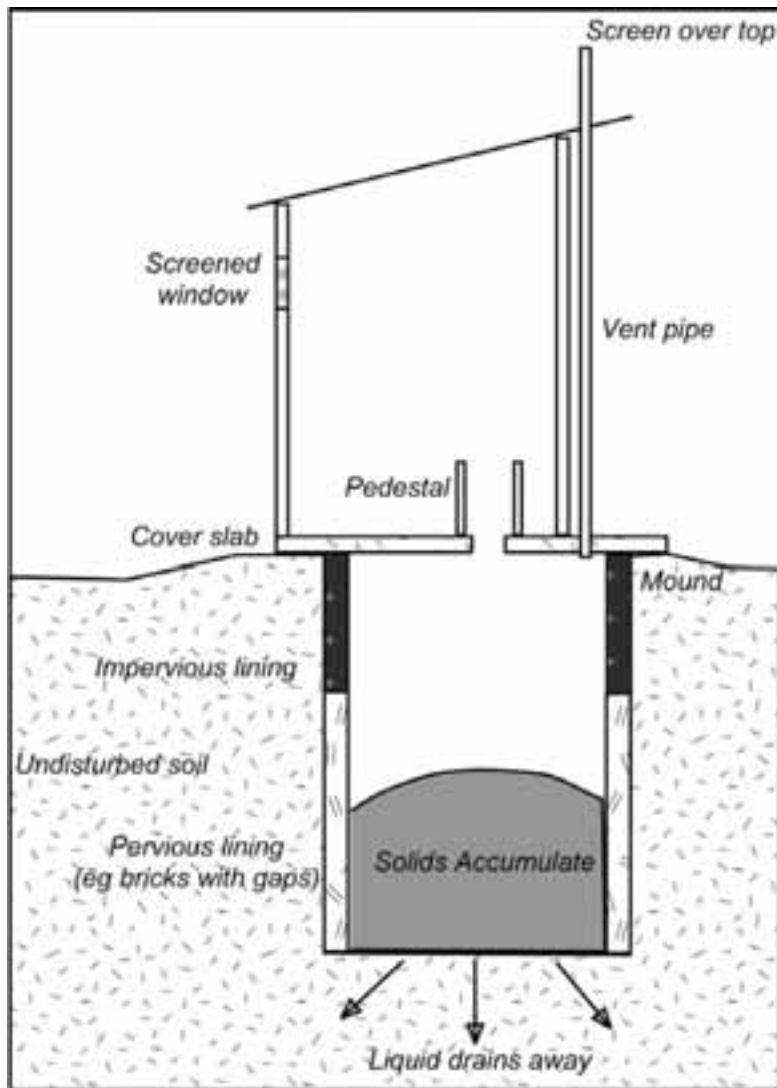


Pit toilets

DIAGRAM 1



There are regulations about where pit toilets can be used and how they must be designed. These are different in each State and Territory. This BUSH TECH is a guide only. You need to make sure that you comply with the law in your State or Territory. CAT staff in Alice Springs, Derby and Cairns can help you design a pit toilet that meets all legal requirements for your location.

do want a flush toilet as their first preference, a pit toilet can be a good back up for when there are lots of people around, or when the flush toilet is not working.

The liquid waste in a pit toilet is not fully contained. It spreads from the pit into the surrounding soil. So it is very important to keep pit toilets away from water sources. A pit toilet should be built at least 100 metres downstream of any well, bore hole, river, creek, dam or lake. This is required by law in most states.

In areas with a high water table, waste from a pit toilet can spread much faster. Pit toilets not be used where the level of the ground water is less than two metres below the bottom of the toilet pit. It also is important to protect toilet pits from flooding, as this will spread contamination. Diversion banks can be built to direct flows around toilet pits.

Pit toilets are not suitable for areas with very dense clay-like soils, or with impermeable rock at shallow depth, because the liquid will not drain away from the pit.

In BUSH TECH #15, we introduced four basic types of toilets and talked about the features, and the advantages and disadvantages of each.* This BUSH TECH has more detail about pit toilets, also known as pit latrines, long drop toilets or earth closets.

