

ANAEROBIC BIO DIGESTER TOILETS, THAKAR EQUIPMENT COMPANY

- **Background**

Thakar Equipment Company (TECO) has developed a **bio-digester toilet** for areas where municipal water, sewage and electricity are absent. The faeces of human beings contain 93-95% water and 5-7% solids. The solids get absorbed by the bio-digester, leaving pathogen-free water and traces of methane gas. The safe pathogen-free water is discharged into the earth, leaving no smell and no maintenance for removal of faeces. They have designed and developed Household Anaerobic Bio Digester Toilets and pathogen free water discharge water in lab tests.

- **Location, Date**

Haryana and Delhi, 2015

- **Areas**

Rural

- **Stage/Scale**

Pilot Stage

- **Objective of the assignment**

TECO is striving to recycle the waste water to be pathogen free, clear and transparent for cabin wash, anal and hand wash to complete Water, Sanitation and Hygiene (WASH) cycle and facilitate menstrual hygiene management within the toilet cabins.

- **What was done**

The TECO has solved the problems of unavailability of running water or underground sewerage connection through its toilets. These toilets are comfortable to use, easy to keep clean, do not have bad odour or stench, require little water for self-washing and cabin cleaning and are attractive to the eye. The anaerobic bacteria consume the faecal solid matter as it's food and gives out water and traces of methane. The output water is treated for reuse as horticulture water and is free of pathogens. By letting it seep into the earth, ground water resources such as wells and hand pump reservoirs are not contaminated which happens with brick and mortar pit latrines. The toilet prototyping work is over. It has been tested in 3 different locations for over 650 days by 3-5 users per day. There is very little sludge that needed to be removed and as such this toilet helps stop manual scavenging. The Proof of Concept stage of the project is also complete. An initial marketing effort to seed 5 more toilets in a village in Haryana is almost complete. Parallel to this, effort is getting the product design and engineering done for reducing cost by large scale manufacture. This is targeted for completion by end of August 2017.

- **"Nirgandh" Bio Standard**

The bio toilet tank is in cement concrete with a capacity is 700 litres. The floor is in cement concrete as well with a fiberglass squatting type toilet bowl. The superstructure

is made up of mild steel pipes with fiberglass panels and has a door. It can serve 4-7 users per day. It is equipped with a separate water tank of 30 litre capacity and has a foot operated water spout for hand wash. A basin can be provided outside the toilet as an accessory. The floor and toilet pan can be washed easily.

- **"Nirgandh" Bio Deluxe**

The bio toilet tank is in fiberglass and has a capacity of 1000 litres. The floor is in stainless steel with an injection moulded imported SaTo toilet pan with a counter weighted lid over the discharge pipe in the squatting type toilet bowl. The superstructure is a foldable Nylon tent-like structure. The toilet can serve up to 6-10 users per day. A separate water tank of 30 lit capacities with foot operated water spout for hand wash is present and a basin can be provided inside the toilet as an accessory, if necessary. The floor and toilet pan can be washed easily.

- **"Nirgandh" Bio Premium**

The bio toilet tank is in fiberglass and has a capacity of 700 litres. The floor is in stainless steel with an injection moulded imported SaTo toilet pan with a counter weighted lid over the discharge pipe in the squatting type toilet bowl. The superstructure is made up of stainless steel pipes with poly carbonate panels and aluminised plastic door. It can serve 4-7 users per day. A separate water tank of 30 lit capacities with foot operated water spout for hand wash and a basin for water conservation can be provided inside the toilet as an accessory. The floor and toilet pan can be washed easily.



- **"Nirgandh" Basic**

The framework of the base is in mild steel with PVC covering. The floor is in stainless steel with an injection moulded imported SaTo toilet pan with a counter weighted lid over the discharge pipe in the squatting type toilet bowl. The superstructure is a foldable Nylon tent-like structure. The toilet can serve limitless users per day. A separate water tank of 30 lit capacities with foot operated water spout for hand wash and a basin for water conservation can be provided inside the toilet as accessories. The floor and toilet pan can be washed easily.

• Impact

The solution is likely to help overcome competition from brick and mortar toilets which take about one month to construct. The requirement of large quantities of water is eliminated and there is no problem of contamination.

• Challenges and Issues

- The initial price of the ready to assemble and use toilets is very competitive with the brick and mortar toilets. The product is about 30% more expensive. However, the cost of ownership over the life of the toilet of 10 years is considerably less by about 10% as maintenance costs are lower.
- Drawing work is being done to incorporate changes in design to meet customer expectations in use of the product. Research is also being conducted to simplify the process of removing pathogens from the output water.

• Innovation

The toilets are factory made in plastics, packed together as sub-assemblies which can be assembled at site with no tools and little skill in a matter of hours and put to use almost immediately.

• Lessons learnt

TECO was one of the top-10 finalists in the Bill and Melinda Gates and BIRAC's Reinvent the Toilet India Challenge in 2013-14. Despite not being awarded the grant; he continues to do his bit to help make India open defecation free. There are financial problems, but the team continues working for a better world sanitation.

• Financials

- **"Nirgandh" Bio Standard:** The price ranges from INR 19000 to INR 27000.
- **"Nirgandh" Bio Deluxe:** The price ranges from INR 20000 to INR 28000.
- **"Nirgandh" Bio Premium:** The price ranges from INR 40000 to INR 48000.
- **"Nirgandh" Basic:** The price ranges from INR 12000 to INR 20000.

• Economic sustainability/Revenue Model

TECO is exploring methods of funding further work in product research, development of a team and market seeding.

• Implementer Contact Persons

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• Sources and References

- <http://sanitation.indiawaterportal.org/english/node/3970>
- <https://www.f6s.com/nirgandhtoilets>
- <https://www.linkedin.com/pulse/open-defecation-free-india-madhu-thakar?trk=mp-reader-card>
- <http://sanitation.indiawaterportal.org/sites/default/files/attachment/Nirgandh-Eco%20friendly%20toilets.pdf>