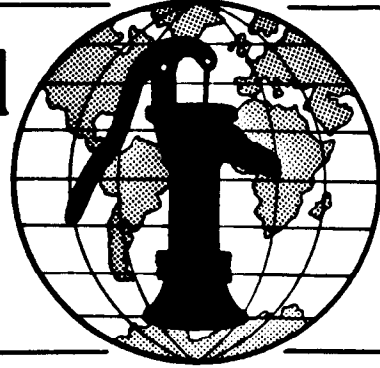


Water for the World



Constructing Slabs for Privies

Technical Note No. SAN.1.C.1

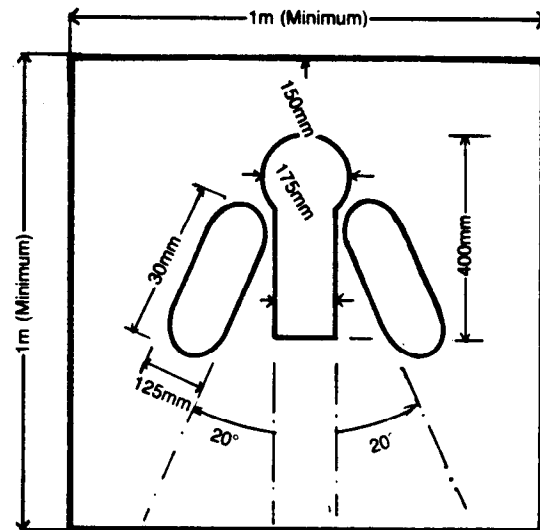
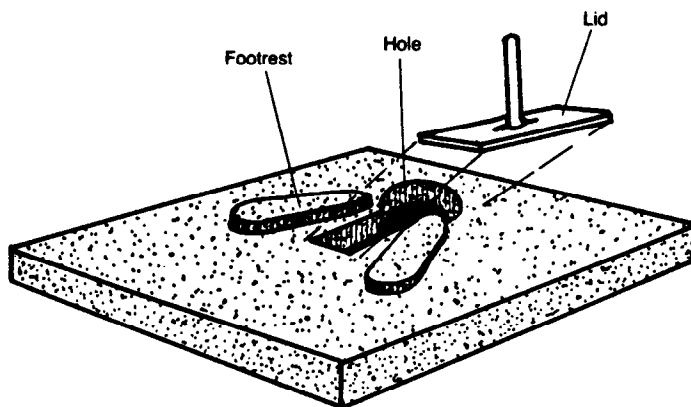
The slab is the floor of the privy. It covers the pit and has a hole through which to defecate. Constructing a slab involves assembling materials, tools, and labor, and building either a squatting slab or a sitting slab (seat and pedestal) to the correct dimensions. It may also involve building a cover for an off-set pit and building or installing improvements (vent pipe, pour-flush bowl, or chute).

This technical note describes each step in constructing a slab. Read the entire technical note before beginning construction.

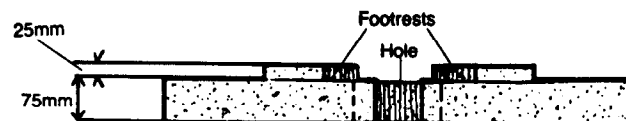
Materials Needed

The project designer must provide several documents before construction can begin:

1. Technical drawings similar to Figures 1-9, showing correct dimensions of the slab, lid, pit cover (if off-set pit), and any improvements;
2. Materials list, similar to the sample shown in Table 1, noting all supplies, tools, and labor needed to construct the slab.

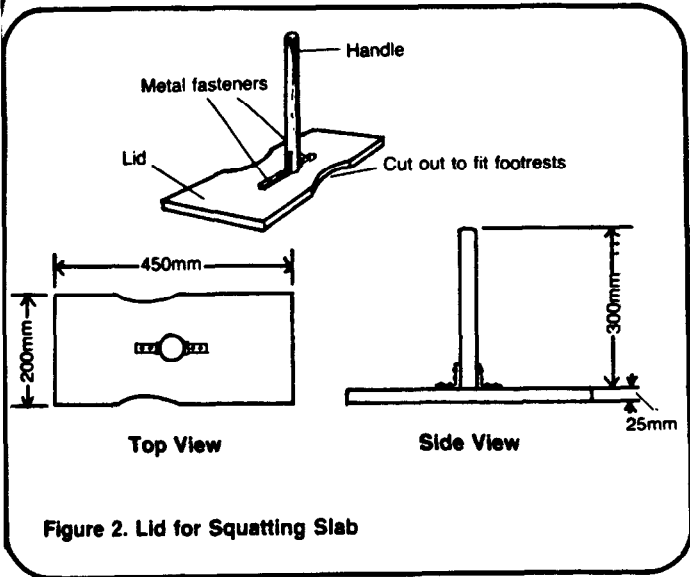


Top View



End View

Figure 1. Squatting Slab

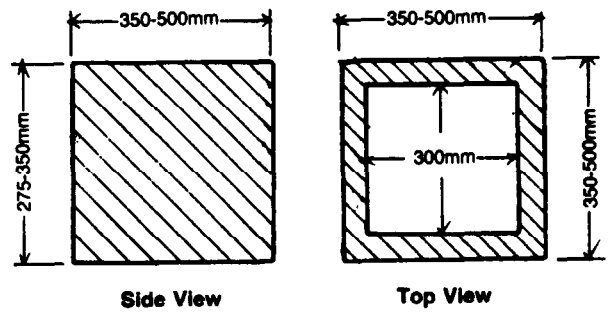
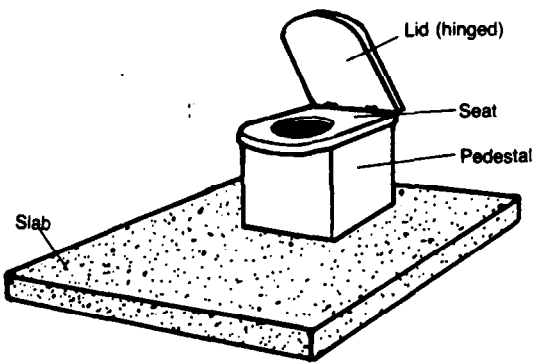


Caution!

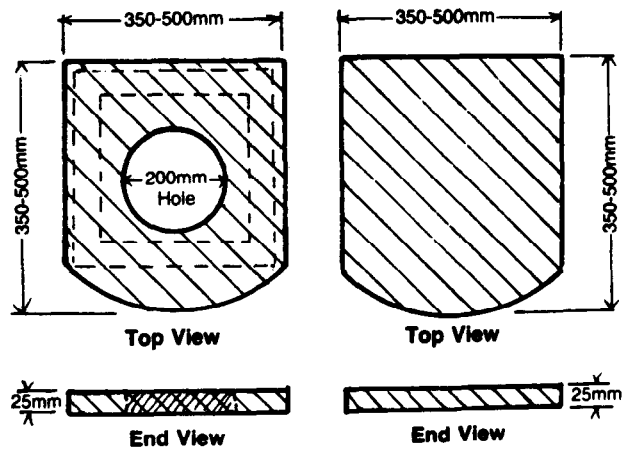
1. Wear gloves to prevent cuts when working with tin or galvanized metal sheets which may have sharp edges.