When to use a pit toilet

The pit toilet is a tried and true technology that has been in use all over the world for centuries. Pit toilets are cheaper and easier to build than other toilet technologies, and, if properly designed and built, they are healthy, safe and extremely reliable. There is not much that can go wrong with a well-built pit toilet. In particular, they are not prone to blockage and overflowing in the way that flush toilets are. Pit toilets need no power and no water.

Pit toilets are suitable for intermittent use and changing populations. They are particularly suited to small, remote communities with just one or a few houses.

Unlike septic tanks, pit toilets cannot be used for the disposal of other waste water from houses (such as waste water from the shower, kitchen and laundry). If you have a pit toilet, you will need another wastewater system for the shower, kitchen and laundry.

Some people don't like pit toilets because they seem old-fashioned, or less pleasant to use than flush toilets. We challenge this view. A well-designed pit toilet is in fact much more pleasant to use than a blocked flush toilet! Alternatively, where people

How does it work?

A pit toilet is basically a hole in the ground with a toilet pan (pedestal) and shelter built over the top. Human waste (faeces and urine) is deposited in the pit. Liquid drains out of the pit into the surrounding soil, and solids remain in the pit where they slowly break down. The pit gradually fills up with solids. When it is full, it must be capped and a new pit dug. The toilet pan and shelter are moved to the new pit.

Pit latrines often smell a bit, and they can attract flies, which can spread disease from human waste back to people. Problems with smell and flies can be avoided by having a ventilation pipe in the pit.

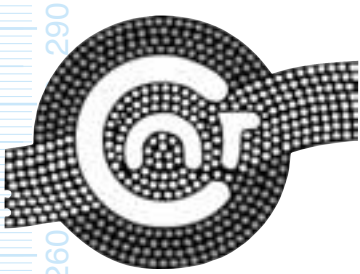
Design features

The main parts of a pit toilet are shown in Diagram 1.

The pit

The pit must be big so that it won't fill up too quickly. The recommended size is 1000mm diameter and 2400mm metres deep. A pit of this size should last at least ten years in a normal household situation. Most states require a pit to be covered up when the waste level is about half a metre from the natural ground level.

The hole in the slab at the top of the pit must be no wider than 190mm to comply with Australian standards and protect the safety of children.



BUSH TECH # 18

Pit toilets (continued)

DIAGRAM 2

If the soil is firm and stable, the pit doesn't require lining. However, if the soil is not stable, the pit needs to be lined so it won't collapse. The lining for the lower portion of the pit needs to have gaps in it so that the liquid can drain out into the soil. The lining for the top part of the pit should have no gaps, so that rainwater flowing in the surrounding soil does not enter the pit. Linings can be made of bricks, concrete blocks, pre-cast concrete pipe sections, or even from 200 litre steel drums with the ends removed. A good and easy option is to use an 'earth ring' or 'tank ring'.

The cover slab

The soil should be mounded up slightly and sloped away from the top of the pit so that rain-fall and surface runoff drain away from the pit. The cover slab is placed on top of this mound. The cover slab needs to be large enough so that it rests on undisturbed soil away from the edges of the pit, and strong enough to hold the weight of a heavy person sitting on the pedestal. Regulations require the footings of the shelter (which will usually be the edge of the cover slab) to be a minimum distance from the edge of the pit.

The pedestal

The pedestal needs to be designed so that it is comfortable to sit on, and so that waste falls cleanly into the pit without fouling the pedestal or cover slab. (The standard porcelain, flush toilet pedestal you can buy in a shop is not appropriate.) In some states dimensions are specified, such as the height of the pedestal and the minimum size of the opening. The pedestal must comply with Australian standards. The pedestal should not have a lid as this would prevent the ventilation system from working. Various materials can be used for the pedestal including steel, wood and fibre cement. Whatever material is used, it needs to be painted or varnished inside and out to make it resistant to moisture and corrosion.

