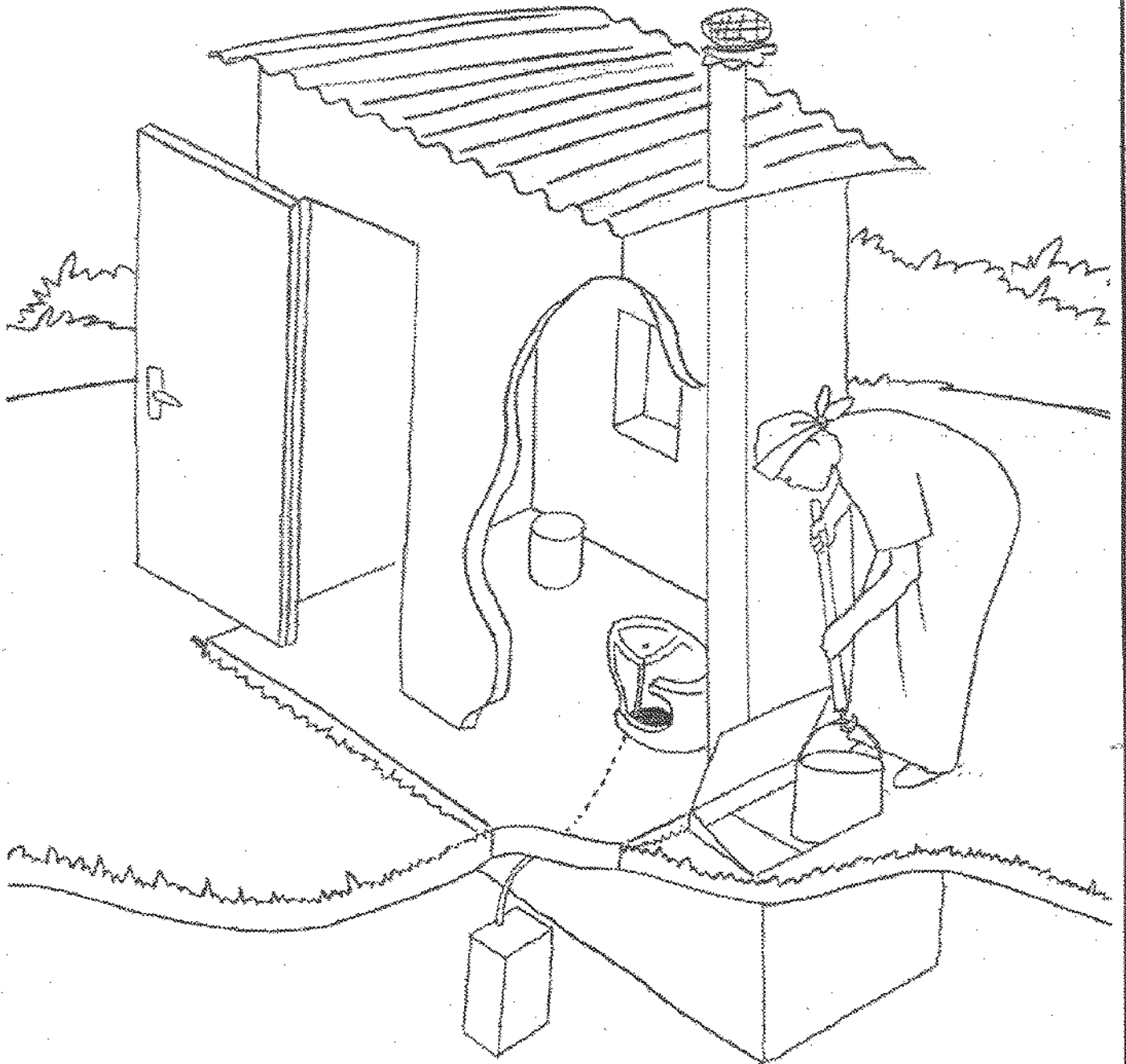


BUILDER'S MANUAL

FOR THE CONSTRUCTION OF DRY SANITATION TOILETS



THE
MYULA
TRUST



RAND WATER

BUILDER'S MANUAL

Introduction

The purpose of this manual is to:

1. Enable builders and or other facilitators, to talk with householders about different types of dry toilets;
2. Give households information to make choices about their own toilets:
3. Guide builders in terms of the construction of pits, slabs, pedestals and toilet buildings.

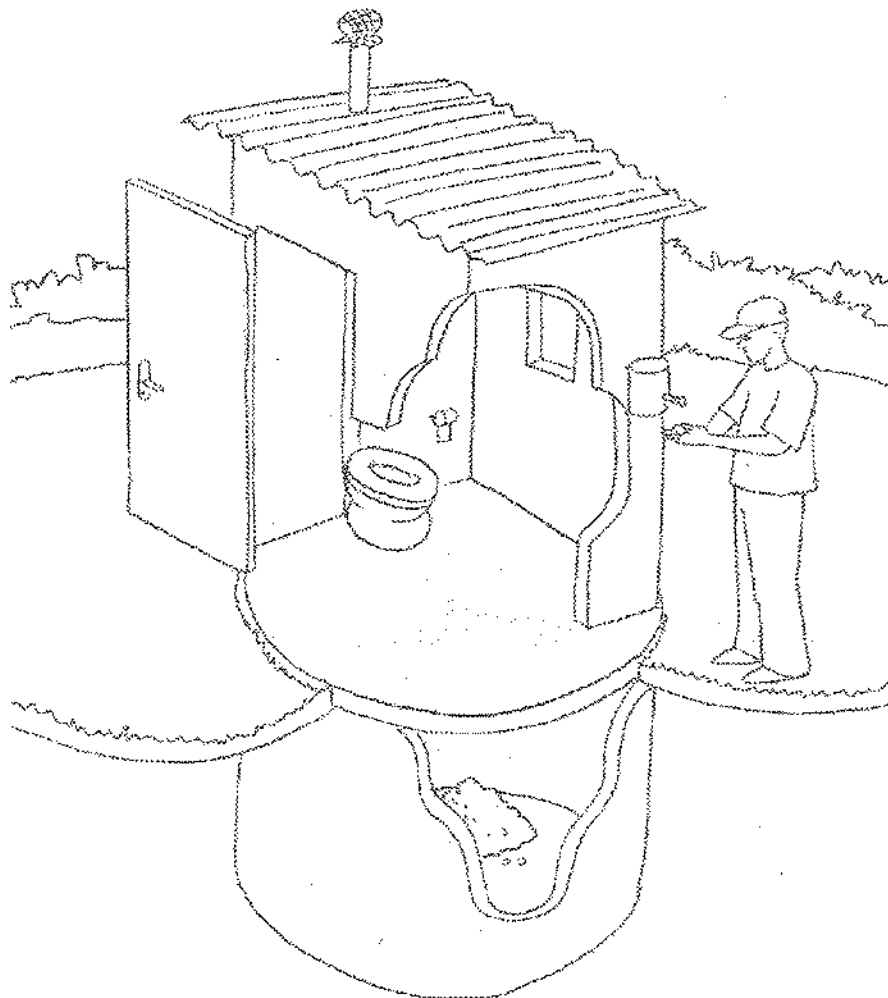
The manual is therefore divided into 4 parts:

Part I: Questions and Answers for the Household

Part II: Construction of Pits for Ventilated Improved Pit (VIP) and Urine Diversion Toilets

Part III: Construction of Slabs & Pedestals

Part IV: Construction of Toilet Buildings



BUILDER'S MANUAL

1: Questions & Answers

1. What Approach is used and Why?

The approach is one of a discussion between the household and the builder (or facilitator).

This is important because it builds on people's knowledge and experience, and encourages active involvement and positive contribution from the household. The approach encourages household participation and responsibility for making decisions and planning. It requires that the builder (or facilitator) does not look at him/herself as an expert coming to teach, but rather as a partner coming to explore the situation and engage the householders to find their own solutions.

This approach creates an open sharing of ideas, and joint attempt to find solutions to the problems that households experience regarding sanitation. It also encourages people to contribute freely and participate actively knowing that their ideas are taken seriously. If this happens households begin to take responsibility for the process because they have been part of finding the solutions.

2 What are the Issues around Affordability & Choice?

2.1 Why Should Local Resources be Used?

The building of a toilet must be made affordable to the household, by using easily available material and resources. Use of expensive material and complicated techniques, may result in no toilet being built.

This means:

1. Using local materials such as sand, mud, blocks, wood etc.
2. Getting the householder to contribute as much as possible (in terms of materials and labour); and
3. Building in stages as and when the householder can afford it i.e. first the pit, then the pedestal and slab and finally the building.

2.2 How do we deal with the choices of a household?

This raises the issue of choices regarding material, type of technology and skills available. Each household will have to consider their own situation, in order to choose:

1. Whether or not they wish to handle the faeces, as this will decide the type of toilet technology; and
2. What can they afford and contribute in relation to the capital and operation and maintenance cost of the technology?

The builder (or facilitator) will have to talk to households on what they can afford and choice of toilet technology. They should not choose for the household, but they may give advice and guidance, based on their knowledge and experience.

For a household to make a choice around technology they must first understand how they work. Then they must look at how to build, the technology they want, and if they can afford it.

Here it might be necessary to go back to the choice of technology if their choice is unaffordable.

BUILDER'S MANUAL

1: Questions & Answers

The next section deals with questions and answers on technology choice.

3. What are the questions on choice of technology?

Most people understand pit toilets and that a Ventilated Improved Pit (VIP) is an improvement on this. People are not usually aware of other options that can be used in difficult ground conditions or inside the house.

3.1 What are VIP Toilets?

A VIP toilet is a pit in the ground with 2 openings in the slab. One for the urine and faeces to fall through and, the other to take the smell out of the pit. The faeces are kept in the pit and the urine seeps into the surrounding soil.

3.1.1 Why is a pit needed?

A pit is needed to keep the faeces in one place and stop people and animals from touching it.

3.1.2 What is the advantage of a large pit?

The advantage of having a large pit is that it lasts longer.

A large pit of 3 cubic metre and 2 m deep will last 20 years and will allow for a more permanent building.

A smaller pit of 1.5 cubic metre and 1 m deep will only last for 5 years and should have a moveable building.

3.1.3 What happens when the toilet is full?

The pit can be emptied:

1. By the household by hand;
2. With a vacuum tanker from the municipality or private contractor (This costs money).

If the householder cannot empty the pit a new toilet must be built. The building on the old pit is taken away and the pit covered.

3.1.4 Why is a pit lined?

A pit is lined to stop soil from the sides falling in. If the sides fall in the slab and building may break or collapse. This is dangerous for the lives of the people using the toilets.