2. Pick up all metal scraps and nails after construction to prevent injuries to people walking barefoot in the area.

3. Avoid back and hand injuries when moving a completed slab into place. The slab may weigh over 180 kilos and will require four to eight men to move.



PEDESTAL



SEAT

LID
(Same dimensions as seat)

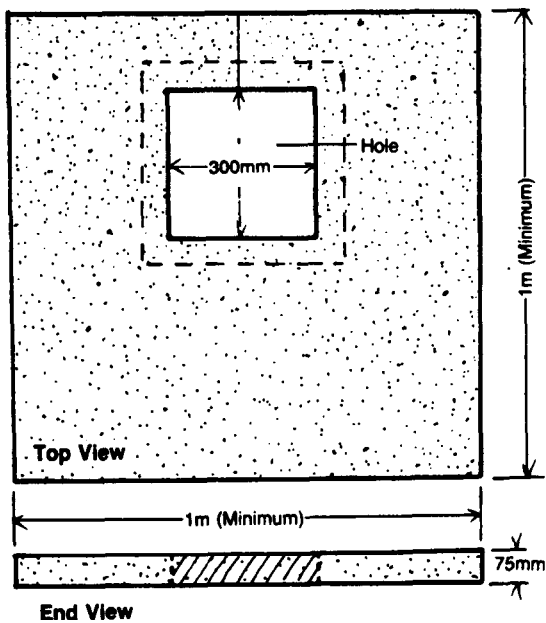


Figure 3. Sitting Slab with Pedestal, Seat and Lid

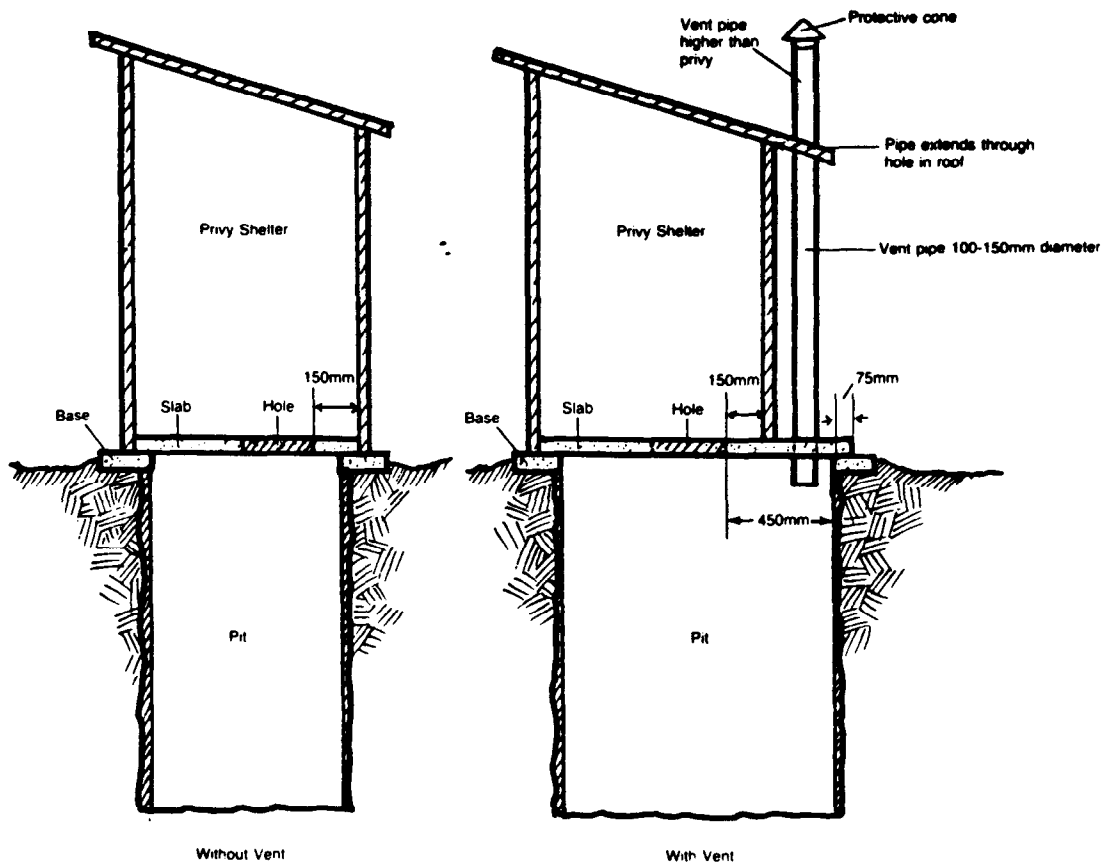


Figure 4. Comparison of Privies with and without Vent

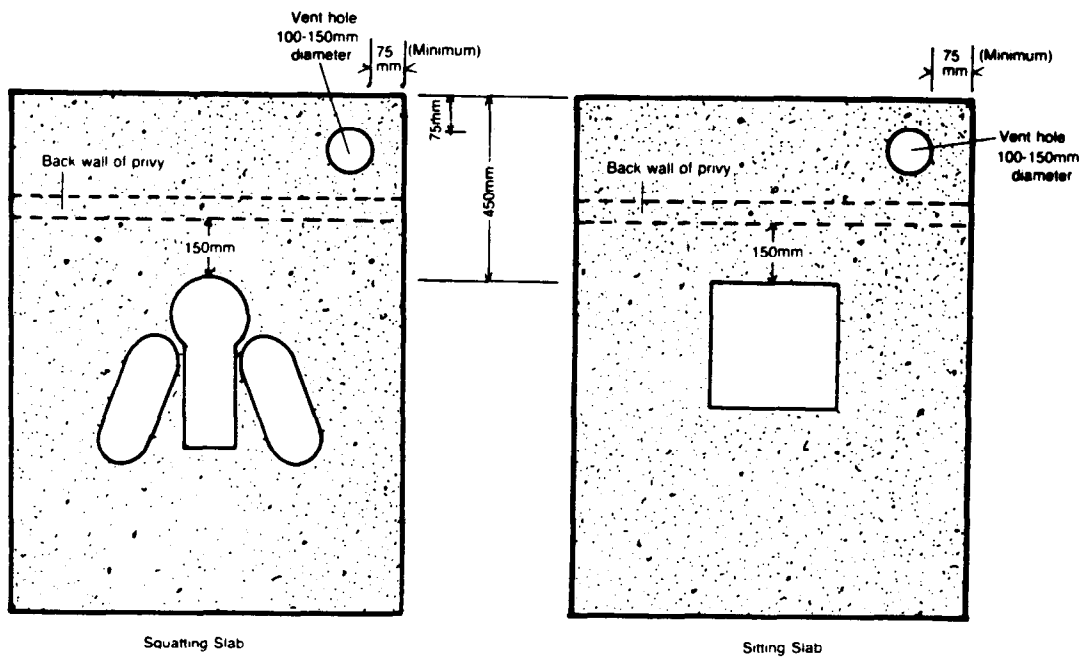
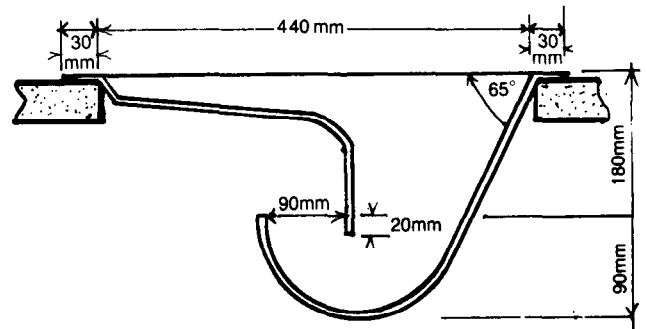
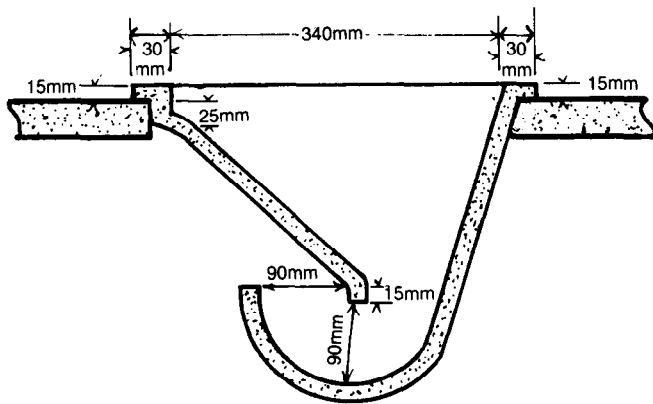
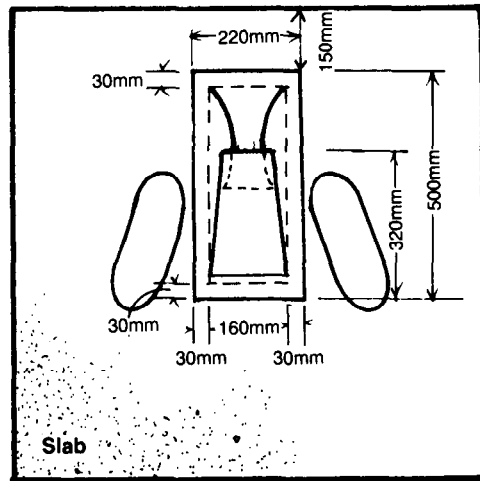
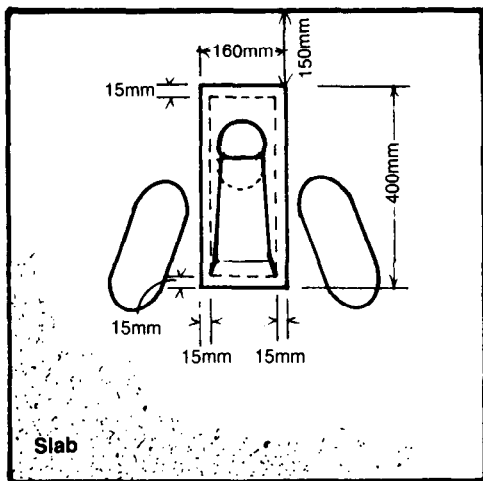


