45. Latrine slabs and seats

The most common type of sanitation for low-income communities, by far, is a pit latrine. This Technical Brief introduces some of the features of latrine slabs and seats which help to improve the safety and comfort of users.

The pit latrine

Excreta decomposes in the pit, forming:

- **gases** (which escape to the atmosphere, or are absorbed in the soil around the pit);
- **liquids** (which seep into the soil beneath and around the pit); and
- **a solid residue** (which accumulates).

Figure 1 shows a section of a simple pit latrine with a latrine slab. Many people, however, (especially in Asia) wash themselves with water after defecation. They usually defecate into a pan which is then cleaned by pouring a litre or so of water from a bucket (*lotta*). This type of pan is often known as a 'pour-flush' pan. A water seal (or trap) prevents smells, and stops insects from leaving the pit (Figure 2a).

A pan above a pit is usually supported by a slab, and the trap hangs down above the pit (unless offset). This trap is sometimes called a 'gooseneck'.

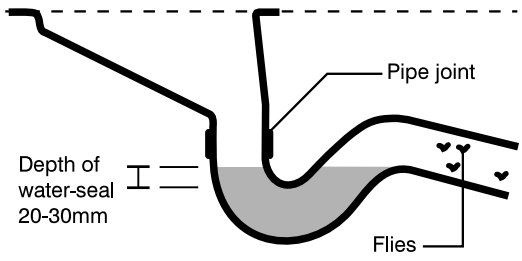


Figure 2a. Section of a water-sealed pan

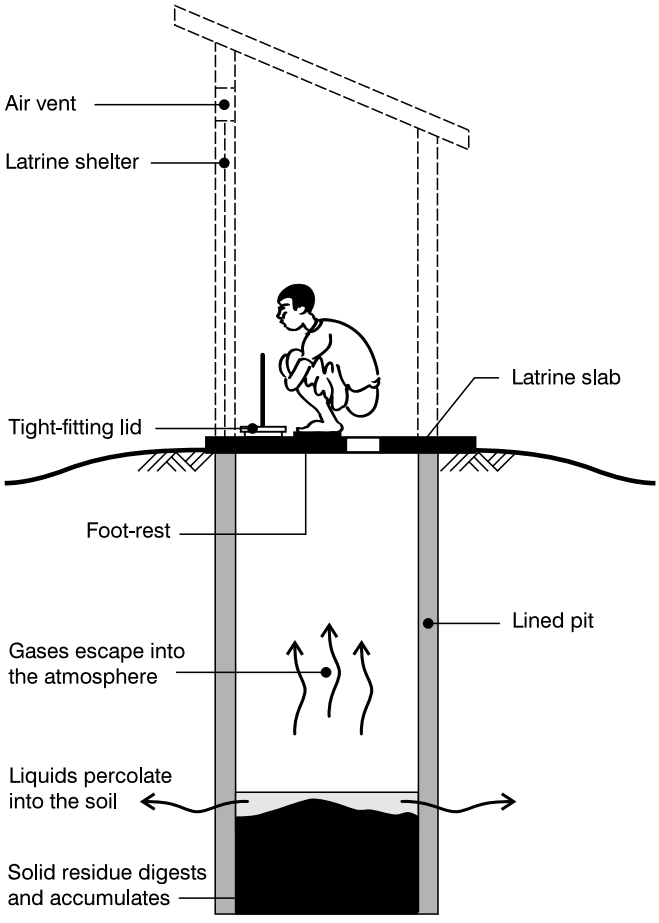
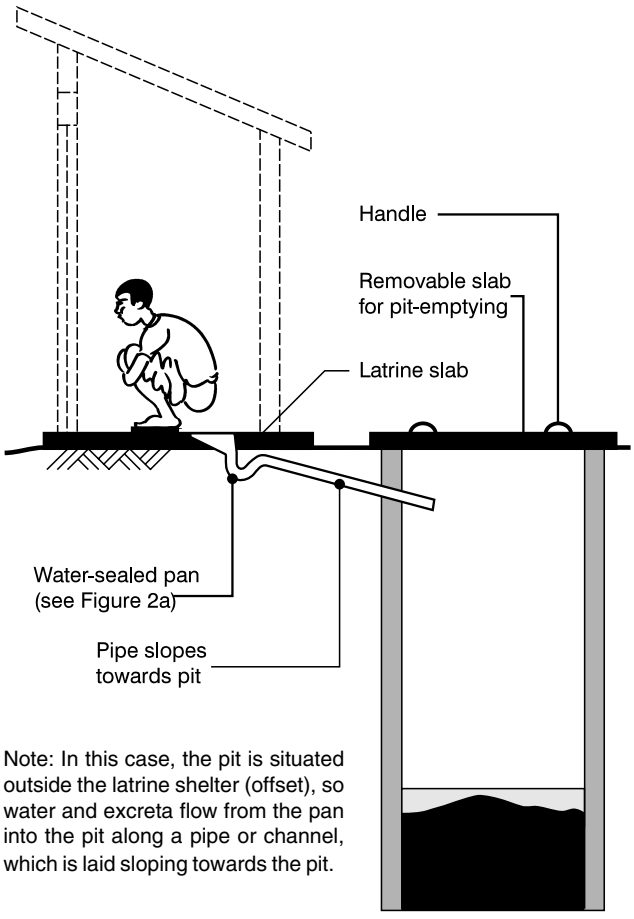