The lining need only be as deep as the loose soil. Where the soil is strong only the top 50-cm need be lined to stop rainwater from entering the pit.

The lining must have holes in it to allow the urine to seep into the surrounding soils or the pit will fill up very quickly.

BUILDER'S MANUAL

1: Questions & Answers

3.1.1 How do you stop a toilet from smelling?

Toilets smell because air does not move through the building. A ventpipe stops smells.

The wind blowing across the top of the ventpipe sucks the air and the smell out of the pit.

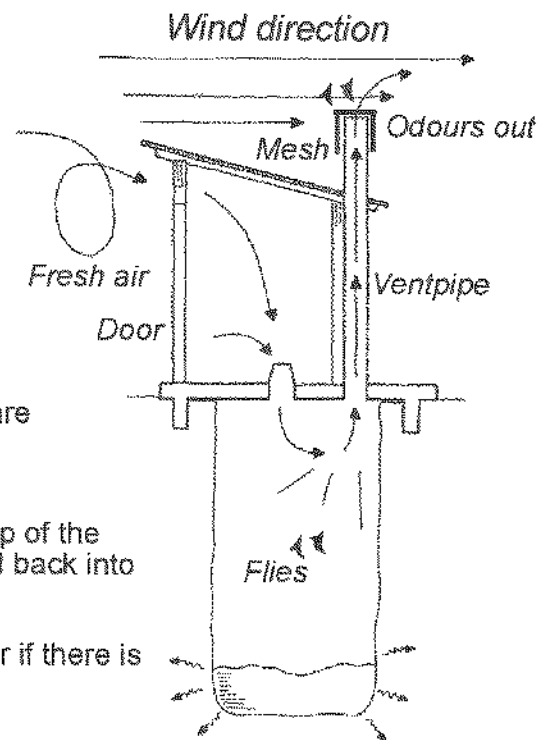
3.1.2 Why are fly screens put on ventpipes?

Fly screens stop flies from moving in and out of the toilet. This means flies can no longer move from the toilet to the house and elsewhere.

When the pit is dark, any flies that manage to enter it are attracted to the light at the top of the vent pipe (flies always fly towards light).

However, because there is a fly screen covering the top of the ventpipe the flies cannot get out. They then die and fall back into the pit.

The pit is kept dark by keeping the toilet seat closed, or if there is no toilet seat the building must be dim.



3.1.3 Under what conditions is it impossible to build a VIP Toilet?

(i) High water table

So long as the gap between the top of the underground water and the bottom of the pit, is greater than 50cm, a VIP can be constructed. When the gap is less it may be necessary to seal the bottom third so as to make longer the distance the liquid travels before entering the water. The pit can also be raised 50cm above the ground to increase the distance.

If neither of these options is possible then a VIP cannot be built.

(ii) Rocky Conditions

If you cannot dig to 2 m then you must either dig a shallower pit and move the toilet often, or choose another technology. If you cannot dig to 1 m then you must use another technology.

3.2 What are the other Technologies?

At present only one other system has been found to work effectively and is affordable to most people. This is called the Urine Diversion Toilet.

3.2.1 How does The Urine Diversion Toilet work?

The toilet uses a special pedestal. The urine is collected in a container at the front of the pedestal and the faeces fall through the back of the pedestal into a dry pit underneath. Every time someone defecates a mixture of soil and ash is thrown over the faeces. This keeps them dry and prevents odour.

BUILDER'S MANUAL

1: Questions & Answers

3.2.1 How does the Urine Diversion Toilet work? (cont.)

If the chamber is below ground moisture may come through the sides of the pit and make the faeces damp. If a bucket is used to catch the faeces then it remains dry. A bucket also makes it easier when emptying the toilet.

The urine is led in a pipe to a soakaway under the ground. Because the urine is kept separate from the faeces it helps stop the smell.

Both men and women can easily use the toilet. However a man will have to urinate sitting down (unless a separate urinal is provided).

Because there is no smell the toilet does not need a ventpipe.

3.2.2 What happens when the toilet is full?

The householder empties the toilet from an opening at the back of the toilet. The waste can be:

1. Burnt when it is dry; or
2. Composted for 1 year, then used in the garden to improve the soil.

Because the pit is very shallow, only 60cm deep, the toilet needs to be emptied once a month. Since the faeces are dry and covered with soil and ash this is an easy task and is not unpleasant.

Since the pit is emptied regularly, the householder will never have to build another toilet.

3.2.3 Are there any other advantages?

As the toilet is absolutely dry it can be built inside a house. The faeces are then removed through an opening on the outside of the house.

4. How can the householder reduce costs?

Once the household has decided on the toilet technology then they can decide on the type of building. The building is there only to provide privacy and to give protection from the weather. The householder may choose any type of building they like depending on what they can afford.

In order to keep costs down the following questions need to be asked of the householder:

4.1 Questions around materials

- What type of material will be used in the construction of the toilet?
- Is there material in the area that can be used? E.g. wood, reeds, tins, sand, mud block etc.?
- Where do they find or buy this material?
- What is the cost transporting this material?

BUILDER'S MANUAL

1: Questions & Answers

Part I: Questions and Answers for the Household

4.2 Questions around helping the builder:

- Can I dig the pit for myself?
- Can I fetch sand, water, bricks etc?
- Can I make bricks?
- Can I be available to assist the builder with building e.g. mixing, bricks etc?

4.3 Why cover concrete when it is setting?

This allows the concrete to dry without losing water and prevents cracking.

5. What is important in a slab?

Slabs should be strongly built for support and be able to handle the weight of the user.

5.1 What happens when buildings are built on slabs?

The slab must be thicker with more re-inforcement. This also makes it heavier and more difficult to move.

5.2 What is the advantage of a dome slab?

It is in a state of compression, which makes it stronger. Only one piece of wire around the outside is required.

6. Conclusion

Once all the questions have been answered then the builder is ready to build the toilet for the householder.

BUILDER'S MANUAL

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Part I: Questions and Answers for the Household

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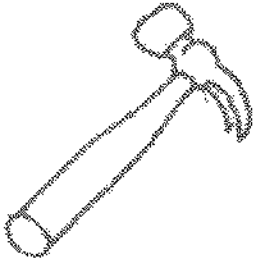
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BUILDER'S MANUAL

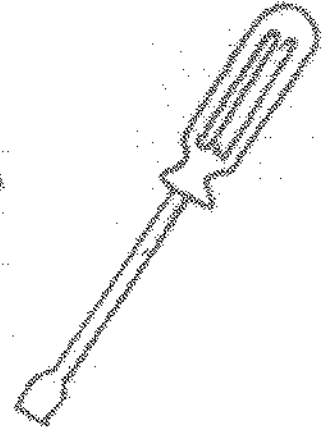
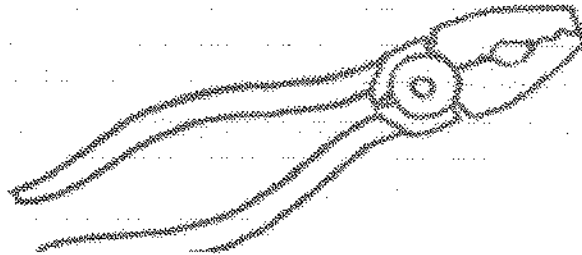
What you need

To build any of the structures in this manual you will need to have access to some or all of the following tools and materials:

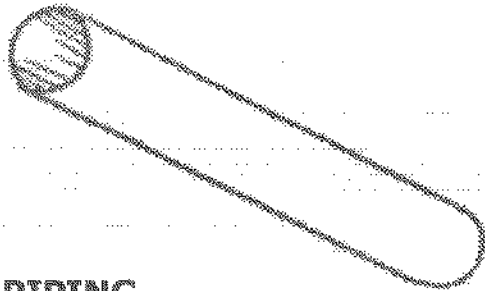
HAMMER



PLIERS

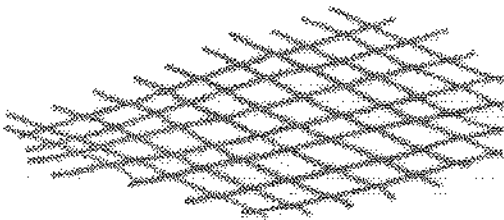
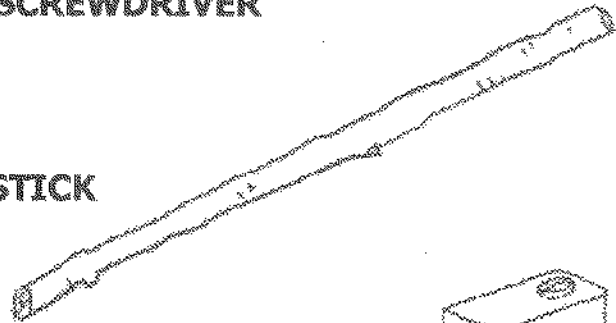


