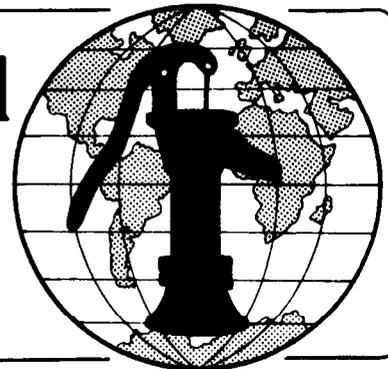


# Water for the World



## Constructing Compost Toilets Technical Note No. SAN. 1.C.6

A compost toilet consists of a pair of waterproof vaults that receive excreta, ashes, sawdust, straw, and grass. Each vault is equipped with a slab for defecating, a rear opening for removing compost, and a hole for a vent pipe. Constructing a compost toilet involves assembling all necessary labor, materials, and tools; building a base and double vault from concrete or brick and mortar; and installing vent pipes, covers for the rear openings, and a pair of slabs.

With careful maintenance, a properly constructed compost toilet can last 10-20 years or more. This technical note describes each step in constructing a compost toilet. Read the entire technical note before beginning construction.

### Useful Definition

**COMPOST** - A dark, fairly dry, crumbly, odorless material that is produced by sealing excreta, ashes, woodchips, straw, and vegetable wastes for 6-12 months in the vault of a compost toilet. Compost can be used to fertilize crops.

### Materials Needed

The project designer must provide three papers before construction can begin:

1. A location map similar to Figure 1.
2. Design drawings similar to Figure 2.
3. A detailed materials list similar to Table 1, showing all necessary labor, supplies, and tools.

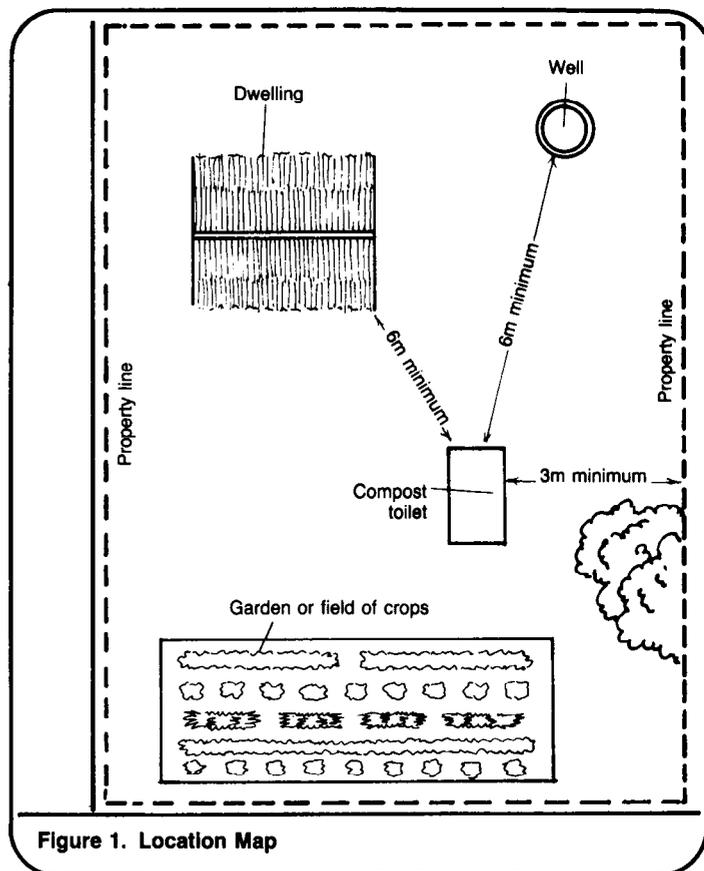


Figure 1. Location Map

### Construction Steps

Depending on local conditions, availability of materials, and skills of workers, some construction steps will require only a few hours, while others may take a day or more. Read the construction steps and make a rough estimate of the time required for each step. Draw up a work plan similar to the sample shown in Table 2. You will then have an idea of when specific laborers, materials, and tools must be available during the construction process.