Figure 5. Top View of Slabs Showing Vent Hole Placement



a. Pre-cast Concrete

b. Galvanized Metal

Figure 6. Pour-Flush Bowls for Squatting Slabs

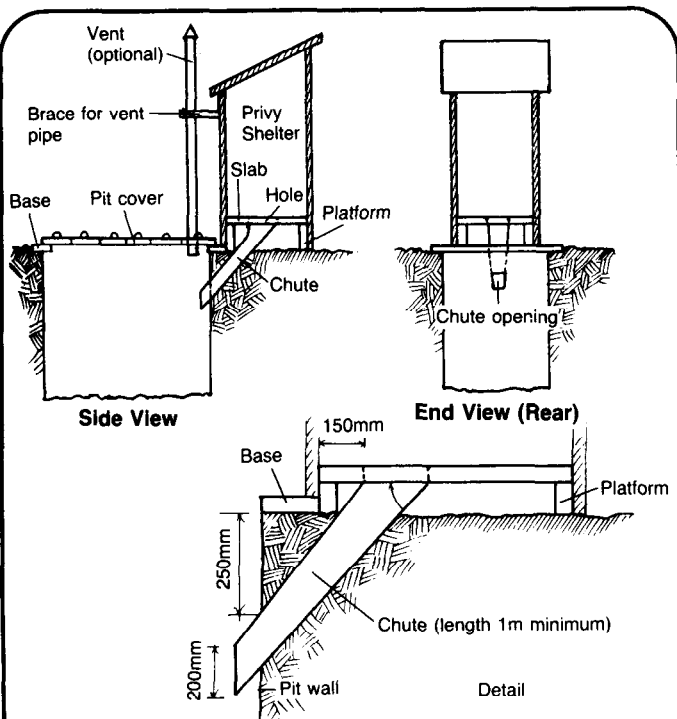


Figure 7. Off-Set Privy

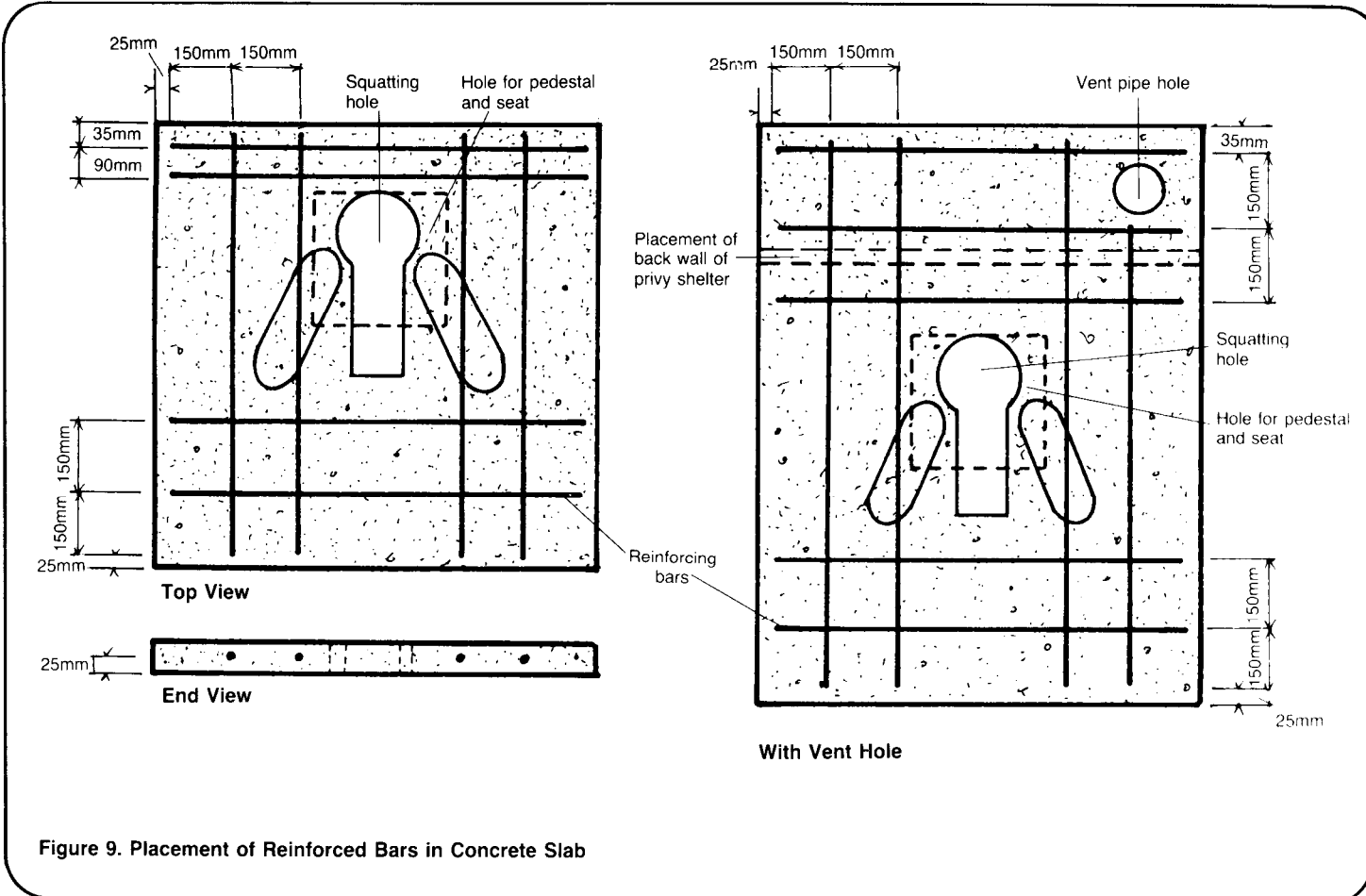
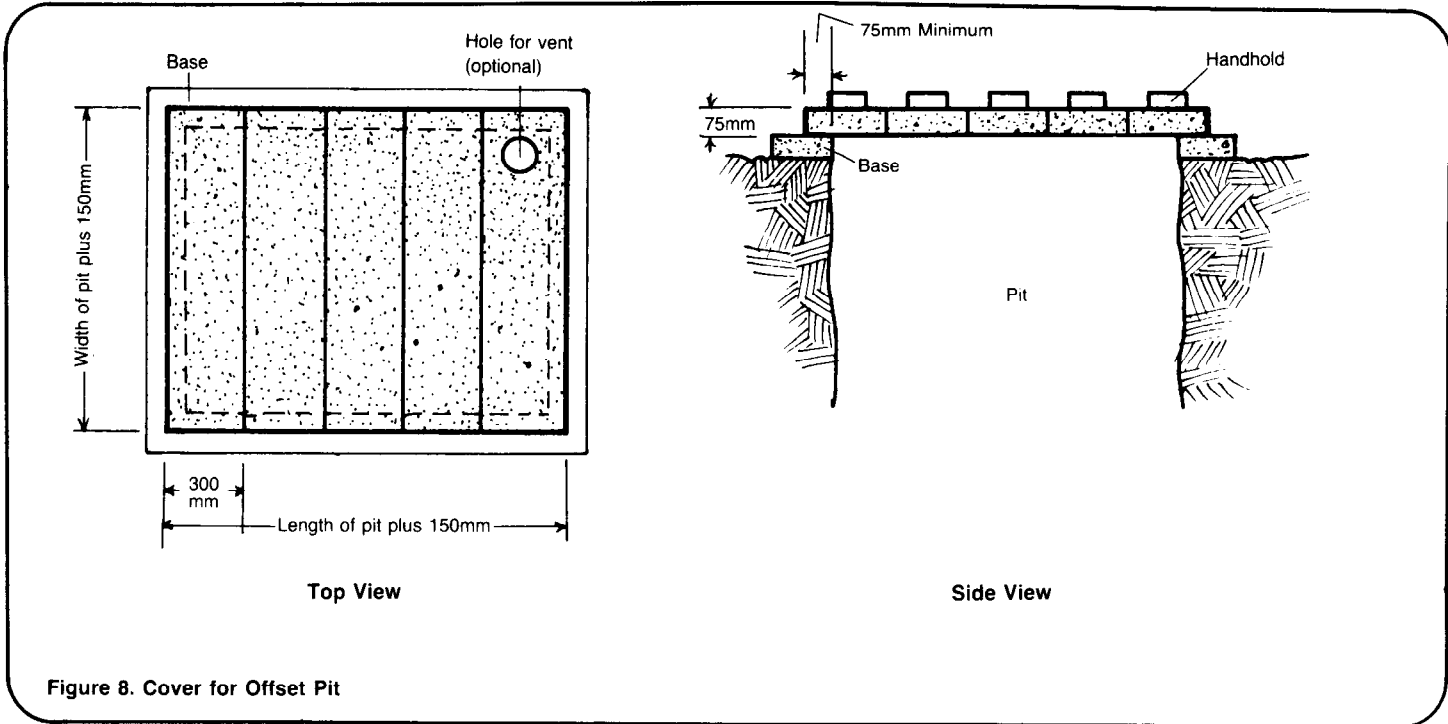


Table 1. Sample Materials List

ITEM	DESCRIPTION	QUANTITY	ESTIMATED COST
Labor	Foreman	1	_____
	Laborer (some experience with concrete)	1	_____
	Laborers (to move constructed slab)	4-6	_____
Supplies	Portland cement	_____ m ³	_____
	Sand: Clean, size fine to 6mm	_____ m ³	_____
	Gravel: Clean, size 6-38mm	_____ m ³	_____
	Water: Clear, drinking water preferred	_____ liters	_____
	Wood (for concrete forms)	_____	_____
	Nails (for concrete forms)	_____	_____
	Reinforcing bars _____ mm long	_____	_____
	_____ mm long	_____	_____
	(or wire mesh)	_____ m ²	_____
	Wood (for lid)	_____	_____

	If seat and pedestal:		
	Bricks (for pedestal)	_____	_____
	Mortar (cement, sand, water)	_____ m ³	_____
	Wood (for seat and lid)	_____	_____

Pour-flush bowl (prefabricated)	_____	_____	
Galvanized metal (for vent pipe)	_____ m ²	_____	
Galvanized metal (for chute)	_____ m ²	_____	
Metal screws	_____	_____	