SCREWDRIVER

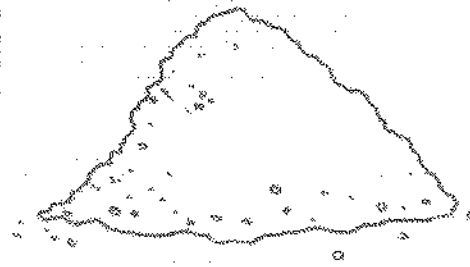


PIPING

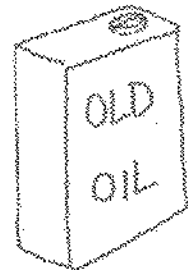
STICK



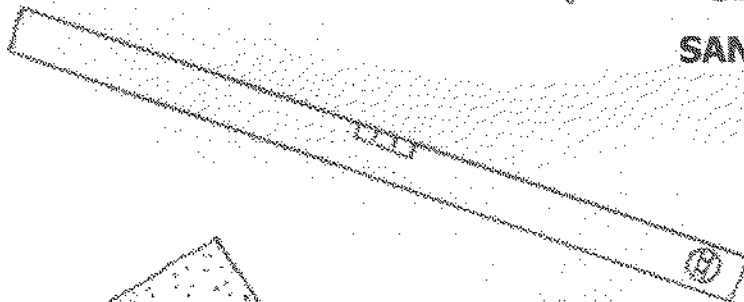
WIRE MESH



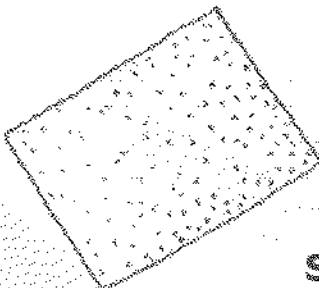
SAND



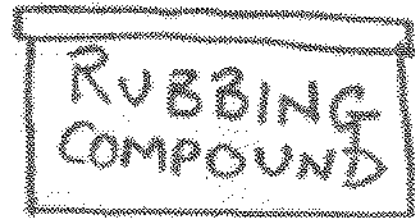
OLD MOTOR OIL



SPIRIT LEVEL

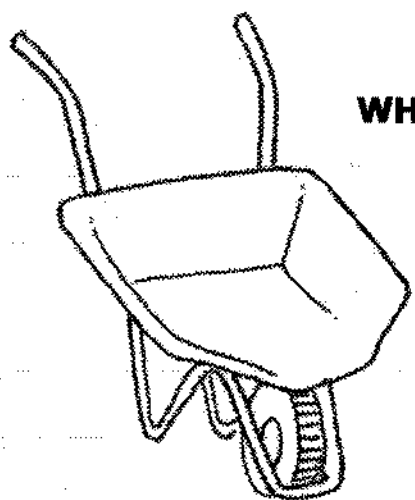
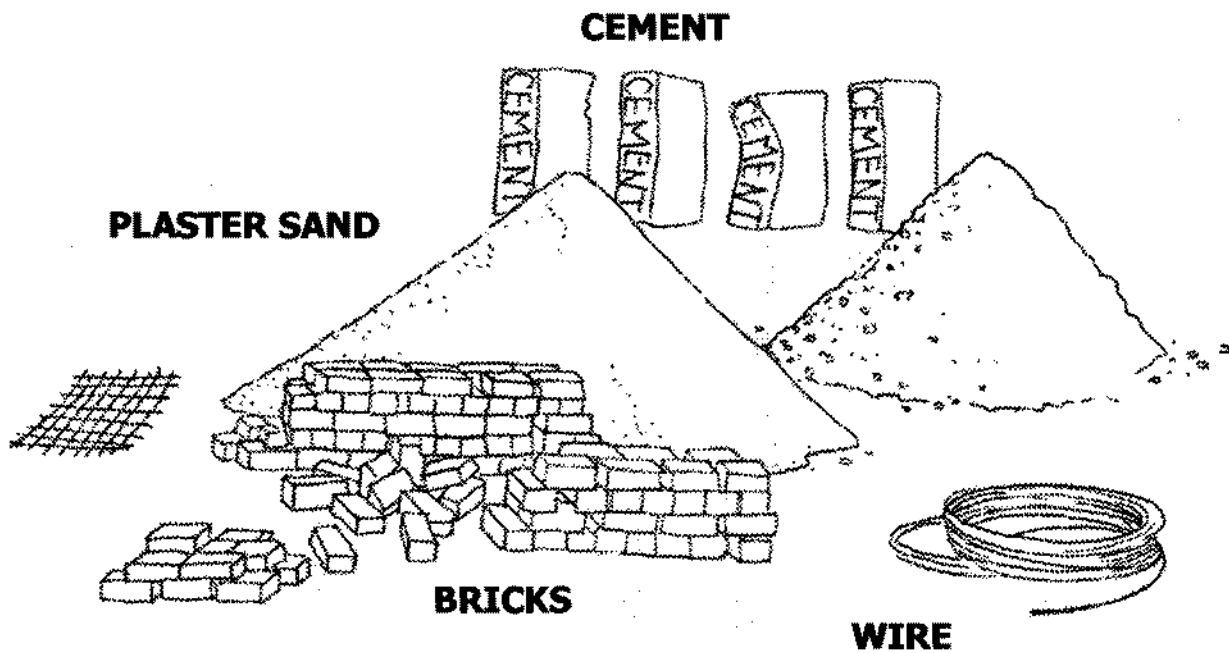


SAND PAPER

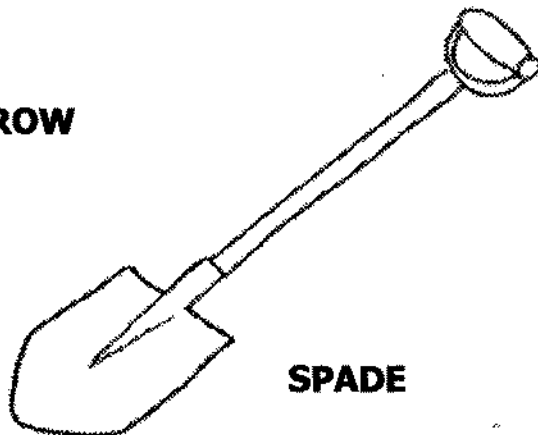


BUILDER'S MANUAL

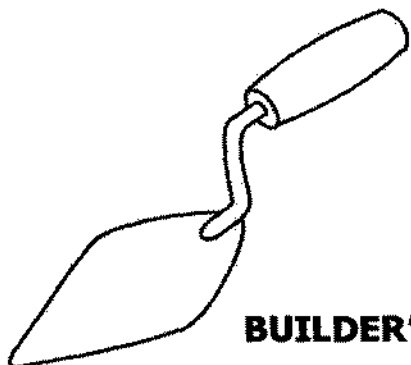
What you need



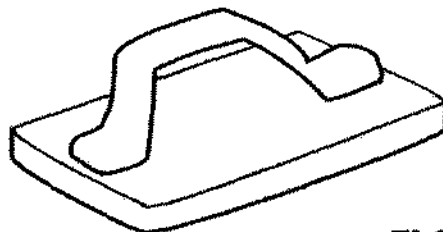
WHEELBARROW



SPADE



BUILDER'S TROWEL



FLOAT

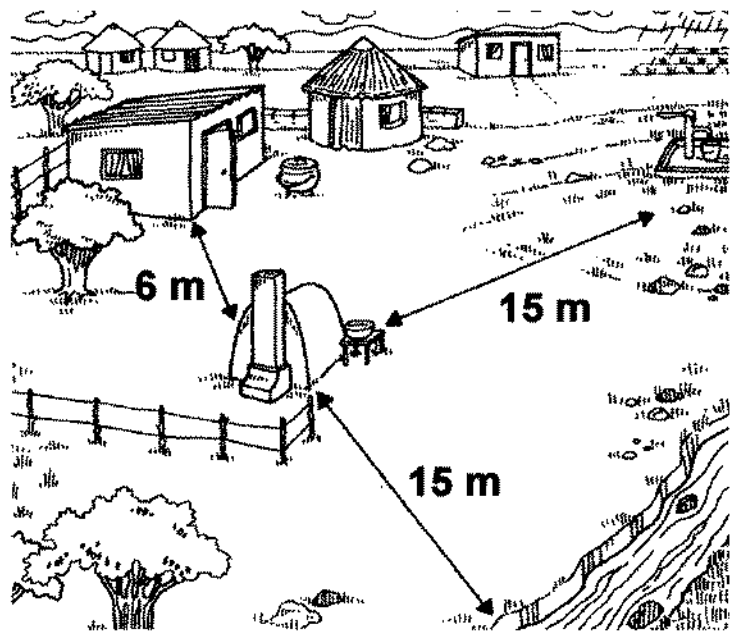
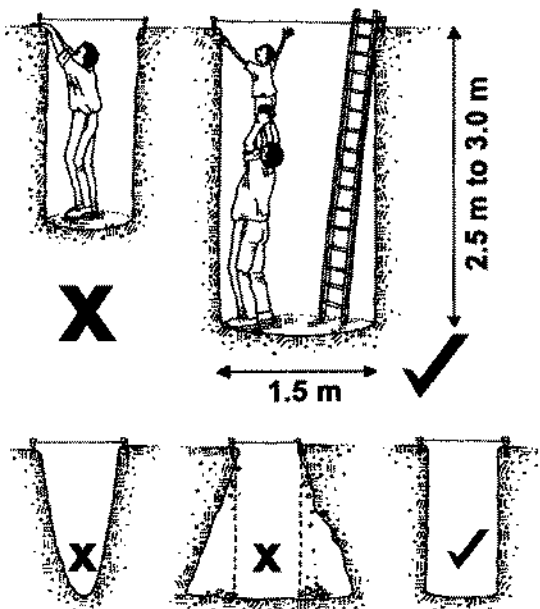
BUILDER'S MANUAL

2: Sub-structures

Siting and digging a VIP pit

The location of a pit latrine is very important. The toilet should be sited for convenience, but should not be situated so as to cause problems through bad smell or water pollution (which could be caused by siting it immediately above an operating spring)

1. The pit should be at least 6m away from the house, to stop smells entering the house.
2. The pit should be downhill of the house and, if possible, downhill of any water source (e.g. a borehole, river, or spring) in the area.
3. The pit should be at least 15m away from any water source (7.5m in sandy soil), to stop it polluting the water.
4. If in an area of fissured rocks or limestone formations, the latrine should be downhill from the water source.
5. To provide a stable pit, it is strongly recommended that a circular pit is used (Franceys, Pickford and Reed, 1992).
6. Although there is much variation in guidelines for the pit size (Pickford, 1995), a good size for one family has been found to be a pit with a circular section 1.5m in diameter and 3m deep. This should provide 10 people with between 8 and 25 years of service, depending on solids accumulation rates. In many areas such depths are not achievable.



7. The sides of the pit should be as straight as possible. A tapered hole reduces the pit volume, while an increasing diameter leads to a very unstable pit.

BUILDER'S MANUAL

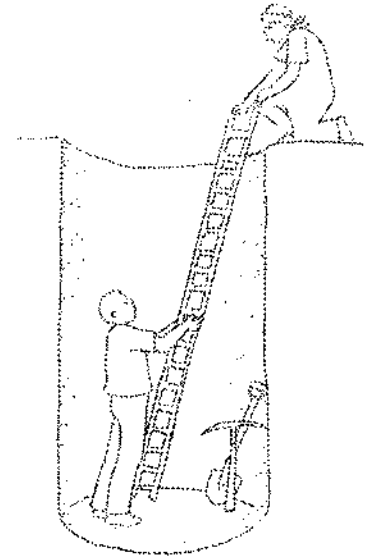
2: Sub-structures

Construction of lined pits for Ventilated Improved Pitlatrines (VIP)

○ STEP 1 - DIG THE PIT

1. Dig a round pit 1.3 meters in diameter and 2.9 meters deep, making sure the sides are straight.

If the pit cannot be dug to 2.9 meters the pit can be made shallower and wider or the floor raised 0.5 meters above the ground. The minimum depth is 1.5 meters.