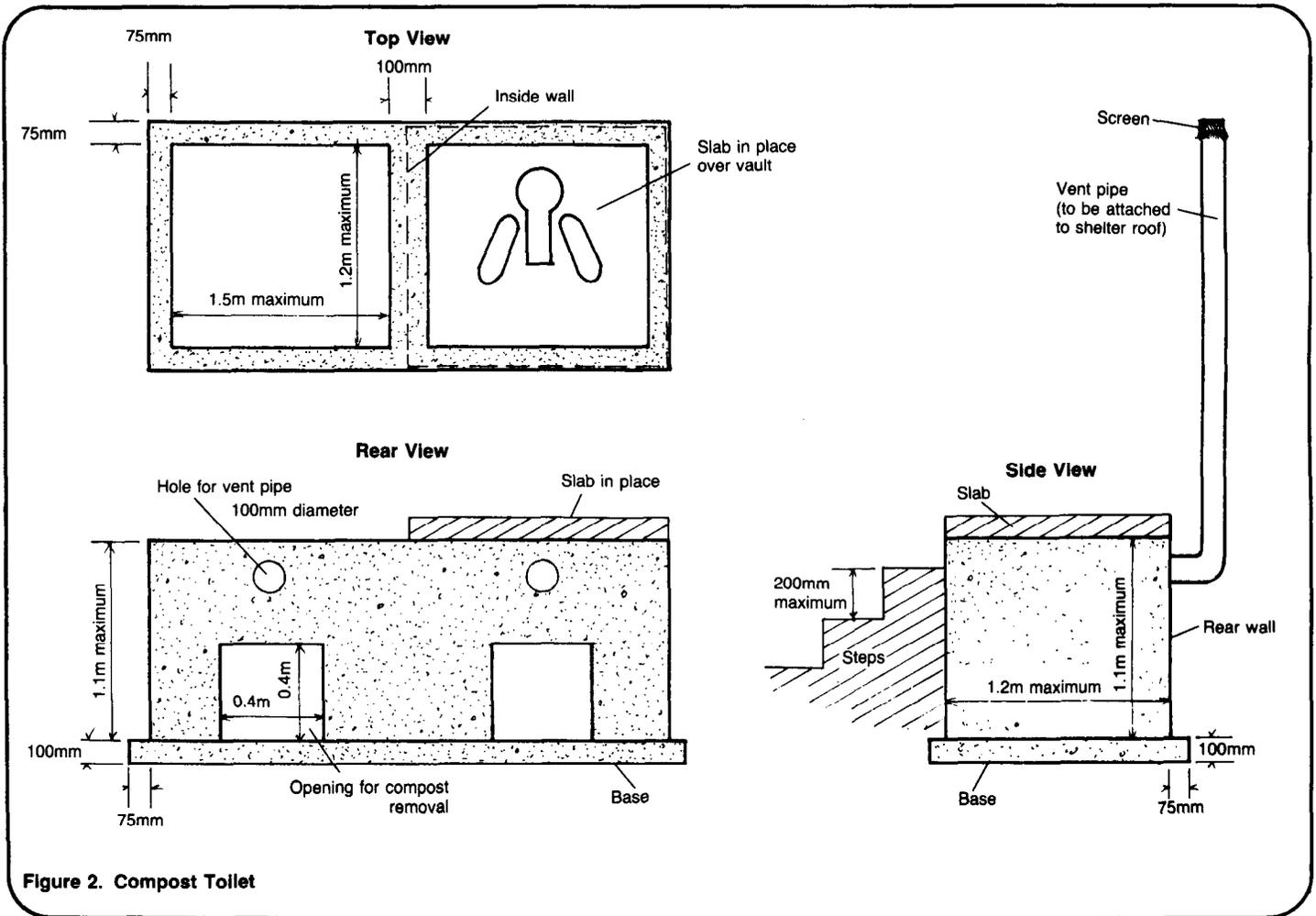


Figure 2. Compost Toilet

Table 1. Sample Materials List

Item	Description	Quantity	Estimated Cost
Labor	Foreman	1	—
	Laborer (skilled with concrete)	1	—
	Laborer (unskilled)	1	—
Supplies	Wood (for forms)	—	—
	Nails (for forms)	—	—
	Cement (Portland)	—	—
	Sand (clean, sized fine to 6mm)	—	—
	Gravel (clean, sized 6-25mm)	—	—
	Water (clear)	—	—
	Reinforcing material	—	—
	Squatting slabs	—	—
	Vent pipes (with screens)	—	—
	Tin sheets (to cover rear wall openings)	—	—
	Other	—	—
Tools	Measuring tape	1	—
	Hammer	1	—
	Saw	1	—
	Shovels	2	—
	Trowel	1	—
	Container for mixing concrete	2	—
	Carpenter's level or equivalent (optional)	1	—
	Carpenter's square or equivalent (optional)	1	—
	Tar or equivalent (for sealing covers over rear openings)	—	—
	Other	—	—

Total Estimated Cost = —

For a concrete compost toilet:

1. Assemble all laborers, materials, tools, and drawings needed to begin construction. Study all drawings carefully.

2. Prepare the site shown on the location map by removing vegetation and rocks and raking the ground smooth. Build forms for the base. See Figure 3.

3. Mix the concrete to the correct proportions. A common mix by volume is one part cement to two parts sand to three parts gravel and enough water to make a fairly stiff mix. Mix until sand and gravel are evenly coated with cement and water.

**Table 2. Sample Work Plan for Building a Concrete Compost Toilet**

Time Estimate	Day	Task	Personnel	Tools and Materials
1 hour	1	Prepare site	Foreman; worker	Location map, measuring tape, design drawings, rake
1 hour	1	Build forms for base	Foreman; worker	Wood, nails, hammer, saw
1 hour	1	Mix concrete	Foreman; 2 workers (one skilled with concrete)	Wheelbarrow, 2 shovels, hoe, cement, sand, gravel, water