Figure 1. Section of a simple pit latrine



Note: In this case, the pit is situated outside the latrine shelter (offset), so water and excreta flow from the pan into the pit along a pipe or channel, which is laid sloping towards the pit.

Figure 2. Section of an offset pour-flush pit latrine

Latrine slabs and seats

Using the latrine

If people squat to relieve themselves, they usually put their feet on a **slab** which goes across the top of the pit. Faeces and urine fall through a squat-hole which is constructed so that the user's feet rest either side.

Other people, either because of custom, or simply because they find it more comfortable, prefer to sit on a **seat** when using a latrine.

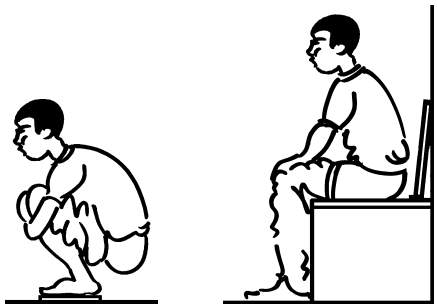


Figure 3. Using a slab and using a seat

Latrine slabs

An effective way of ensuring that a slab is strong enough to support the heaviest users is for five men to stand on it! (Figure 4).

Figure 4. Ensuring that a slab is strong

Latrine seats

A latrine seat is made by building or fixing a support or pedestal on top of the slab. The height depends on what the majority of users find comfortable. This is normally about 350mm above the floor, with the hole commonly 250mm wide.

A seat support can be made with timber, brick, concrete, or blocks. The seat itself is usually made of timber or concrete. A hinged cover may be fitted to control the escape of flies and smells.

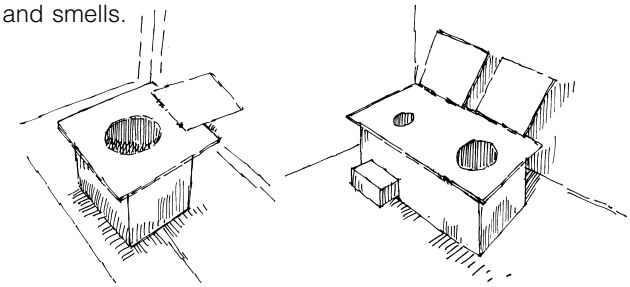


Figure 5. Latrine seats

Seats for children

Children may be frightened by a large opening, so a separate hole with a smaller diameter may be provided.

The seat height may be a problem, so a lower children's seat may be built. Alternatively, a block can be placed for children's feet, as shown above (right).

Slab supports

Latrine slabs should be properly supported. If the slab rests on bare earth (where the pit is not lined), it needs about 200mm-wide support all round. So a 1100mm-diameter pit requires a 1500mm-diameter slab. On a good base — such as the top of a brick lining, 50mm width of support is enough.

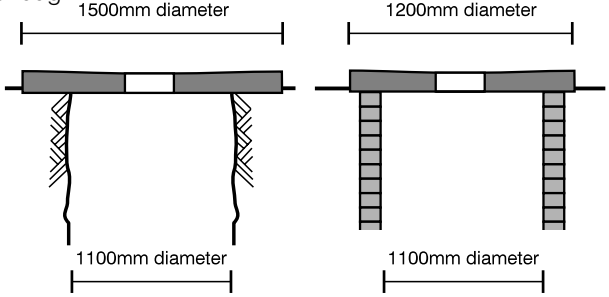


Figure 6. Supporting latrine slabs

A concrete collar to support the slab may be formed by digging a trench round the top of the pit.