○ STEP 2 - LINE THE PIT

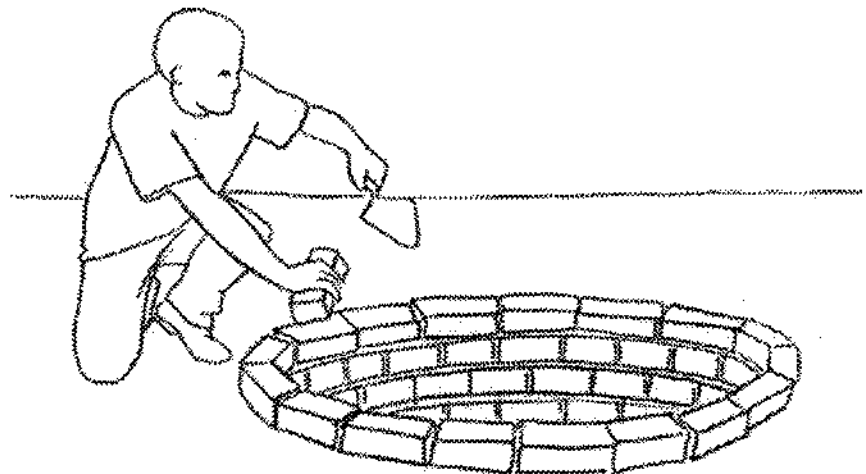
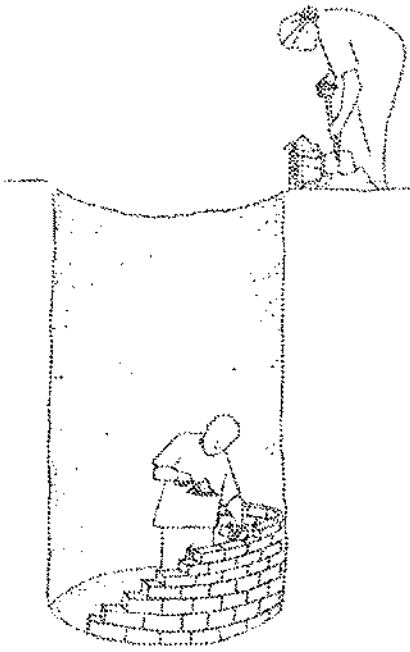
Line the pit with cement-mortared brickwork using a cement mortar mix of 10 parts pit sand and 1 part cement.

The inside diameter of the pit should be 1.1 meters.

Use wet bricks if possible.

○ STEP 3 - FINISH THE LINING

Continue the pit lining to one course above ground level or 0.5 meters above ground level if your pit is the minimum depth of 1.5 meters.



Construction of a lined pit using hessian and plaster

1. The extent of the pit lining should be determined by soil conditions, and by the stability of the pit in a completely saturated state.

The extent of the lining has a major impact on the stability of the structure and the total cost, so this decision should not be taken lightly. If soils are unstable to the extent that digging is impossible, it is necessary to use concrete rings in order to support excavation, and these also provide a suitable lining.

If the pit is not likely to be stable when saturated, it is wise to line the pit with hessian for as deep as soil conditions demand and then to plaster the hessian with a 4 parts to 1 part cement mortar mix.

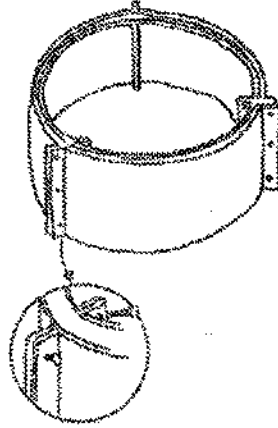
2. Hessian is draped around the hole. The hessian can be held in place with sharp sticks, nails or large staples, depending on the soil conditions. The hessian is then plastered in layers. It is important that the lining is as concentric as possible.
3. U-nails or staples can be used to attach the hessian to the side of the pit before is plastered.



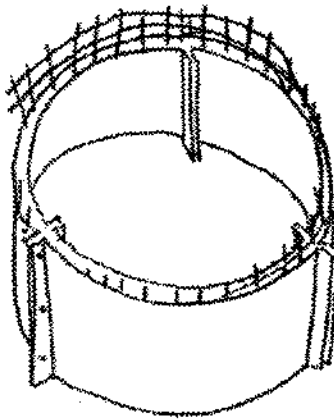
4. Each layer of plaster should be left to dry before the next one is added.
5. For deep pits, it is possible to line prior to further excavation, so providing extra safety
6. A shallow ring foundation should be dug and laid around the top of the lining once it is set. This could also be laid prior to excavation.

Construction of a lined pit using rings (for very soft sand)

○ STEP 1: MAKING A RING



1. Place the mould and join with pins



2. Measure the brick force and place in the mould



Sand

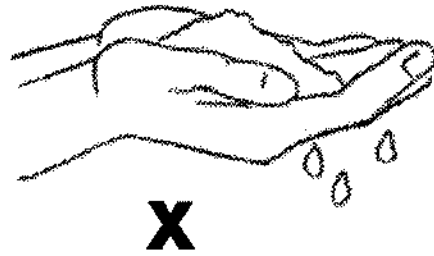


Cement

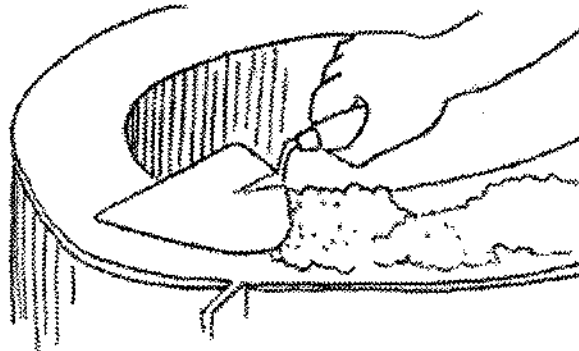
3. Mix the sand and cement 4 parts sand to 1 part cement

Construction of a lined pit using rings (for very soft sand)

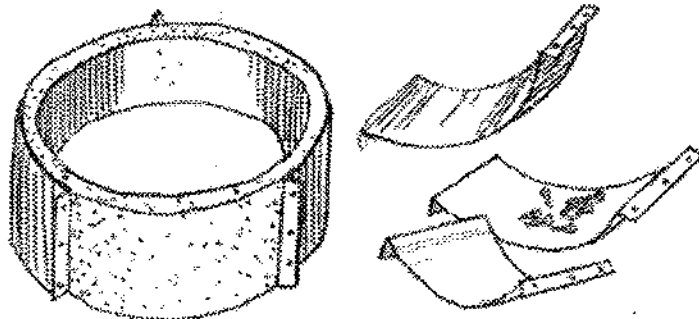
MAKING A RING



4. Your mixture should be muddy like the mixture used for forming bricks



5. Place the mixture into the mould. Vibrate the mould by the sides with a stick, then smooth the ring with a trowel



6. Strip the mould after 4 days

BUILDER'S MANUAL

2: Sub-structures

Construction of a lined pit using rings (for very soft sand)

MAKING A RING

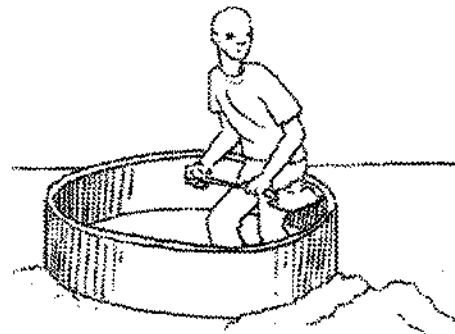


7. It is important to water the rings and keep them covered with plastic so that the concrete cures and is strong.

○ STEP 2: DIGGING THE PIT



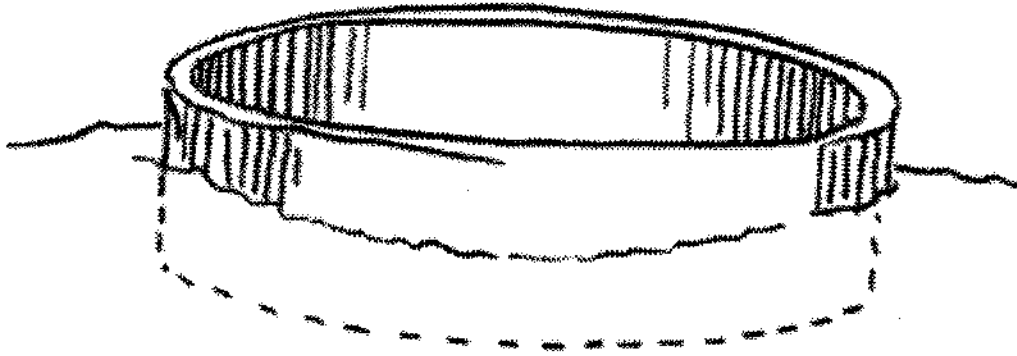
1. Find people who will assist in carrying the ring and place them where the building will be taking place



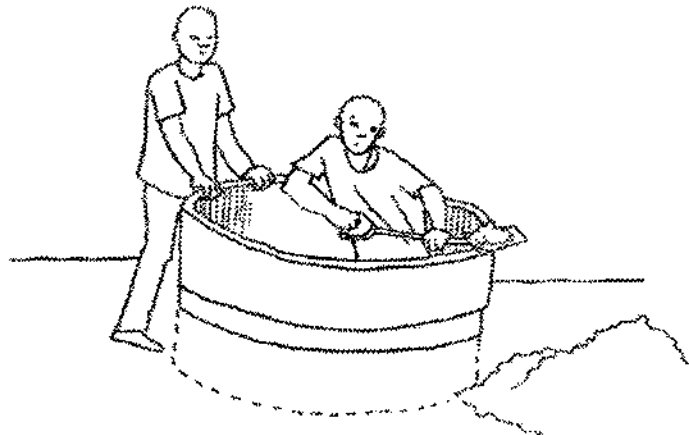
2. Start digging inside the ring

Construction of a lined pit using rings (for very soft sand)