Screen (for vent)	_____	_____	
Tools	Measuring tape	1	_____
	Shovel	2	_____
	Bucket	1	_____
	Container for mixing concrete	1	_____
	Trowel	1	_____
	Saw	1	_____
	Hammer	1	_____
	Tinsnips	1	_____
	Pliers	1	_____
	Screwdriver	1	_____
Other	_____	_____	

Total Estimated Cost = _____

Table 2. Sample Work Plan for Constructing Reinforced Concrete Squatting Slab

Time Estimate	Day Number	Task	Personnel	Tools/Materials
5 hours	1	Build wooden forms for the slab	Foreman and one skilled workman (Note: Foreman present during all phases of construction)	Measuring tape, wood, saw, hammer, nails, oil
5 hours	2	Mix and pour concrete; set reinforcing material	1 skilled workman, 2 laborers	Cement, sand, gravel, water, reinforcing material, container for mixing, 2 shovels, trowel
½ hour	2	Cover concrete and keep moist	1 laborer	Wet straw
½ hour	3	Remove wood plug for squatting hole, after concrete has taken initial set	1 laborer	None
5 days	3-7	Keep concrete covered and moist	1 laborer	Wet straw
3 hours	8	Separate slab from wooden forms; place slab over pit	4-8 laborers	Hammer (or nail-puller)
2 hours	8	Build lid for squatting hole; set in place	1 skilled workman	Measuring tape, wood, hammer, saw, nails