2 hours	1	Pour concrete into forms; smooth surface; cover	Foreman; 2 workers (one skilled with concrete)	Reinforcing material, trowel, wet straw
----	2-5	Keep moist	----	----
1 hour	6	Remove cover material and forms	Foreman; worker	2 hammers
3 hours	6	Build forms for walls	Foreman; 2 workers (one skilled with concrete)	Wood, nails, hammer, saw, 2 sections of vent pipe
1 hour	6	Mix concrete	Foreman; 2 workers (one skilled with concrete)	Wheelbarrow, 2 shovels, hoe, cement, sand, gravel, water
2 hours	6	Pour concrete into forms; smooth surface; cover	Foreman; 2 workers (one skilled with concrete)	Reinforcing material, trowel, wet straw
----	7-10	Keep moist	----	----
1 hour	11	Remove cover material and forms	Foreman; worker	2 hammers
2 hours	11	Seal bottom edges of walls with mortar	Foreman; 2 workers (one skilled with concrete)	Wheelbarrow, 2 shovels, trowel, cement, sand, water
2 hours	11	Mortar slabs in place	Foreman; 2 workers (one skilled with concrete)	Wheelbarrow, 2 shovels, trowel, cement, sand, water, 2 squatting slabs
1 hour	11	Cover openings in rear wall	Foreman; worker	Tin sheets, tar
3 hours	11	Build steps	Foreman; 2 workers	Wood, hammer, saw, nails
----	12-13	Build privy shelter	Foreman; 2 workers	See "Constructing Privy Shelters," SAN.1.C.3. for details
2 hours	14	Install vent pipes	Foreman; 2 workers	100mm diameter galvanized metal pipe, metal bands, fly-proof screen
½ hour	14	Cover one squatting slab hole	Foreman; worker	Tin sheet, heavy rock

4. Pour in concrete until the forms are about half full, lay in reinforcing material (steel rods, wire mesh, bamboo strips, or equivalent), and pour in concrete until the forms are full. Smooth the surface with a trowel.