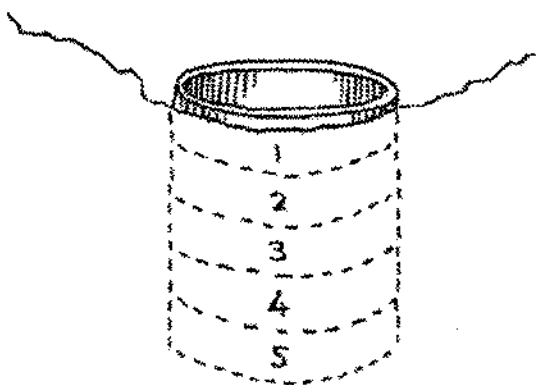
DIGGING THE PIT



3. The ring should sink into the ground



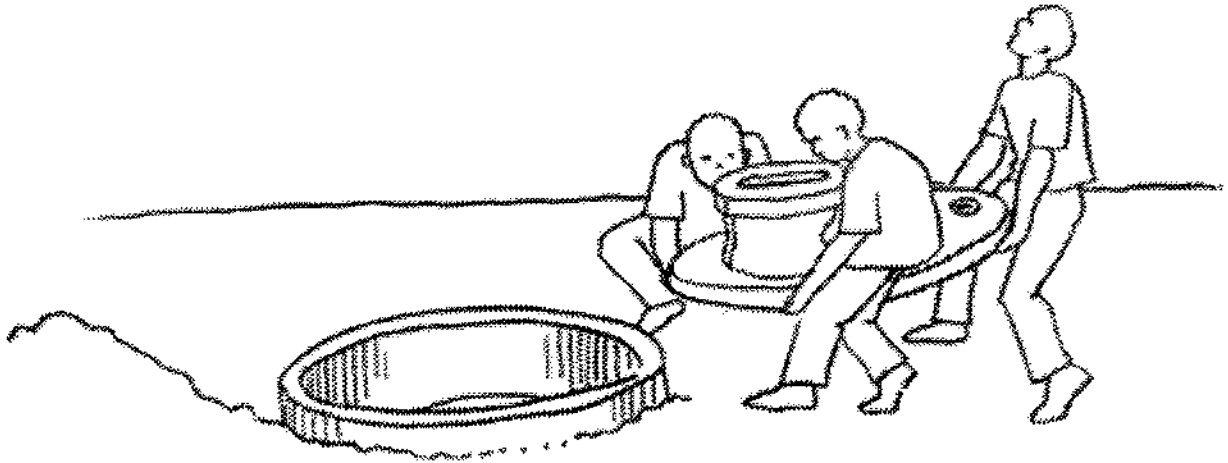
4. Place another ring on top of the first one



5. Continue digging and placing more rings on top of the other until there are five sunk into the ground

Construction of a lined pit using rings (for very soft sand)

FINISHING OFF



6. Assist the builder in placing the slab

BUILDER'S MANUAL

3: Slabs and pedestals

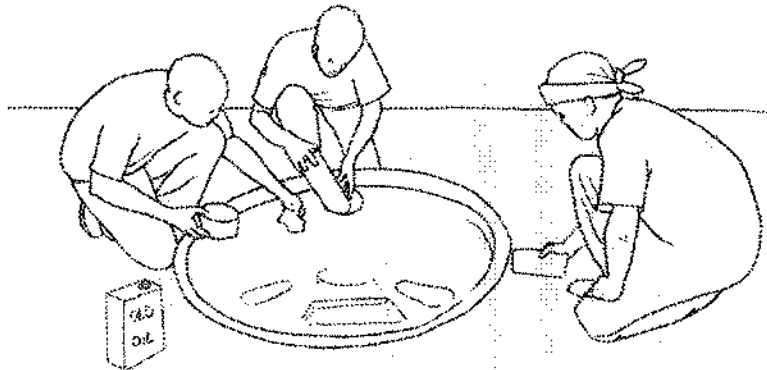
Construction of the domed slab

Mix: 1 ½ wheelbarrow river sand
½ bag of cement

Important: The mix should not be too wet, otherwise it will slide to the centre where the seat hole is.

○ STEP 1

Clean the mould and then oil it using the motor oil

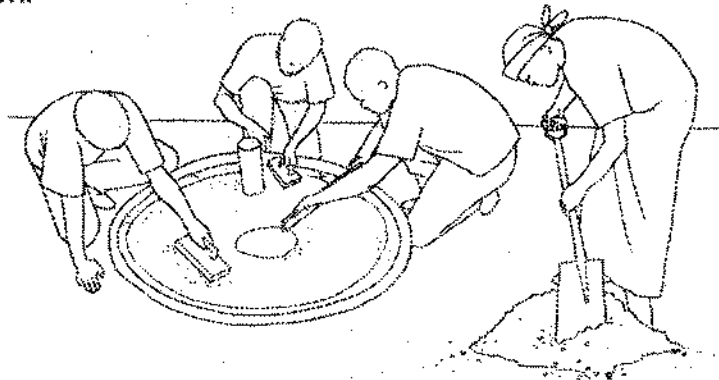


○ STEP 2

Oil about 20cm vent pipe and put it into the vent pipe hole

○ STEP 3

After the mould is properly oiled, put the sand and cement mixture inside the mould and begin to stamp it down.



○ STEP 4

Fill the mould with the mixture and continue stamping it down to close air spaces and for closer compacting. Do this until water begins to rise to the surface.

○ STEP 5

After the mould is filled put the building wire around the outside of the mould.

○ STEP 6

Use a steel float for better finish and then cover the slab up with paper or plastic to prevent moisture from escaping.

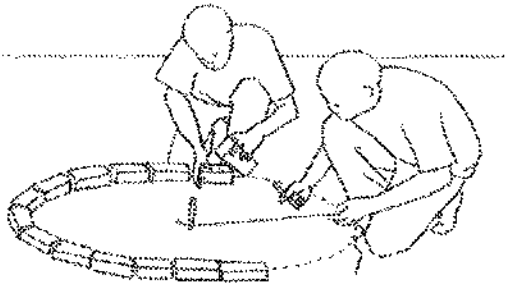
BUILDER'S MANUAL

3: Slabs and pedestals

Construction of a round slab for Ventilated Improved Pit (VIP) and Urine Diversion toilets.

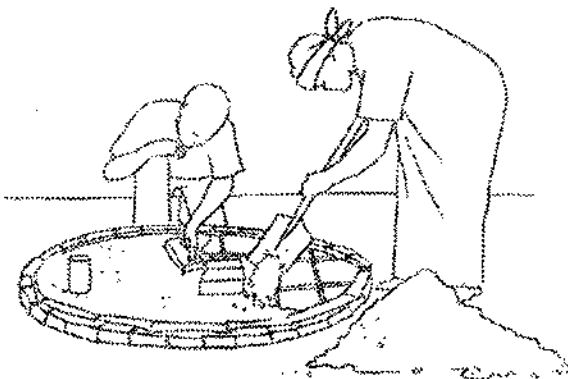
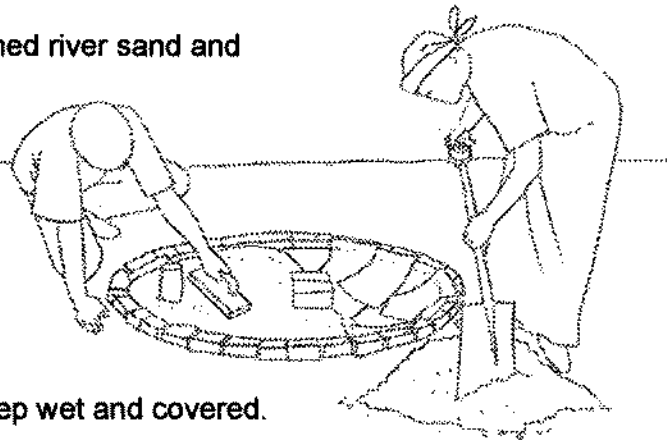
○ STEP 1 - MAKING THE COVER SLAB MOULD

1. Make a circle of bricks with internal diameter of 1.3 meters.
2. Lay cement bag paper or plastic inside the bricks.



○ STEP 2 - MAKING THE COVERSLAB

1. Place form for ventpipe and pedestal hole.
2. The concrete mixture is 5 parts washed river sand and 1 part cement.
4. Add half the mixture first (full mixture uses half bag cement).
5. Add 4 mm reinforcing wire with 150mm spaces.
6. Add remaining mixture until slab is 75mm thick.
7. Leave for a least 5 days to cure - keep wet and covered.



BUILDER'S MANUAL

3: Slabs and pedestals

Construction of a square slab (maximum size 1.5 m x 1.5 m)

Mix: 3 parts river sand to 1 part cement

► STEP 1

Make a mould of the required size using wood or bricks. The frame can be made from wood taken from old furniture, cupboards, beds etc. or you could build a frame from steel or bricks.

Fill the mould with sand to get the correct volume of sand, then fill one third of the mould with cement to get the correct volume of cement.

► STEP 2

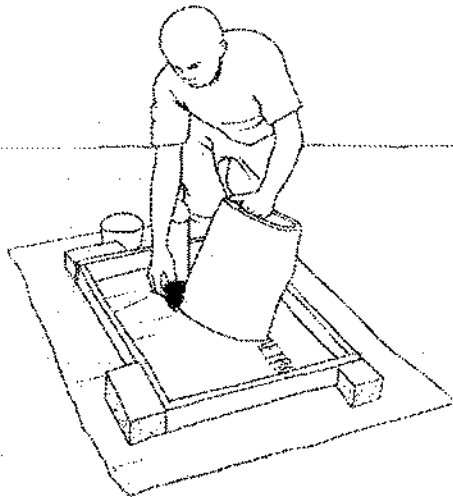
Put down plastic and then place the mould on top of the plastic. The plastic prevents water from being absorbed into the soil, which will cause the slab to lose moisture and become dry.

The slab needs water to harden properly and become strong.

► STEP 3

Secure your mould firmly by placing bricks or other heavy materials against the sides.

This is important for a better finish and a slab with square corners.



► STEP 4

Oil the 20 cm vent pipe and seat mould to be used, so that they can easily be removed when the slab is dry.

► STEP 5

Position the vent pipe by placing two bricks at right angles to each other in one corner of the frame. Place the vent pipe and remove the bricks.

The position of the vent pipe must be measured accurately, otherwise the hole in the slab may be on top of the collar of the pit and ventilation may be hindered.

Place the seat mould in the centre of the slab, one brick length from the front.