Construction Steps

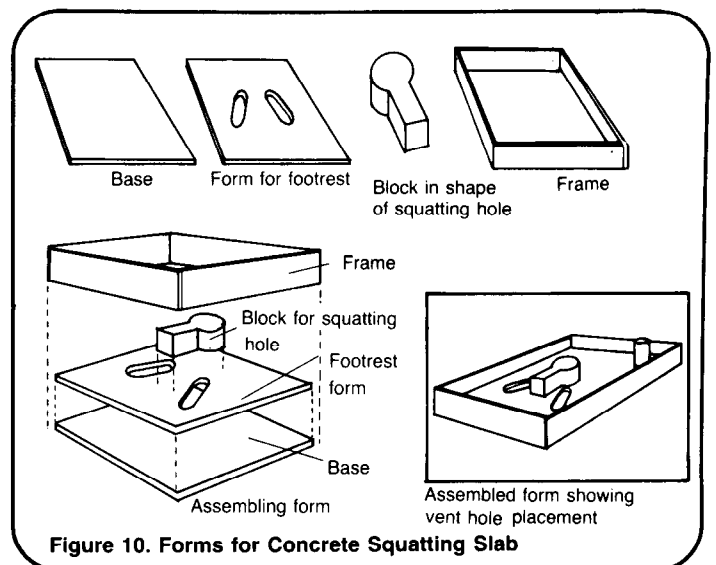
Depending on local conditions, availability of materials, skills of workers, and so on, some construction steps will take only a few hours, while others may require a day or more. Read the construction steps and make a rough estimate of the time required for each step, based on local conditions. You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

Assemble all laborers, supplies, tools, and drawings needed to begin construction. Study all diagrams carefully.

For a reinforced concrete squatting slab:

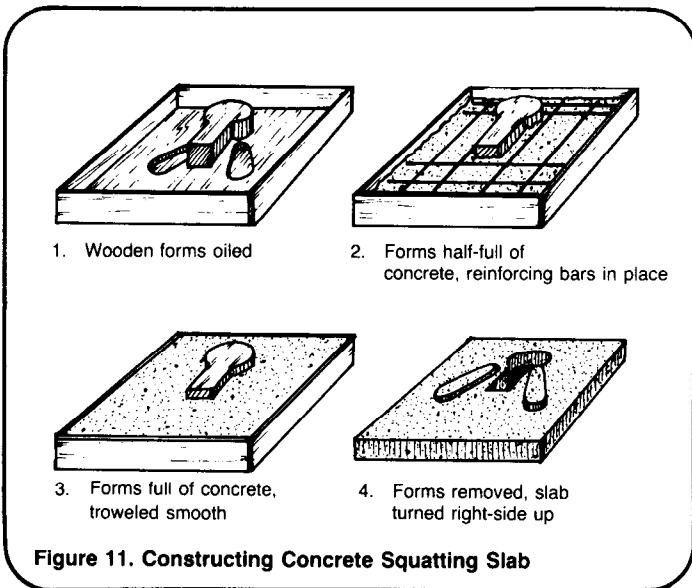
1. Build wooden forms similar to Figure 10. For a ventilated privy see the inset on Figure 10. Note that the

squatting hole and the hole for the vent pipe are produced from solid wood blocks and the raised footrests from holes cut in the form. The slab is made upside down. If the slab is to have a pour-flush bowl, the shape of the hole must conform to the shape of the bowl unit. Check all measurements from drawings provided by the project designer.



2. Treat the forms with oil or grease to make it easier to remove the slab after the concrete has set as shown in Figure 11.

3. Mix concrete with the correct proportions of cement, sand, gravel and water. A common mix by volume is one part cement, two parts sand, three parts gravel, and enough water to make a fairly stiff mix. The cement should be Portland cement. Remove any hard lumps of cement before mixing. The sand should be clean and sized fine to 6mm. The gravel should be clean and sized 6-25mm. The water should be clean and clear drinking water, if possible.



4. Pour concrete in the form to a depth of about 50mm and smooth surface with trowel. See Figure 11.

5. Set reinforcing material--bars or wire mesh--in place. Be sure the reinforcing material is positioned according to drawings supplied by the project designer and that the material does not touch the sides of the forms or the wooden block used to produce the squatting hole.

6. Pour in the remaining depth of concrete, about 25mm, and smooth surface with trowel. See Figure 11.

7. Cover concrete with wet straw or burlap bags. Keep shaded for one or two days until concrete takes its initial set.

8. Remove wood block used to produce squatting hole. See Figure 11. Keep concrete covered and wet for four to six days until it has firmly set. During this period, work can begin on the pit and the pit lining and base (see "Constructing Pits for Privies," SAN.1.C.2).

9. After the concrete has set firmly, remove the slab from the wood form. See Figure 11. Set it in place on the base around the pit.

10. Build a lid for the squatting hole and set it in place.

For a wood or bamboo squatting slab:

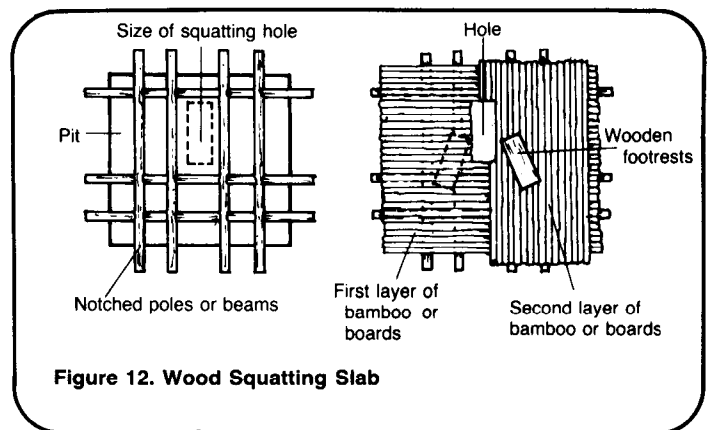
1. Build a gridwork of notched poles or stout bamboo as shown in Figure 12. The space for the squatting hole is 50mm longer and 50mm wider than the finished hole. Nail or tie the poles together.

2. Place poles, bamboo, or boards across gridwork as shown in Figure 12. Poles or boards overlap space for squatting hole so that actual hole is 400mm long and 150mm wide. Fasten together ends of poles, bamboo, or boards with binding or nails.

3. Place second layer of poles, bamboo, or boards across the first as shown in Figure 12. Secure each pole or board to the first layer with binding or nails.

4. Cut wood blocks or boards for footrests and nail them in place.

5. Set the completed slab in place over the pit.



6. Build a wooden lid to cover the squatting hole and set it in place.

For a concrete sitting slab with a brick and mortar pedestal:

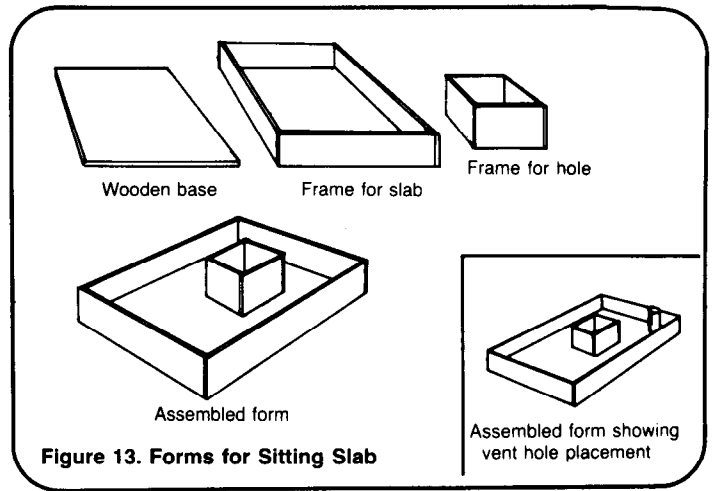
1. Build wooden forms similar to Figure 13. For a ventilated privy, see Figure 13. Note that the hole for defecation is produced by a square wood frame. Do not pour concrete inside this frame.

