A simple Guide for the construction of “Affordable & Cost effective” Sanitary Latrine
Acknowledgement

Author

Mr. Arumugam Kalimuthu, B.E., M.Sc (London), (M.B.A).
Technical Advisor - Water Supply & Environmental Sanitation
Plan International (India), New Delhi &
Chairperson - Water and Environmental Sanitation Network
(WES-Net India)

Edited by

Ms. Verity Corbett
Programme Support Manager
Plan International (India), New Delhi

Pictures Drawn

Children in the Tsunami affected area
C. Ashok Kumar (16), V. Selvavizhi (16)
Manivannan (14), V. Jeyaveni (15)
Nagapattinam District, Tamilnadu, India.

Design and development

Mr. L. Peter
Executive Secretary,
Rural Education and Action for Liberation (REAL)
Dindigul, Tamilnadu.

Facilitation artist

Mr. A.J. Kennedy, Drawing Master,
Dindigul, Tamilnadu.

Printer

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FOREWORD

I am happy to introduce three booklets, “A simple guide for the construction of affordable and cost-effective sanitary latrines”, “A simple guide on better water quality for better health” and “A simple guide to EcoSan”.

I hope these guidebooks will help field level functionaries, school teachers, anganwadi and village level health workers to promote safe and sustainable water and sanitation systems and inculcate good hygiene practices in rural communities.

New Delhi,
March 12, 2008.

[Santha Sheela Nair]
Plan India

E-12, Kalkaji Colony, New Delhi-110018
Ph.: +91-11-4650848, Fax: +91-11-46508443
E-mail (i) : planindia@plan-international.org
E-mail (ii) : India.co@plan-international.org
www.planindia.org, www.plan-international.org

Foreword

It is a well known fact that 80% of the most common diseases are related to water and sanitation. Every day, about 1000 children die in India due to diarrhea and globally 4000 children die per day. Preventing contamination of the drinking water sources and adopting good hygiene practices will help the communities to be healthy. Promoting cost effective and eco-friendly sanitation services, and continued monitoring of the drinking water quality, especially in the rural villages and urban slums are very important to prevent diseases. I am sure the guide books on “Construction of cost effective Sanitary Latrine”, “EcoSan construction” and “Better Water Quality for Better Health” would be of great use to the people who are actively involved in promoting water and sanitation interventions, especially at the grass root level.

Place: New Delhi
Date: 17th March 2008

Benedikt Wagner
Country Director

Children are at the heart of everything we do.

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If your answer is “Yes”
A leach pit toilet would serve your needs ...

The procedure for construction of single leach pit pour flush toilet is very simple ...
just follow the steps narrated in the booklet ...

*Village/Area prone to water logging/shallow water table is usually situated in coastal belt, perennial riverbanks and valleys. In the project site, if the water level in a bore well/open well is less than 10 ft, it can be considered as water logging/shallow water table area. In such location, avoid leach pit toilet construction and promote EcoSan.
Let us understand various parts (components) of a single leach pit pour flush toilet

- Ventilator
- Superstructure
- Door
- Pan with P-trap
- Leach Pit
- Weep holes/Honeycomb
- Cover Slab
- Runoff Buffer
- Stoneware pipe (slope 1:12 cm)

Site Selection

**Proximity:** As far as possible, the toilet should be located very near the house/residence for convenience. As shown in the figure, using an existing wall of your house would reduce construction cost.

**Site condition:**

Avoid construction of leach pits in low-lying areas to prevent runoff water entering the leach pit.
Permissible safe distance:
Maintain a safe distance between leach pit and drinking water sources.
Though safe distance between a leach pit and drinking water (ground water) sources varies from soil to soil, as a rule of thumb...

Horizontal distance between the leach pit and water source can be 9 times the depth of leach pit (or approximately 40 feet).
Vertical distance between the leach pit bottom and ground water table should be 3 times the depth of leach pit (or approximately 15 ft).

Fixing the right dimensions
Depending on space availability around your house and what you can afford, decide whether to construct just a toilet or bath with attached toilet for the sake of convenience.

Suggested size for only a toilet:
Leach pit inner diameter: 3ft. and height: over 6ft.
Basement inner size: 3'6“ x 3'6” (refer design)
Leach pit inner diameter: 3ft.; Leach pit height: over 6ft.; Basement size: 7ft x 4ft (refer design).

Fixing the layout & earth work

After marking, excavate the soil for the basement foundation and leach pit 1½ ft. deep. Pit depth can be over 6 ft.

Using lime powder, mark the layout on the ground before earthwork.
Construction of basement & lining of leach pit

Use locally available construction materials for the basement and leach pit lining construction - mud or cement mortar can be used.