BUILDER'S MANUAL

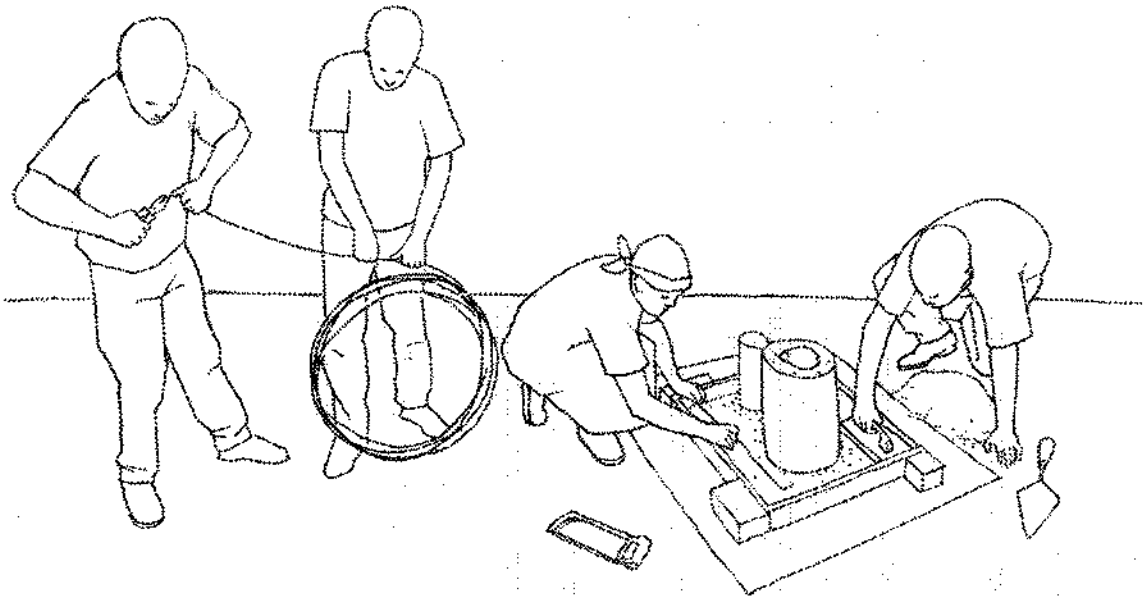
3: Slabs and pedestals

Construction of a square slab (maximum size 1.5 m x 1.5 m)

○ STEP 6

Pour $\frac{1}{3}$ of the mixture and spread it evenly inside the mould.

Make sure that you pour only $\frac{1}{3}$ of the mixture at this stage, so that the wire is in the bottom quarter of the slab. This is where the slab is in tension and needs the wire.



○ STEP 7

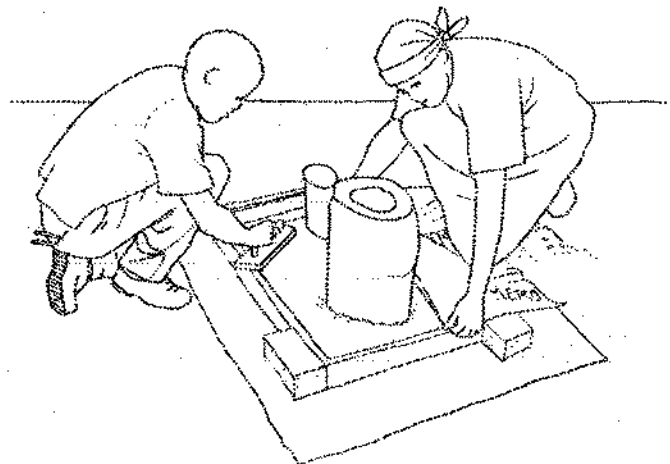
1. Place 3 building wires, which have been cut to size to fit the slab frame on the right of the VIP seat.
2. Place another 3 wires on the left side of the seat.
3. Place 2 in front of the seat.
4. Place 2 at the back of the seat.

○ STEP 8

Add the rest of the mixture and level it. Cover the wet slab with plastic.

Remove the vent pipe and seat mould after one day.

The slab can be moved after 7 days.



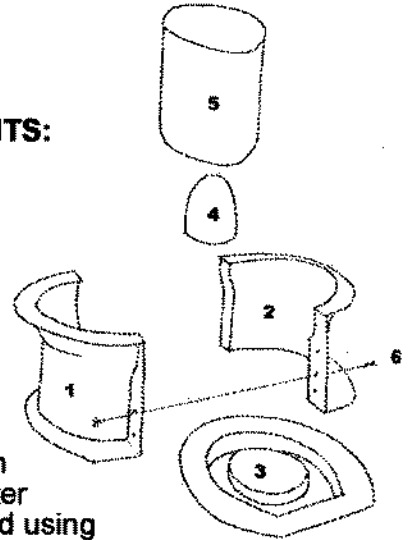
BUILDER'S MANUAL

3: Slabs and pedestals

Construction of a Cement Mortar Toilet Pedestal

THE MOULD CONSISTS OF THE FOLLOWING COMPONENTS:

- 1 & 2 Outside forms
- 3 Top form
- 4 Urine Diversion form
- 5 Inside form
- 6 Gutter bolts and wing nuts

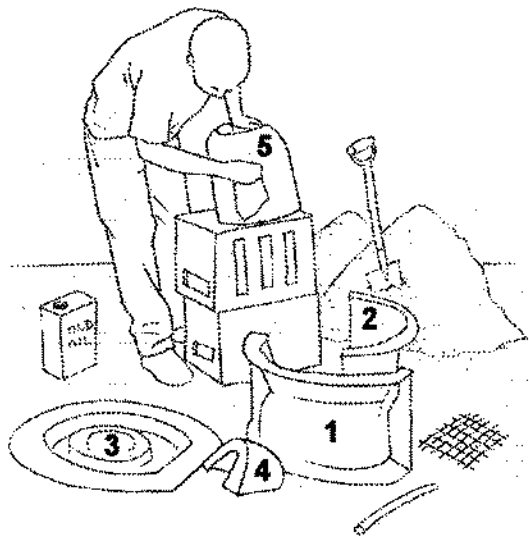


○ STEP 1 - CLEANING THE MOULDS

Make sure the smooth side (inner side) of the moulds are clean before you begin. (If there are holes or cracks, use the polyester filler to fix them, then polish the mould with a rubbing compound using a dry cloth.

If the mould is badly scratched, apply the rubbing compound, then use a buffer attachment on an electric drill to smooth out the surface.

○ STEP 2 - ASSEMBLING THE MOULDS



1. Attach the inside form 4 to the top form 3
2. Seal the joint between forms 4 and 5 with Prestik. Attach to form 3.
3. The joints must be tightly sealed with Prestik and Masking tape to prevent any leaks during casting.
4. Oil the insides of the moulds after assembly using the old oil in order to prevent the cement from sticking to the mould.
5. Cut a piece of wire mesh to shape and size and insert it in the slot between forms 4 and 5. (Urine Diversion toilet only)

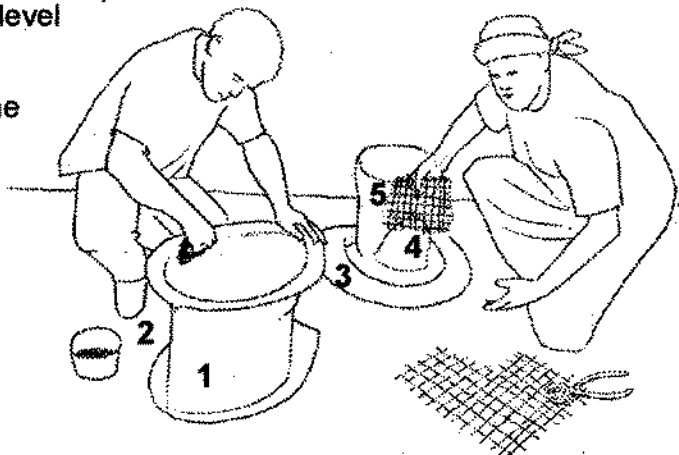
6. Assemble forms 1 and 2 and line the joints with masking tape to prevent leaks, then oil well.

7. Place the assembled mould so that the open end is facing up, then place on a level surface.

Use a spirit level to ensure that the moulds are level to the ground.

8. Insert a pipe over the screw in form 4 and hold it in position while feeding the mixture into the mould.

(Urine Diversion mould only)



BUILDER'S MANUAL

3: Slabs and pedestals

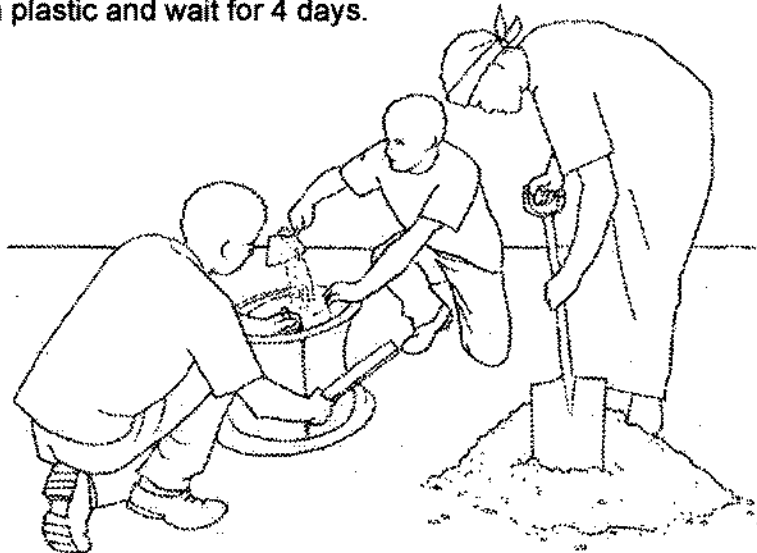
Construction of a Cement Mortar Toilet Pedestal

○ STEP 3 - CASTING THE PEDESTAL

Use the Spirit Level to ensure that the moulds are level to the ground.

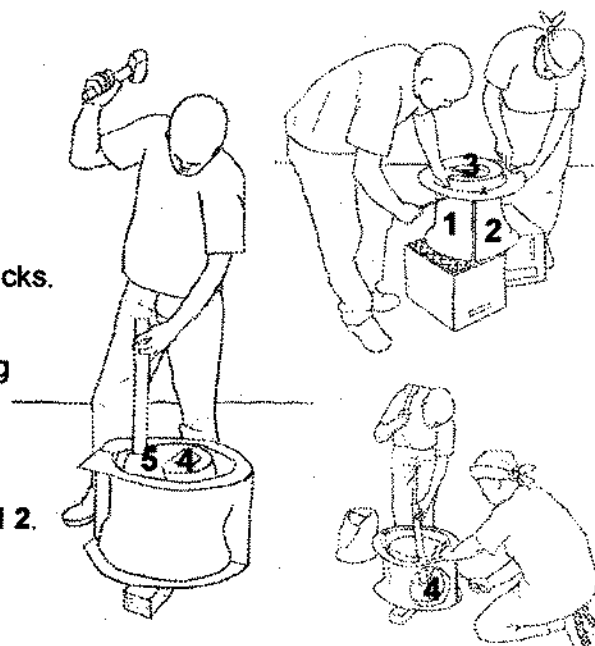
Mix: 1 part river sand to 1 part plaster sand and 1 part cement. This means you should mix 6 litres of cement with 6 litres of plaster sand and 6 litres of river sand. Add water to form a smooth paste.