2. Follow steps 2 through 9 for a reinforced concrete squatting slab. See Figure 14.

3. Mix concrete mortar with one part cement, three parts sand, and enough water to make a workable mix.

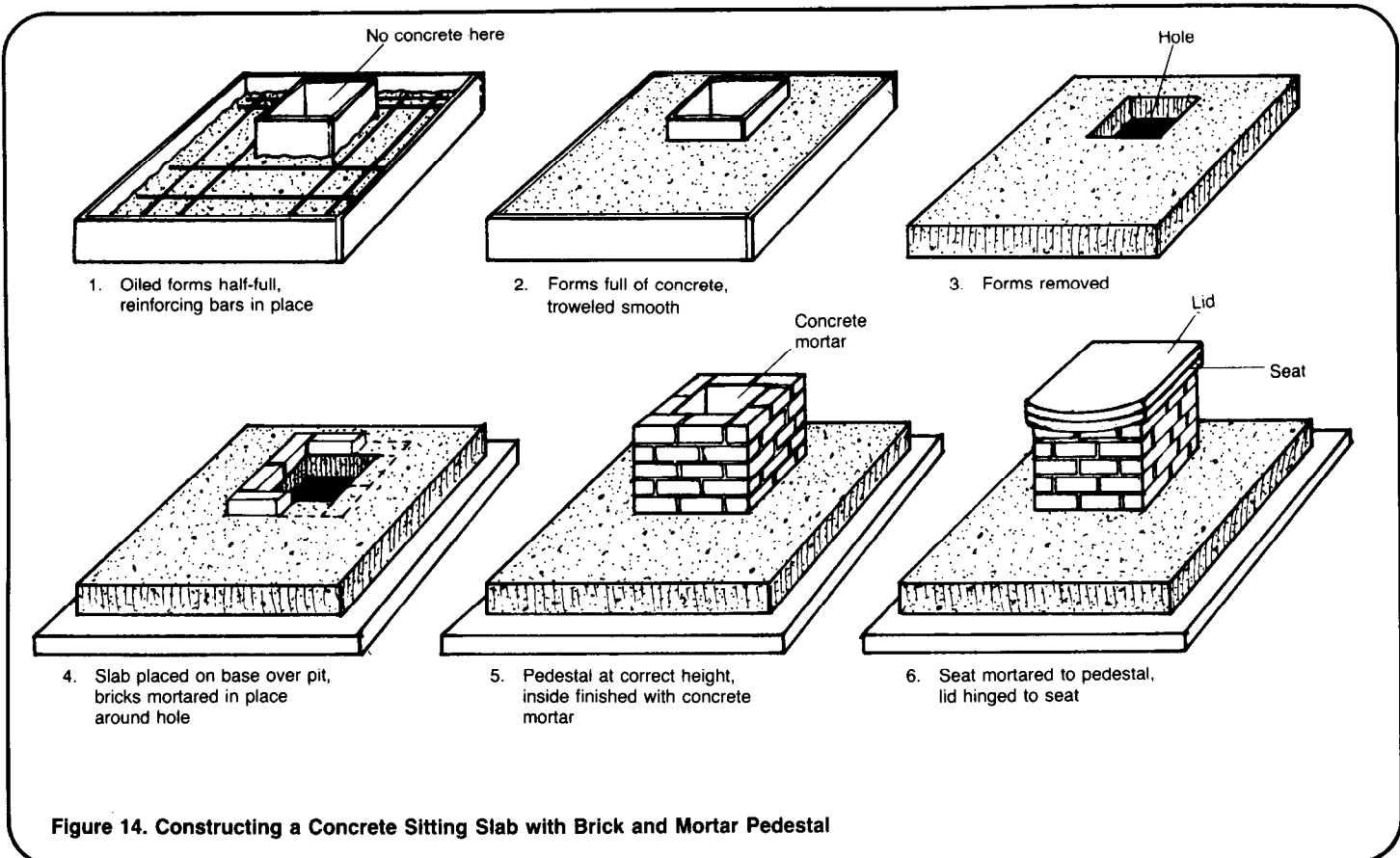
4. Lay bricks or selected stones around the hole in the slab as shown in Figure 14. Mortar the bricks to the slab and mortar them together.

5. Overlap the second row of bricks as shown in Figure 14. Continue laying bricks until the pedestal reaches 275-350mm.



6. Wet the inside of the brick pedestal and plaster the inside with a 12mm thick layer of cement mortar. Smooth the mortar coating with a trowel.

7. Build a wood seat and lid similar to Figure 14 and set in place. Mortar seat to pedestal.



For a wood sitting slab with a wood pedestal:

1. Cut two stout poles or beams the length of the pit plus 150-200mm. The beams should be 100mm by 100mm in size. Lay the beams on the base on each side of the pit as shown in Figure 15.

2. Nail 25mm thick boards to the beams as shown in Figure 15. The open space toward the rear of the slab should be about 450mm wide.

3. Build a bench 350-400mm high from 25mm thick boards. See Figure 15. The bench may have one or two holes for defecation. If two holes, make one 200-250mm diameter for adults and one about 150mm diameter for children. The edges of the holes should be sanded and free from splinters.

4. Build a hinged lid for each hole and attach in place.

5. Nail a board to each end of the privy floor to seal the pit. See Figure 15.

For a vent pipe:

1. Cut a rectangular sheet of tin to the dimensions provided by the project designer. See Figure 16.

2. Bend the tin to form the vent pipe. Overlap the edges about 25mm and fasten with metal screws. See Figure 16.

3. Cover one end of the pipe with fly-proof screen. See Figure 16.

4. A cone-shaped vent cover which is optional, but recommended in rainy regions, may be made from a round piece of tin about 250mm in diameter. Cut out a wedge with a base of about 150mm, bend tin to form a cone, and fasten with metal screws. See Figure 16. Attach the cone to the end of the vent pipe with metal struts to leave free air space.