5. Cover the fresh concrete with wet straw, burlap bags, or equivalent and keep moist for three to seven days. See Figure 3.

6. Remove the cover material and forms from the base. Build forms for the vault walls. Build an opening in the rear wall of each vault for compost removal. Set a section of vent pipe into the rear forms for installation of the vents. Secure reinforcing material in place inside the forms. Brace the forms to be certain that they hold together when the concrete is poured. See Figure 4.

7. Pour concrete into the wall forms. The concrete must completely fill the forms. Use a steel rod or stout stick to work concrete between the reinforcing materials and the forms. Smooth the tops of the walls with a trowel. See Figure 5a.

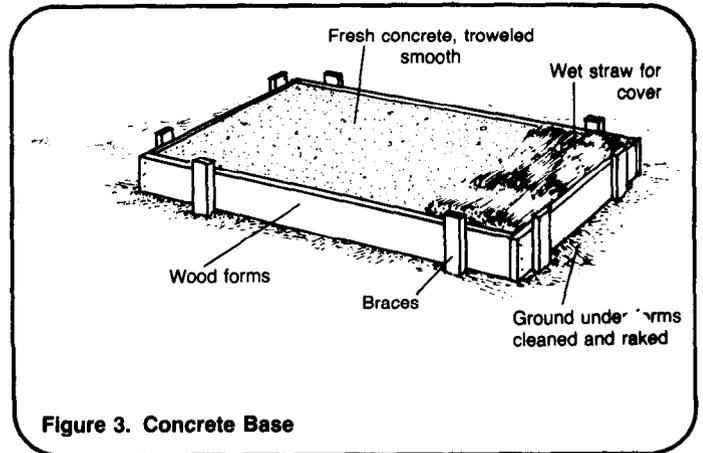


Figure 3. Concrete Base

8. Cover the fresh concrete with wet straw, burlap bags, or equivalent and keep moist for three to seven days.

9. Remove the cover material and forms from the walls. Seal the bottom edges of the walls, inside and outside, with cement mortar made with one part cement to three parts sand and enough water to make a workable mix.