1. Ensure that the mixture is consistent as impurities cause weak points and cracks.
2. Feed the mixture into the mould using the spade, holding the pipe in place.
3. Vibrate the mould by tapping the outside with a wooden stick until bubbles stop appearing on the surface. Do not push the cement forcefully into the mould.
4. Cover with plastic and wait for 4 days.



○ STEP 4 - STRIPPING THE MOULDS

1. Undo the nuts to release form 3. This will also release forms 4 and 5. Ease off form 3 using a screwdriver.
2. Turn the mould over and place on bricks.
3. Turn the mould over, place it on the ground and release form 4 by tapping with a hammer and block.
Release form 5 the same way.
4. Undo the nuts to release forms 1 and 2.



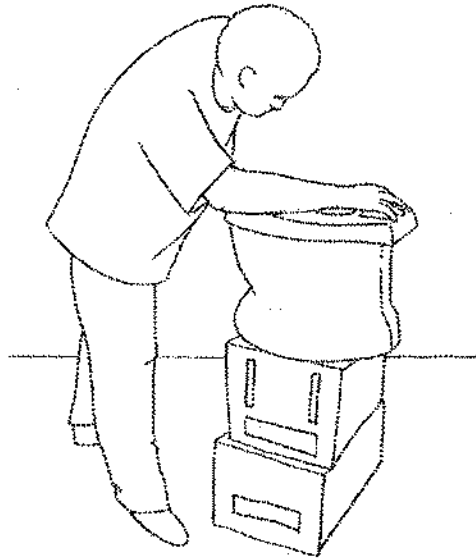
BUILDER'S MANUAL

3: Slabs and pedestals

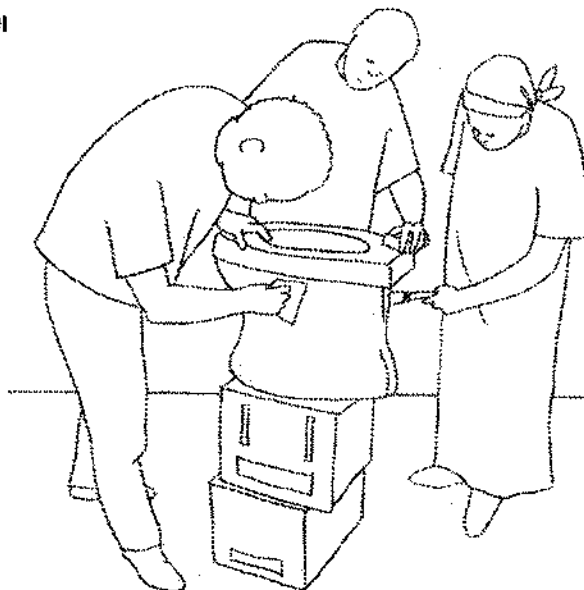
Construction of a Cement Mortar Toilet Pedestal

○ STEP 4 - STRIPPING THE MOULDS

5. Make sure the urine diversion pipe is clear.
6. Neatly fill all holes in the pedestal with cement paste.



7. Use **grade 6 (P60) sand paper** to smooth off any rough areas.
8. Cover with a plastic bag for 7 days.
9. Paint with oil based undercoat.
10. Finish with oil based paint.



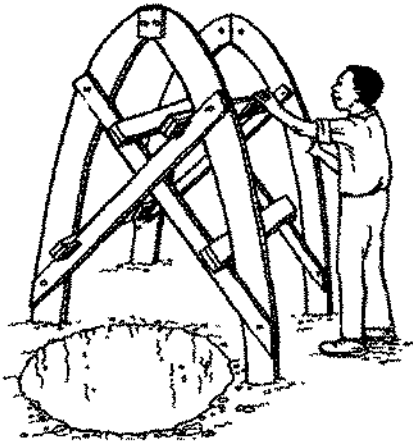
BUILDER'S MANUAL

4: Toilet buildings

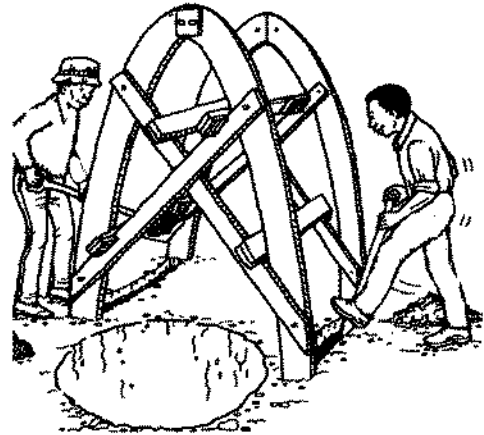
Construction of the Archloo Superstructure

DAY 1

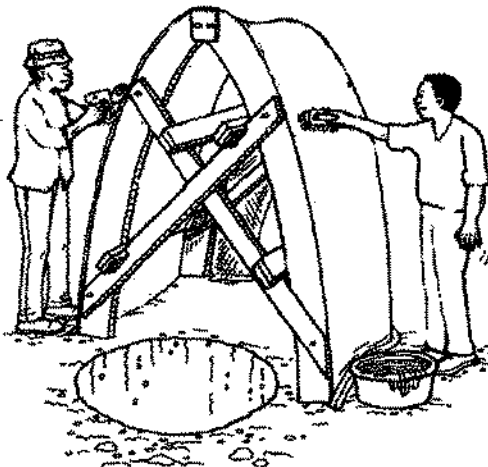
◉ STEP 1 - SET UP THE FORMWORK



◉ STEP 2 - DIG THE FOUNDATION



◉ STEP 3 - LAY HESSIAN AND PAINT WITH SLURRY AND PLASTER



◉ STEP 4 - LAY HESSIAN FOR COLLAR AND PIT LINING. PLASTER FIRST LAYER.



◉ STEP 5 - SET UP FORMS FOR FRONT AND BACK SECTIONS OF THE PIT COVER.



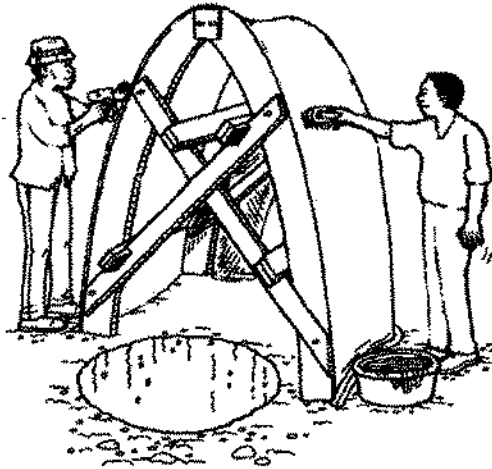
BUILDER'S MANUAL

4: Toilet buildings

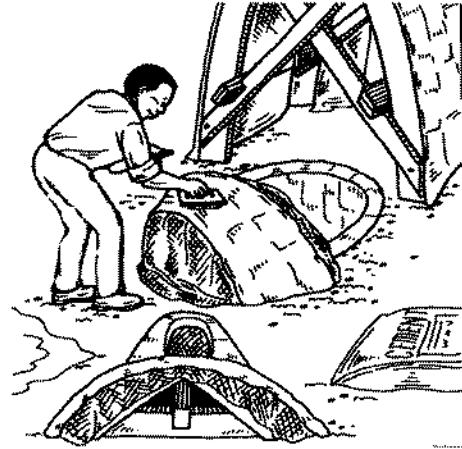
Construction of the Archloo Superstructure

DAY 2

○ STEP 1 - PLASTER MAIN ARCH (SECOND LAYER)

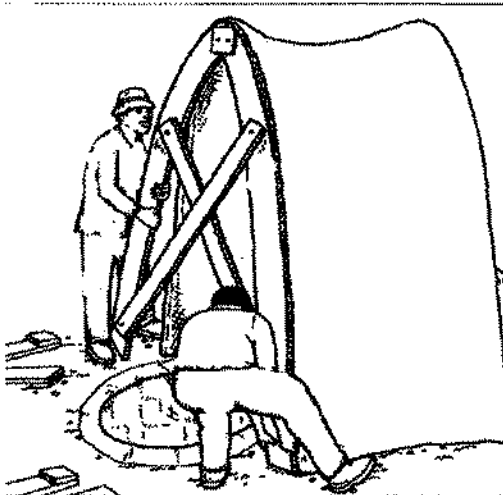


○ STEP 2 - PLASTER PIT COVER (SECOND LAYER)

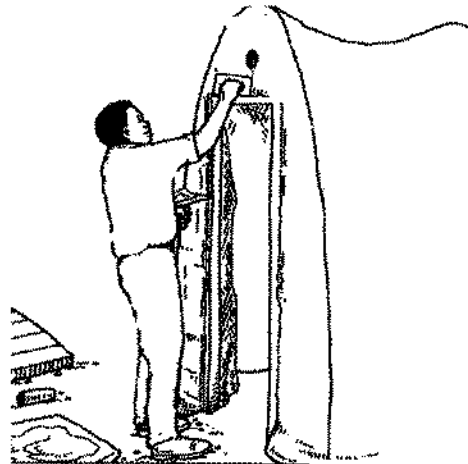


DAY 3

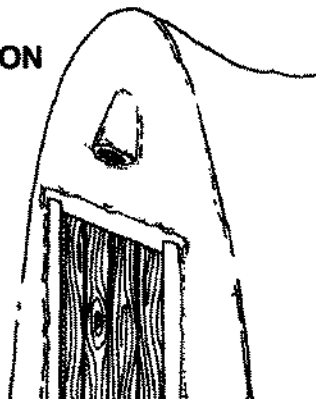
○ STEP 1 - REMOVE FORMS. APPLY THIRD PLASTER LAYER WITH SMOOTH FINISH.



○ STEP 2 - SET DOOR FRAME AND HESSIAN FOR FRONT WALL. APPLY FIRST LAYER OF PLASTER.



○ STEP 3 - INSERT VENTILATION HOLE ABOVE THE DOOR.