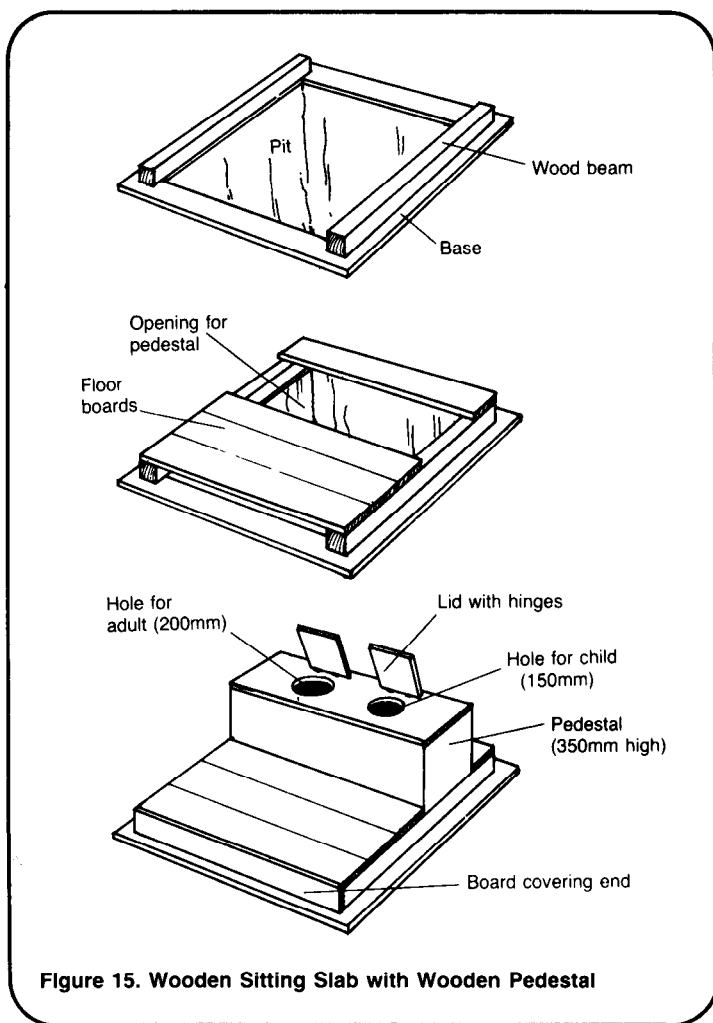
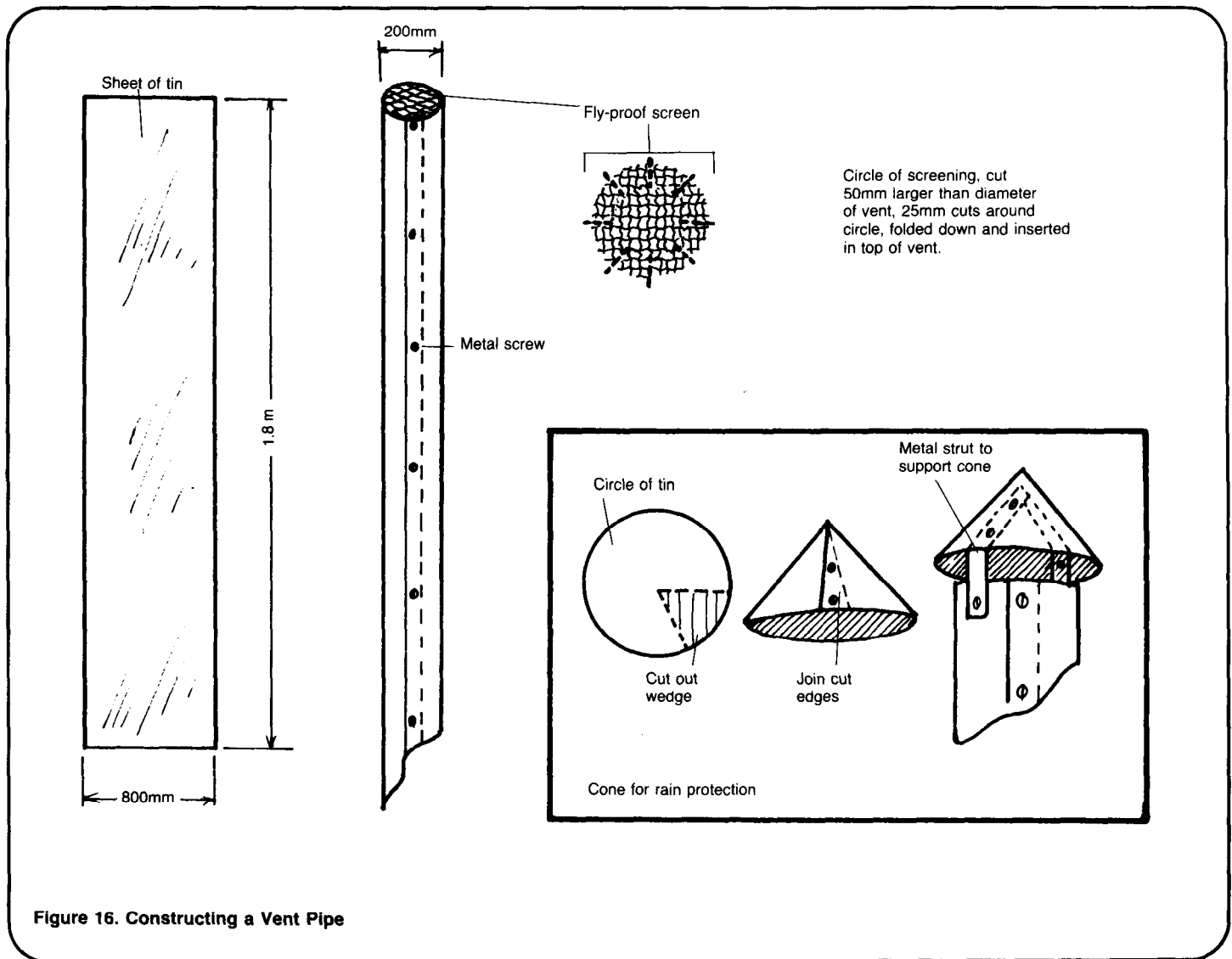


Figure 15. Wooden Sitting Slab with Wooden Pedestal

5. The vent pipe should not be installed until after the privy shelter is in place (see "Constructing Privy Shelters," SAN.1.C.3). Place the open end of the vent pipe in the hole in the slab and make the edges airtight with mortar or tar. Secure the vent pipe to the privy structure. The screened end of the pipe should be 0.3-0.6m above the roof of the privy.

For a pour-flush bowl:

1. Pour-flush bowls are often prefabricated units made from galvanized metal, concrete, molded rubber, or ceramic material. They are built to fairly exact specifications and may be difficult to produce in the field. A skilled craftsman could possibly build a concrete bowl using Figure 6a or, a galvanized metal pour-flush bowl using the design information in Figure 6b.

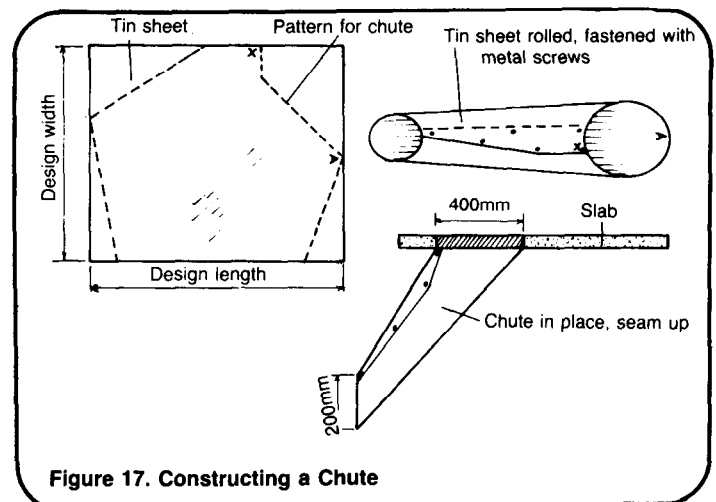


This technical note does not describe how to build a pour-flush unit, but if you try it keep the following two points in mind: the edges of a galvanized metal bowl should be rounded or dulled by a file; and a concrete bowl is generally cast in two halves in wooden molds, the halves mortared together, and the entire unit cured under water for a week.