Materials normally used for basement construction are:
- Rough stone/boulders
- Brick/fly ash brick
- Hollow blocks/solid blocks

Materials that can be used for leach pit lining include:
- Rough stone/boulders
- Brick/fly ash brick
- Cement/ferrocement rings
- Bamboo mats etc.
While constructing the leach pit, take care of the following:

- Weep holes or honeycomb arrangements in the lining of leach pits are to be made only below the topsoil level.
- The lining of the leach pit should be sealed completely by top soil if the formation is loose (max. up to 2 feet).
- Raise the lining 3-6 inches above ground level to prevent runoff entry into the leach pit.
- Soil/stoneware pipe from the P-trap should extend well inside leach pit (minimum of 3 inches projection)
- Leach pit should be covered with RCC or ferrocement slab and sealed thoroughly.
- Do not provide a vent pipe to the leach pit like septic tanks.

Selection of Pan

There are two types of Indian water closets (pans) available in the market (footrest attached and without footrest attachment)

- Use a pan with the footrest attached to avoid construction faults wherever possible.
- For children toilets use small pans (20 inches size)
- For the convenience of physically challenged people use western type pans.

Various types of pans such as ceramic, mosaic, micro concrete and fibre/plastic are available in the market.
Step 6

Placing Pan, P-trap (water seal) and stoneware pipe

Assembling of pan, p-trap and stoneware pipe is an important part of toilet construction. Use a spirit level to carefully level the pan and fix the P-trap to it. Fix the pan in such a way that the back edge of the pan is located at a distance 9 inches from backside wall of the toilet.

Step 7

Sealing of joints

The joints between the pan & p-trap and p-trap & stoneware pipe should be sealed properly to prevent any leakages. Wet cloths/gunny bags dipped in cement slurry can be used to seal these joints.

After fixing and sealing the joints, fill the basement with brick ballast and sand. Ensure tight packing around the pan assembly.
While fixing the basin, proper alignment is essential. Avoid following mistakes.

- **Very close to back wall**
- **Very close to door**
- **Reversal**
- **Right set-up**

Similarly, if you are fixing the footrests yourself, avoid the following construction faults.

- **Fixing the footrest wrongly makes use uncomfortable.**
Superstructure construction

Depending on what you can afford, select the right materials for the superstructure construction. Materials such as thatch, palm leaf, reeds, fertiliser/gunny bags, hollow blocks, solid blocks, bricks, ferrocement slab, etc., can all be used.

If your area receives normal rainfall and has no high raised buildings surrounding your toilet, roof cover for the toilet is not really necessary.
How to use your toilet

Before use, pour a litre of water to wet the pan.

Position yourself properly over the pan.

After defecation, flush the toilet. Ensure Feacal matter passes into the water seal.

Wash your hands using soap, ash or mud.

Keep your toilet neat & clean.

After use, keep the toilet door shut.

Please note

Do not put a vent pipe on your leach pit. The vent pipe is only needed for septic tanks and not for leach pits.

A deeper leach pit lasts longer than the shallow pit, it is advisable to go for a deeper pit (over 6 ft.)

A leach pit model is not advisable for water logged or water scarcity areas. In such conditions, eco-san is a preferable design.
The construction materials required up to basement level for single toilet unit are:

<table>
<thead>
<tr>
<th>Component</th>
<th>Materials Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leach pit</td>
<td>Using cement rings: 6 rings of 3 ft. diameter and 1 ft. height (or)</td>
</tr>
<tr>
<td></td>
<td>Using honey comb brick construction:</td>
</tr>
<tr>
<td></td>
<td>225 bricks, 15kg cement and 0.7 cft. sand</td>
</tr>
<tr>
<td>Leach pit</td>
<td>6mm rod (steel) - 5kg, binding wire,</td>
</tr>
<tr>
<td>cover slab</td>
<td>cover slab cement 14kg, sand 0.7 cft and</td>
</tr>
<tr>
<td></td>
<td>broken stone chips 1.41 cft.</td>
</tr>
<tr>
<td>Basement</td>
<td>550 bricks, cement 40 kg, 15 cft</td>
</tr>
<tr>
<td></td>
<td>Basementsand, 3.50cft brick ballest, 1 pan,</td>
</tr>
<tr>
<td></td>
<td>1 p-trap and 1 stoneware pipe.</td>
</tr>
</tbody>
</table>

Cost Estimate

Since materials cost varies from place to place, no cost details are incorporated in this booklet. Experience shows that a bath attached, thatched superstructure model costs around Rs.1,250/- and bath attached hollow block model costs around Rs.2,500/-
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