The top of a brickwork or masonry pit lining may be corbelled so that the slab can be reduced in size.

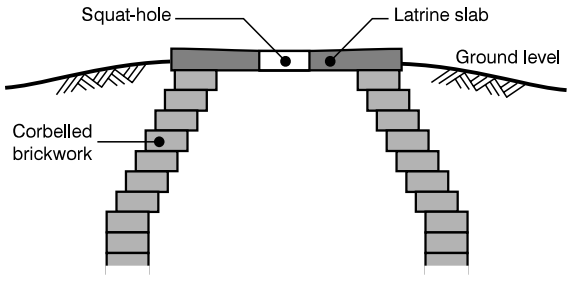


Figure 7. Corbelled brickwork

More about latrine slabs ...

Squat-holes

A squat-hole is usually about 400mm long; any smaller and fouling is likely. Children must be protected, so the hole should not be too wide. A child is unlikely to fall through a hole that is less than 180mm wide.

Traditionally, squat-holes come in many shapes. The best shape is a 'keyhole' (see Figure 8).

Footrests

Footrests are often provided for both squat-holes and pour-flush pans. They are usually about 10mm above the remainder of the surface of the slab, and keep users' feet off the floor. They also enable users to find a good position for squatting, which is especially helpful at night.

Slab surface

In order to maintain cleanliness, the surfaces of all slabs should be as hard and smooth as possible. Except for domed slabs, the top of the slab should slope towards the hole allowing spilled water, or water used for cleaning, to drain into the pit.

Domed slabs

Slabs can be cast as flat domes with no reinforcement. They are strong enough to support their own weight and the weight of latrine users.

The dome shape is made by mounding earth to the required profile of the underside of the slab. The earth is compacted and smoothed, and then covered with plastic sheeting or old cement bags, or coated in old engine oil.

Domed slabs 1500mm in diameter can be made 40mm thick at the edges, with the centre of the bottom rising 100mm.

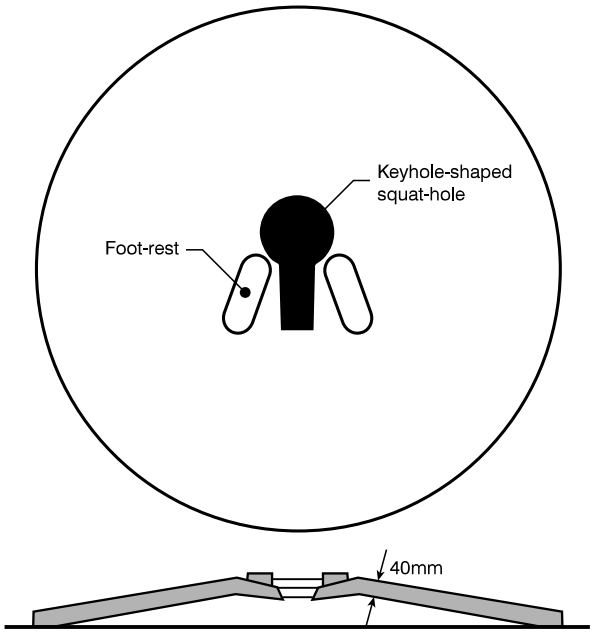


Figure 8. Plan view and cross-section of a domed slab

Small concrete slabs

Squat-holes set in small concrete slabs about 600mm square can make a pole-and-mud slab hygienic.

These slabs, sometimes referred to as SanPlats, weigh about 35kgs, light enough to be carried by one person, and lifted by two.