2. Secure the pour-flush bowl to the slab with cement mortar and allow two or three days to set before use.

For a chute for an off-set pit:

1. Cut a rectangular sheet of tin or galvanized metal to the dimensions provided by the project designer. See Figure 17.



2. Bend the sheet of tin to form the chute. Overlap the edges so that the overlapping seam is along the top edge and fasten with metal screws. Cut the sheet of tin in a shape like that shown in Figure 17 prior to bending.

3. Mortar the upper end of the chute in place below the squatting slab or seat, circling the squatting hole or the hole in the seat. See Figure 17.

For a wood platform for an off-set pit:

1. Build a framework to the dimensions of the slab, or slightly smaller, using poles or beams at least 50mm in diameter. See Figure 18a.

2. Add one or more rows of poles or beams to the framework, nailing or binding each row to the one below, until the correct height is reached. When the slab is in place, its top should be about 200mm above ground level. For example, if the slab is 75mm thick, the framework should be 125mm high: $75\text{mm} + 125\text{mm} = 200\text{mm}$.

3. When the platform reaches the correct height, nail or tie corner pieces inside each corner to further secure it. See Figure 18a.

4. When the platform is completed, place the slab on top. See Figure 18a.

For a brick and mortar platform for an off-set pit:

1. Lay a row of bricks, mortared together, to the dimensions of the slab at the desired slab location. See Figure 18b.

2. Continue mortaring rows of bricks in place until the correct height is reached as described in step 2 for wood platform. See Figure 18b.

3. After the mortar has set for two or three days, mortar the slab on top of the platform. See Figure 18b.

For a concrete platform for an off-set pit:

1. Build wooden forms for the concrete platform to the correct height as described in step 2 for wood platform and to the dimensions of the slab. Build the forms in place and so that the finished platform will have walls at least 75mm thick. See Figure 18c.

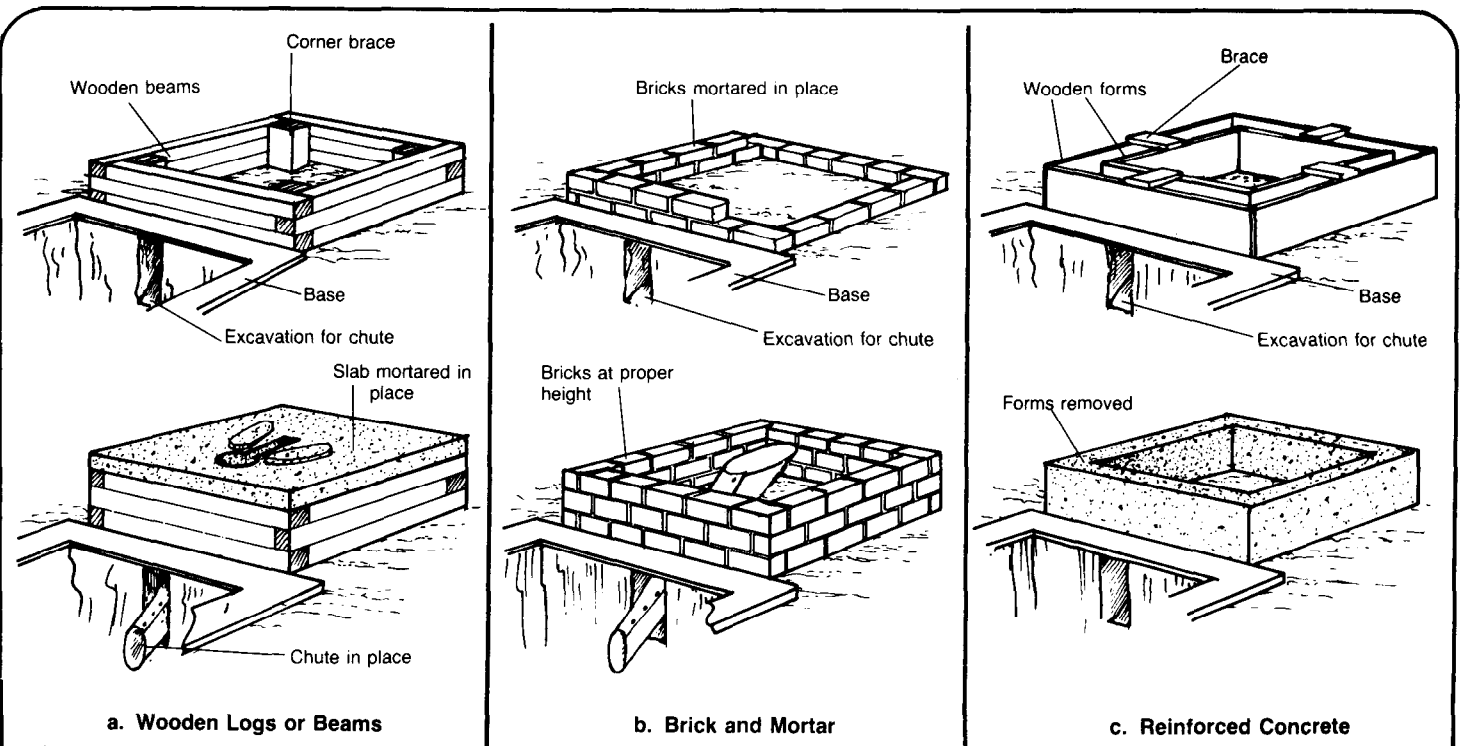


Figure 18. Platforms for Off-Set Privy

2. Mix concrete using the correct proportions of cement, sand, gravel and water as described in step 3 for a reinforced concrete squatting slab.

3. Pour concrete in the forms to about half their depth.

4. Lay reinforcing material in place.

5. Pour in the remaining depth of concrete and smooth the surface with a trowel.

6. Cover concrete with wet straw or burlap bags and allow it to set for three to seven days. Then, remove wood forms. See Figure 18c.

7. Mortar the slab on top of the platform.

For a reinforced concrete cover for an off-set pit:

1. Build wooden forms for the cover. See Figure 19. The cover is made in sections with each section about 75mm thick. The length of each section equals the width of the pit plus 150-200mm so that the sections overlap the pit on each side by 75-100mm. All sections but one are 300mm wide. One section is 300mm wide plus whatever measurement is necessary to add up to the total length of the pit plus 150mm. The width of this last section should be provided by the project designer or calculated in the field. For example, if the pit is 1500mm long, then the total widths of the sections should equal 1500mm plus 150mm, or 1650mm. The widths of the sections would be:

$$300\text{mm} + 300\text{mm} + 300\text{mm} + 300\text{mm} + 450\text{mm} = 1650\text{mm}$$

2. Mix concrete using the correct proportions of cement, sand, gravel and water as described in step 3 for a reinforced concrete squatting slab.

3. Pour concrete in the forms to about half their depth.

4. Lay reinforcing material in place.

5. Pour in the remaining depth of concrete and smooth the surface with a trowel.

6. Set handholds into the concrete near both ends of each section. See Figure 19.

7. Cover the concrete with wet straw or burlap bags and keep moist for five to seven days to allow concrete to set.

8. Remove wooden forms and place sections over the pit. Do not mortar. Waterproof between each section, and between the sections and the base around the pit, with tar or other material. See Figure 19.

9. Mound with soil. See Figure 19.