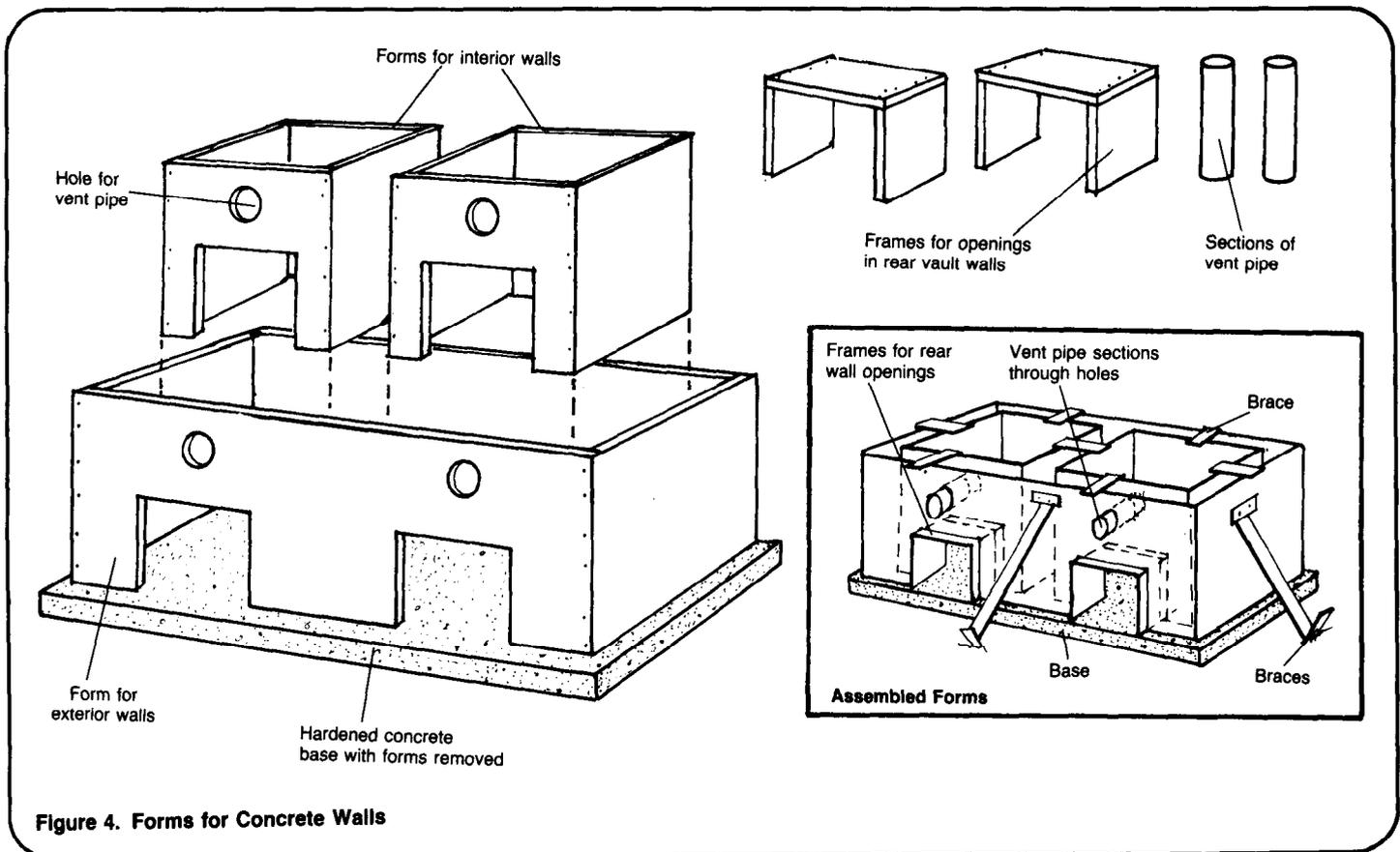
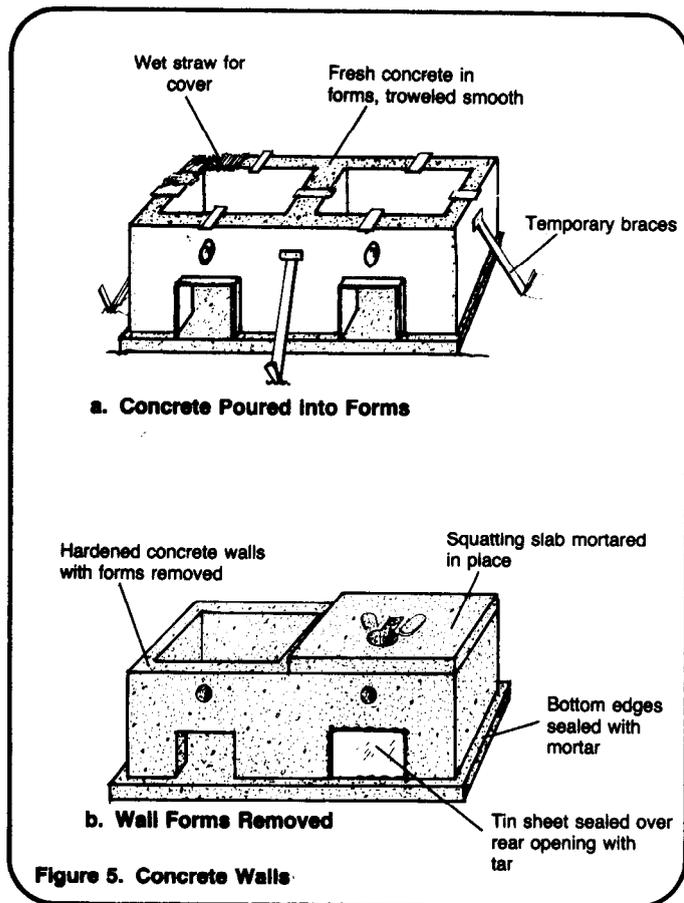