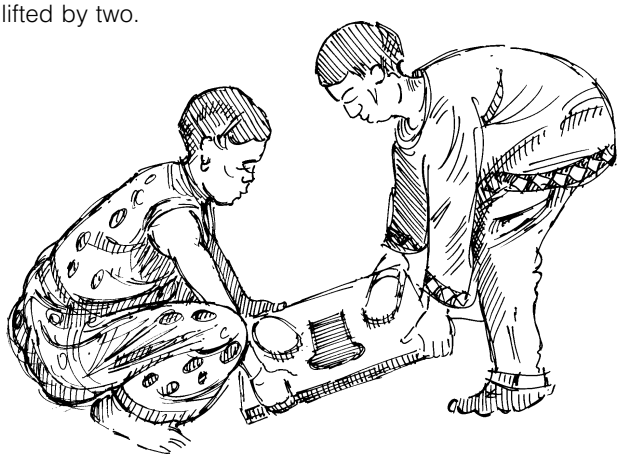


Figure 9. Positioning a SanPlat

A tight-fitting lid is often used with this type of small slab — an effective way of dealing with flies, smells, and the risk of hookworm transmission. The handle can be wooden or made from a length of reinforcing steel.

A tight-fitting concrete lid can be cast in the squat-hole. Holes may differ slightly, so the lid and its corresponding slab may be given an individual identification mark or number.

Figure 10. A tight-fitting lid

Removable slabs

Of course, the pit has to be emptied, so the whole, or part, of the slab should be easy to lift.

Removable slabs usually come with handles made of reinforcing steel (see Figure 2).

Movable slabs should be sealed with weak mortar (made with mud or lime) to ensure an insect-proof joint.

Large slabs should be constructed in sections, so that each part can be lifted by two men. Each section should be at least 600mm wide, however, to allow enough room to empty the pit.

Materials for latrine slabs

Latrine slabs are made from a variety of materials, depending on what is available.

Concrete

Concrete is ideal: it is strong, durable, and has a smooth, easy-to-clean surface.

Slabs can be made *in situ:* a mixture of cement, sand, stones and water is laid over the pit and left to 'cure'. A temporary timber platform to support the concrete is essential.

More often, concrete slabs are ***prefabricated*** or ***pre-cast*** — made and cured until strong enough to be moved without cracking or breaking.

Most pre-cast slabs are flat, and are reinforced with steel bars. Mild-steel bars, 6mm in diameter, spaced 150mm apart; or 8mm in diameter and spaced 250mm apart, in both directions, are normally sufficient for an 80mm-thick slab spanning up to 1.5 metres.

The shape of the slab depends on the individual pit: it can be rectangular, square, or circular.

Circular slabs have the advantage that they can be rolled into the correct position.

Figure 11. Rolling a circular slab

Ferrocement slabs (slabs made of cement reinforced with wire mesh) may be thinner, lighter, and easier to handle than normal reinforced-concrete slabs.

Two, three, or four layers of chicken wire are plastered with several layers of a rich cement mortar to make a slab about 20mm thick. The mortar is made by mixing one part of cement to two parts sand, and adding enough water to obtain a thick, creamy consistency.

Logs and bamboo

Logs and bamboo are often used as they are locally available and cheap. Sometimes they are free.

Ideally, the harder the wood, the better. Timber should also be protected against rot and termite attack by being soaked in used oil, for example.

Logs and bamboo are often covered with a layer of gravel and/or mud finished to a smooth, hard surface. Traditional methods include using animal dung or cassava (soaked in water overnight) which is then mixed with soil.

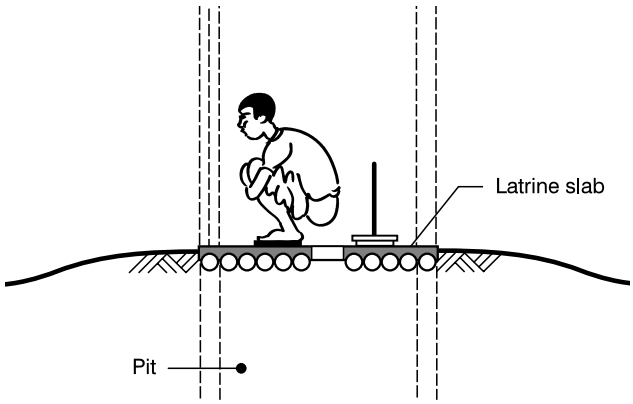


Figure 12. Section of a bamboo slab

Other materials

Other suitable materials are sawn timber, metal sheets (for example, old advertisement signs), natural stone, and brick arches. The chassis of an abandoned car or lorry makes a good support for a slab, and the slab itself may be made from flattened car doors and other scrap material.

Further reading

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Morgan, Peter, *Rural Water Supplies and Sanitation,* Macmillan, London, 1991.

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