system. I trap is connected to the containment using a PVC pipe.

SATO pan is fixed in position using concrete (1 cement: 1.5 sand:3 aggregate) with a smooth finish on the top. 25 mm thick concrete has been considered for fixing the pan and providing a smooth surface



## Part C: Superstructure

### PVC sheet:

Two layers of 100 micron PVC sheet are fused to the dimension of wall and roof with provision for filling the polyurethane foam liquid. Hard boards are fused in the PVC sheet itself for screwing the hooks for latch, SATO hand wash, solid waste disposable bag. The edges are provided with holes (25 mm dia) for tying the PU foam filled PVC sheet to the Bamboo/casuarina pole.

The PVC sheet acts as a containment for the rigid PU foam to expand and produce a stiff wall.

### Rigid polyurethane foam:

Rigid polyurethane foam with Free rise density (ASTM D 1622-63) of 25 kg/m<sup>3</sup> are considered in our design. The two component PU foam liquid is added in the ratio of 100: 120.

Each side of the superstructure and roof are provided with required quantities of PU foam in a pouch that can be mixed and poured readily. Detailed calculation for foam attached in excel

PVC tie - 20" length- PVC ties are used to lock the poles in position. The vertical and horizontal poles are held in position using these ties.

PVC tie - 6" length - PVC ties are used for holding the superstructure to the vertical poles.

### Fittings:

Door Hook are easy to screw to the board provided in the PVC sheet. The hooks are easy to operate even for children.



## **Installation overview**

1. PVC sheets are laid flat on a smooth ground surface with opening for PU foam filler on facing up.
2. PU foam pouches corresponding to each face of the wall/containment are identified.
3. PU foam pouch seal is broken by gentle squeeze. The reaction of Compound A & B will initiate which is poured inside the flat laid PVC sheet opening.
4. The PU foam liquid poured inside the PVC sheet is spread evenly. The PU foam will start expanding and form a rigid wall. Each wall can be prepared within 5 minutes
5. The same procedure is followed for the wall/roof of superstructure and containment.
6. The rigid PU foam walls are ready for erection.
7. Since the PVC sheet already comes with a pre- pressed fold it is easy to form the shape of superstructure/containment.
8. Traditional sato pan fixing of filling soil and providing 25mm thick concrete can be used.
9. The Hook for the door can be screwed to the board which is pre-moulded along with PVC sheet.
10. All the optional fitting like hand wash, solid waste disposal bag can be screw fixed to the board provision.

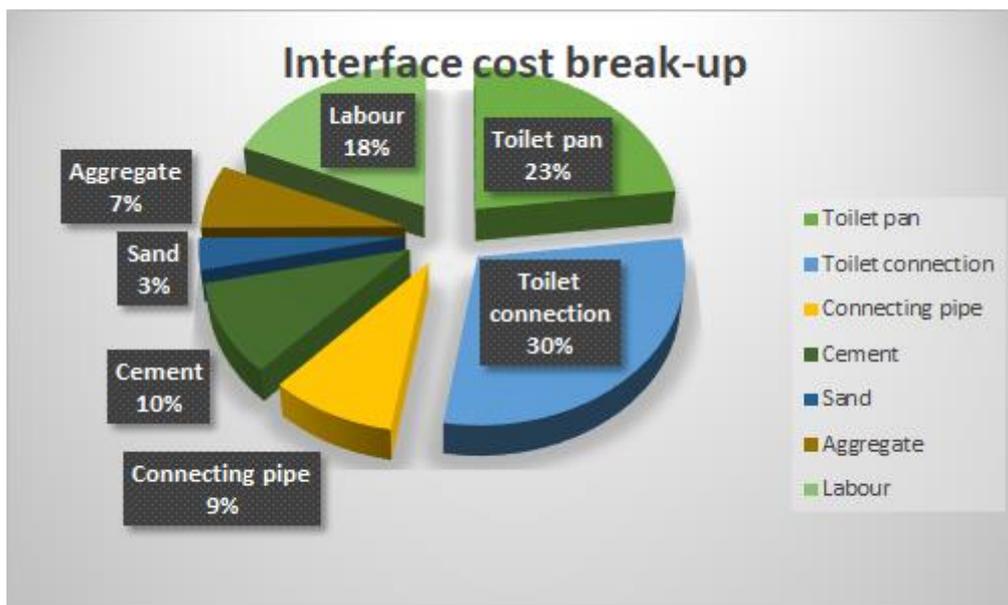
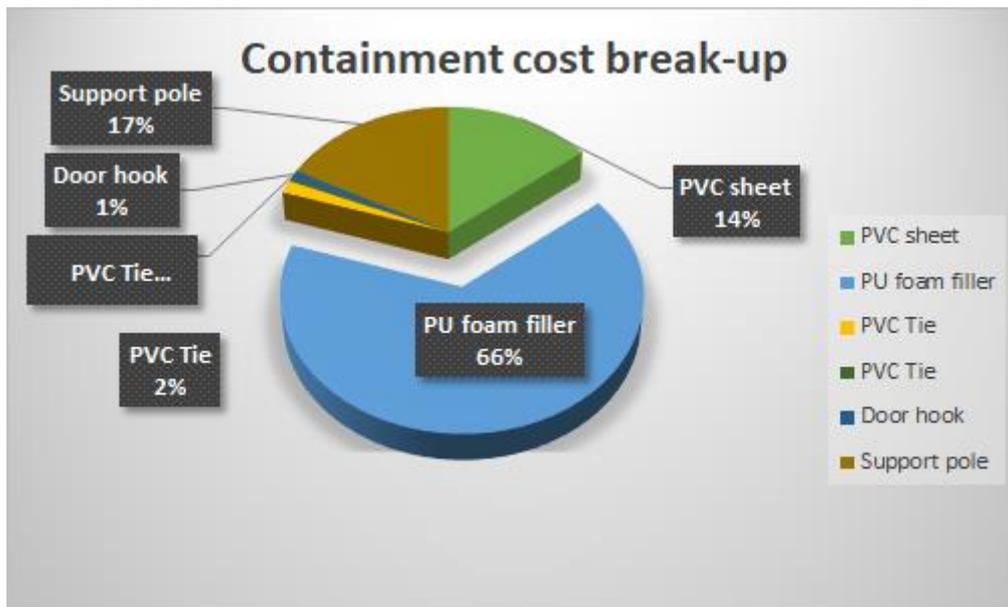
### Cost calculation:

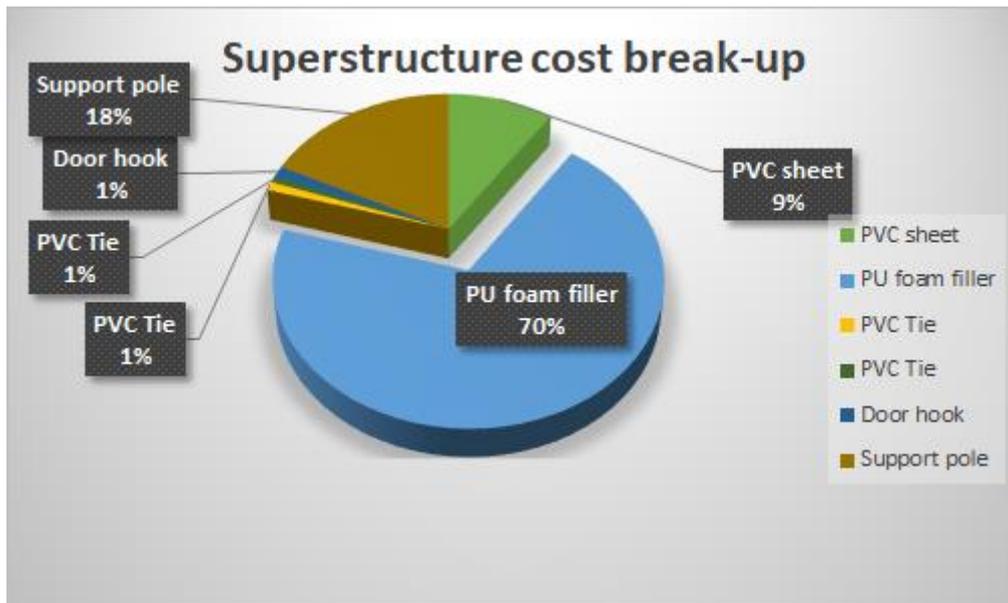
All the calculations are taken for Indian rupees value to provide exact cost. The same shall be considered for African value with some variation.

Total cost of our toilet system is Rs. 3718.10/-. Detail calculations are provided in the excel sheet attached with the solution.

The cost break up is as follows:

1. Containment - Rs. 1052.20/-
2. Interface- Rs. 1083/-
3. Superstructure- Rs. 1582.90 /-





**Conclusion:**

A best solution satisfying all the requirements of a family toilet has been obtained in a cost-effective way. Further improvement can be done and cost can be brought down if PVC sheet, SATO pan and PU foam filler are procured in large quantities.