Figure 4. Forms for Concrete Walls



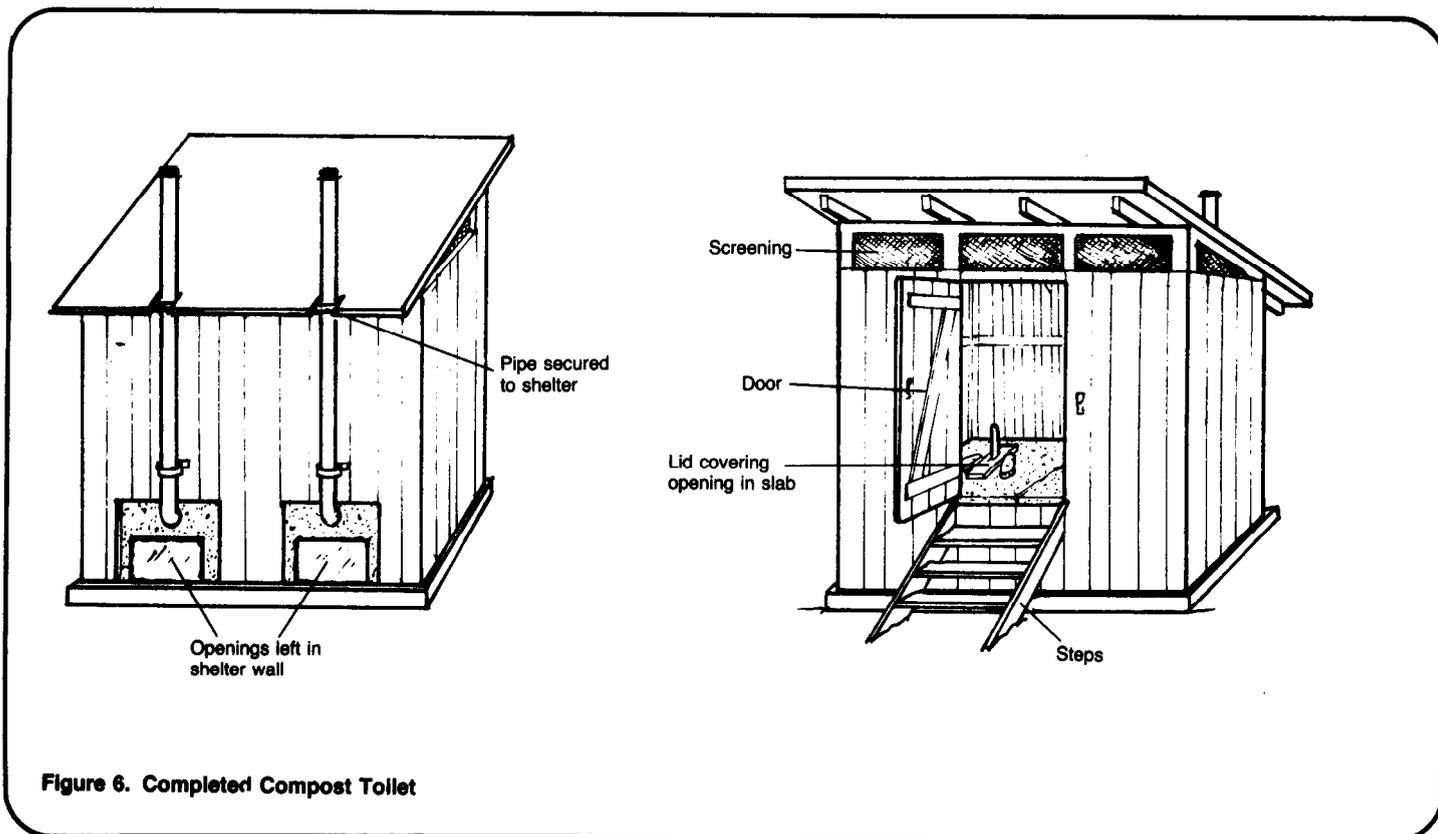
10. Cover the rear openings and seal with tar or equivalent. Be sure that the cover is several inches larger than the opening and that the opening is flush on all sides. This will help ensure the tar seal is strong enough to hold the weight of the accumulating compost. Do not use cement to seal the covers because eventually they will have to be removed. The covers may also need to be braced.