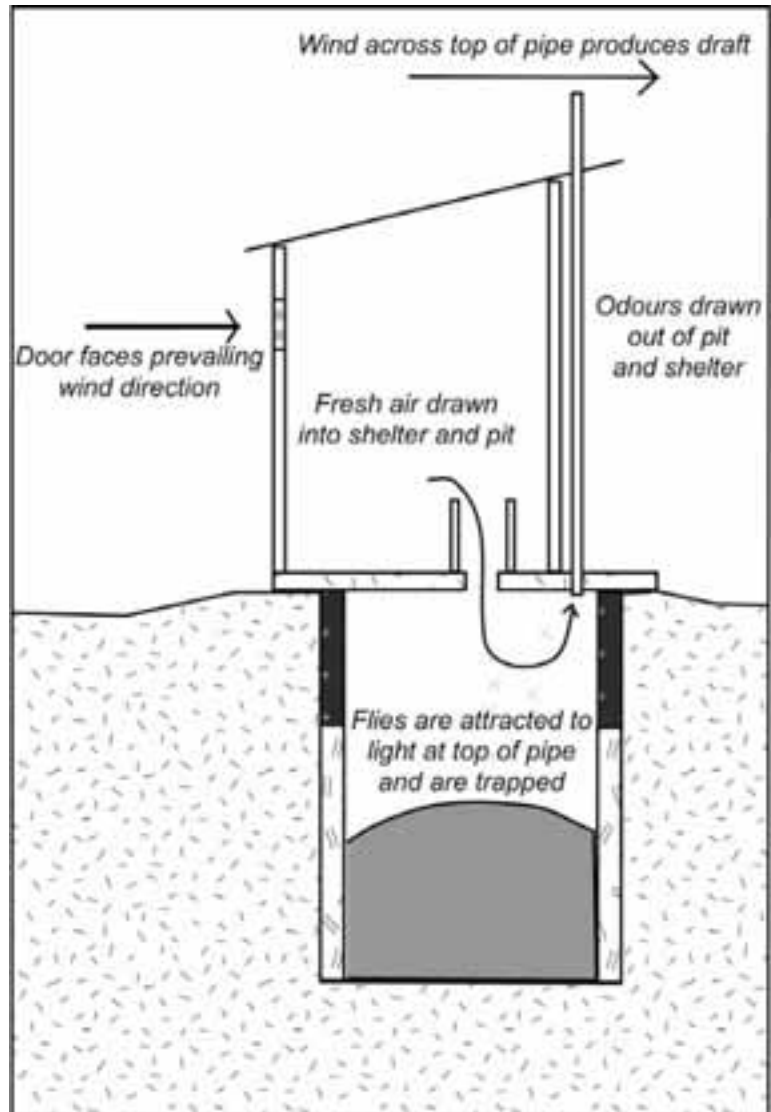
The shelter

The shelter must be designed to meet all normal construction standards and to meet legal requirements for disabled access. It should have a mesh door facing the prevailing wind so that air pressure will build up inside the shelter and air will be forced down the pit. The door should lock from the inside for privacy. The shelter should have no other openings. An electric light is a good idea. If the toilet is not close to a power source, then a single solar-powered light with its own battery can be installed.

Previously, VIP latrines often were built in a spiral shape to make them dark inside without the need for a door. Having the shelter dark inside helps control insects, as explained below. However most people don't like sitting in a dark toilet, and the low light created by having a door that closes will still achieve good insect control.

The vent pipe

Usually, the vent pipe is made with 150mm diameter pipe. It should rise vertically from the pit, without any bends, to a height of 300mm above the highest point of the roof. The top of the pipe must be covered with fine stainless steel, or brass, insect mesh. The wind flowing over the top of the pipe causes a sucking affect that draws foul air out of the pit, so reducing odours in the toilet. The pipe must be straight so that insects in the pit see the bright light at the top of the pipe and fly towards it. The insect



mesh blocks their escape and they die and fall back into the pit. Diagram 2 shows how the ventilation works.

The CAT Workshop manufactures steel-framed, steel-clad shelters for toilets, showers and laundries. These are built in compliance with the Building Code of Australia and freighted in kit form. Telephone the Workshop on 08 8951 4311 to discuss your requirements.

Written and illustrated by Michael Martin, CAT Cairns

*See BUSH TECH #15 *Choosing the right toilet* for information on how to choose a toilet system for a small, remote community or outstation. There's an overview of four basic types of toilets – pit, septic tank, composting and aerobic wastewater treatment systems. Telephone (08) 8951 4311 and ask for a free copy of BUSH TECH #15 to be mailed to you, or view it on the CAT website at www.icat.org.au.