11. Mortar the squatting or sitting slabs in place. See Figure 5b.

12. Build steps leading up to the toilet. Use bamboo, wood, bricks, or other local material. Be certain each step is no higher than 200mm.

13. Build a shelter, see "Constructing Privy Shelters," SAN.1.C.3.

14. Install the vent pipes and secure them to the rear wall or roof of the shelter. See Figure 6.



15. Build a heavy lid to cover one squatting slab hole to prevent its use until the proper time. The lid can be concrete, or it can be wood or metal with a heavy rock on top. Set the lid in place.

For a brick and mortar compost toilet:

1. Assemble all laborers, materials, tools, and drawings needed to begin construction. Study all drawings carefully.

2. Prepare the site shown on the location map by removing vegetation and rocks and raking the ground smooth.

3. Build the base from bricks and mortar. A common mortar mix is one part cement to three parts sand and enough water to make a workable mix.

4. Plaster the top of the base with a 12-25mm thick layer of cement mortar. Smooth with a trowel, cover with wet straw, burlap bags or equivalent, and keep moist for one to three days. See Figure 7.

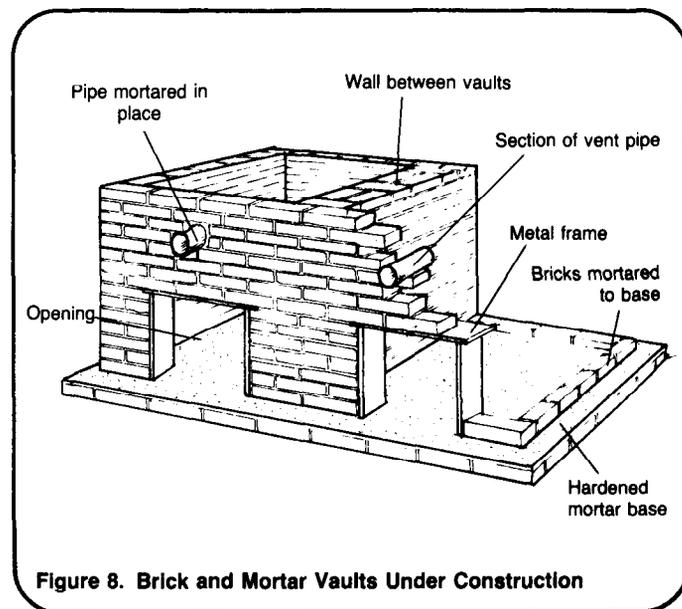
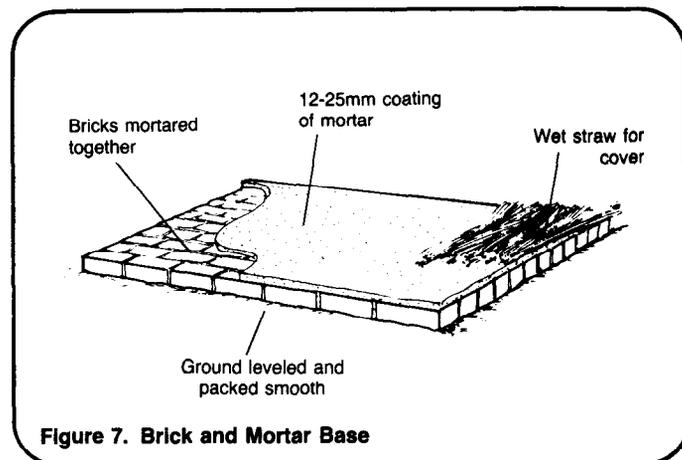
5. Remove the cover material and begin laying up the walls, including the wall between the vaults. Build and install frames for the rear wall openings. Rust-proof metal is the best frame material, but wood, bamboo, or other local material can be used. See Figure 8.

6. When the walls are 200-300mm short of their designed height, mortar sections of the vent pipe in place, lay bricks around the sections, and continue laying up the walls to their designed height. See Figure 8.

7. Fill in any holes or openings in the top course of bricks with cement mortar. Allow one to three days for the walls to set.

8. Coat the insides of the walls with 12-25mm of cement plaster. Seal the bottom edges of the walls, inside and outside, with cement plaster. See Figure 9.

9. Follow steps 11-15 for a concrete compost toilet. See Figure 6.



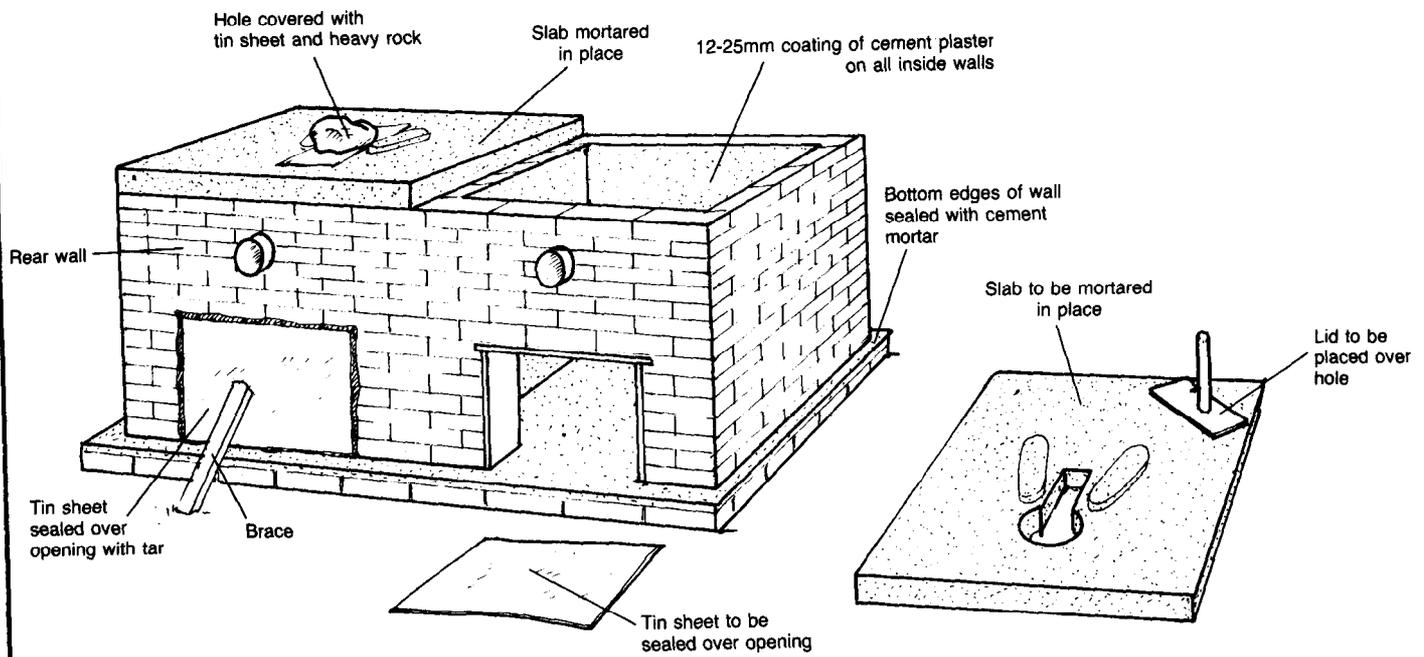


Figure 9. Brick and Mortar Walls Completed