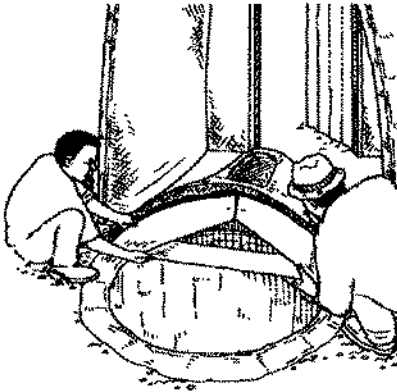
BUILDER'S MANUAL

4: Toilet buildings

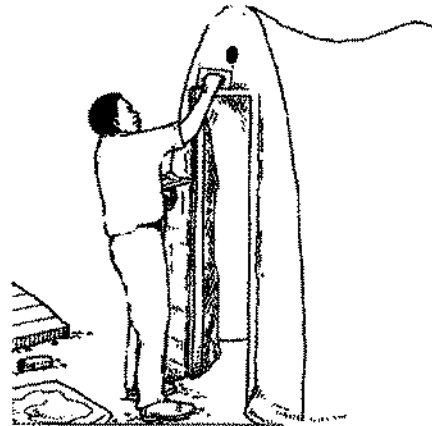
Construction of the Archloo Superstructure

DAY 4

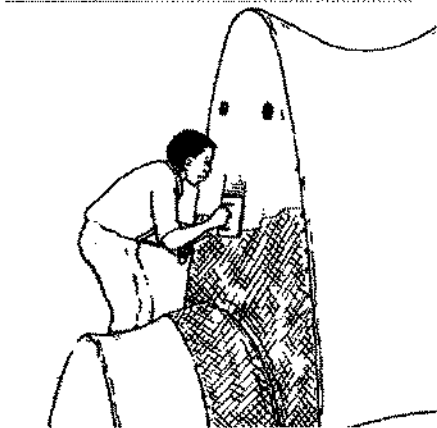
- STEP 1 - PLACE PEDESTAL/COVER OVER PIT. REMOVE FORMS.



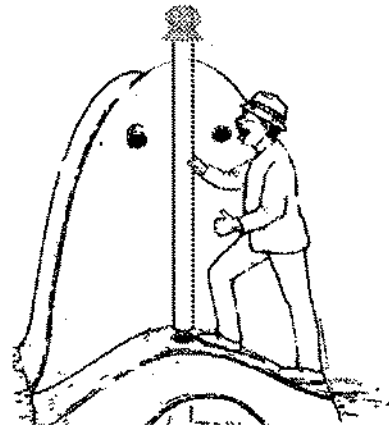
- STEP 2 - PLASTER FRONT WALL. (SECOND LAYER)



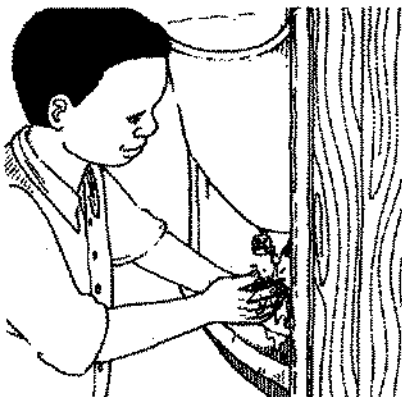
- STEP 3 - LAY HESSIAN AND PLASTER THIRD PLASTER LAYER WITH SMOOTH FINISH.



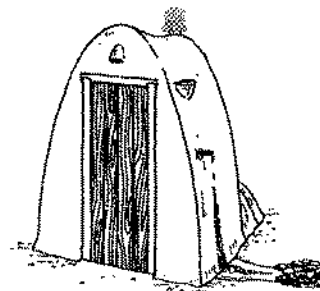
- STEP 1 - INSERT VENT PIPE INTO PEDESTAL COVER HOLE. SEAL AROUND THE HOLE



- STEP 2 - INSERT SINK AND TAP



- STEP 3 - COMPLETE SOAKAWAY. APPLY THIRD AND FINAL LAYERS TO FRONT AND BACK WALLS. FIT DOOR. PLASTER FLOOR.



BUILDER'S MANUAL

4: Toilet buildings

Installing a UDS inside a house.

▷ STEP 1 - CAST THE SLAB

Follow the instructions under 3: Slabs & Pedestals - Square slab.

The size of the slab should be 600 mm by 830 mm

▷ STEP 2 - CONSTRUCTION OF THE PIT

Dig a pit outside of the house (if floor is at ground level).



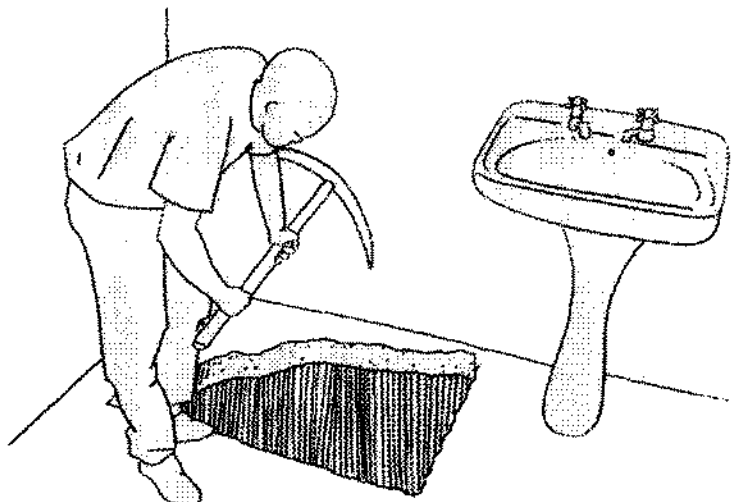
▷ STEP 3: EXTEND THE PIT

From the outside pit, dig a pit under the floor of the house to where toilet will be placed.

▷ STEP 4: INSIDE THE HOUSE

Break through floor in house, cast floor of pit and build walls.

Size of pit under house should be 600mm wide, 600mm long (from bathroom wall), and 600mm deep (or to suit bucket).



BUILDER'S MANUAL

4: Toilet buildings

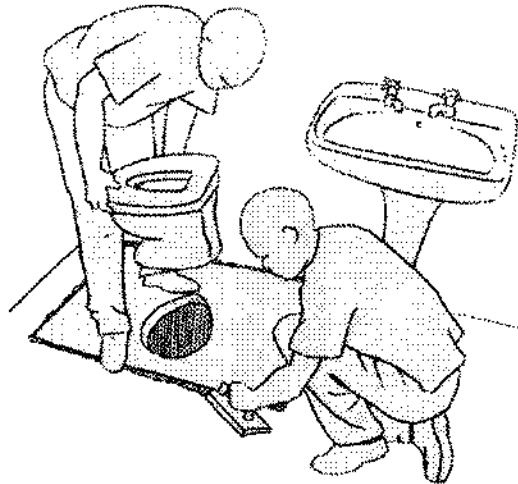
Installing a UDS inside a house

◉ STEP 5 - PLACEMENT OF SLAB AND PEDESTAL

1. Put a layer of plastic on top of the pit walls.
2. Push slab in from outside the house, over the plastic. Mortar the gap between the slab and wall to prevent movement or collapse of the home wall.
3. Level the floor with the cement – sand mixture.

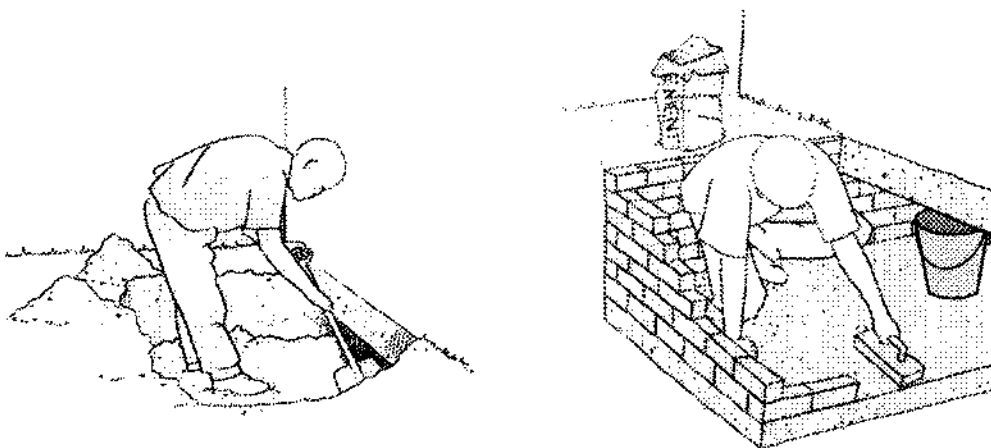
◉ STEP 6 - FIX THE PEDESTAL TO THE SLAB

1. Fix pedestal to slab, using a weak mortar mix.
2. Connect the pipe in the pedestal to the urine outlet pipe using a compression fitting.
3. Lead the outlet pipe through the back-wall of the pit to the soakaway, making sure that the pipe is next to the wall so that faeces cannot drop on it.



◉ STEP 7 - EXTEND THE PIT

If pit is below **ground** level, as opposed to being below **floor** level, extend the pit outside of the house to enable bucket to be removed.



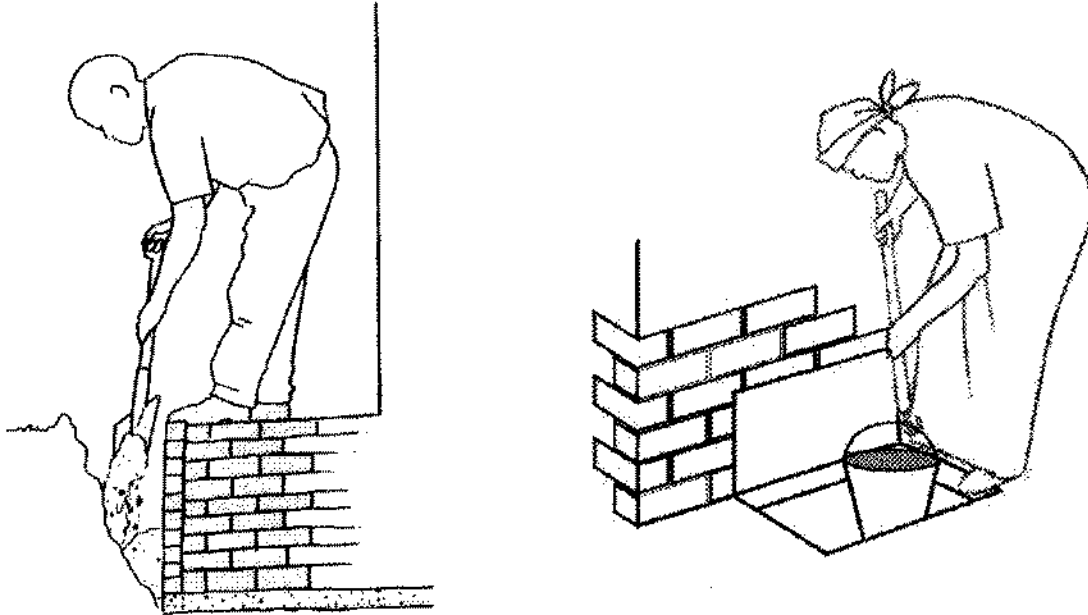
BUILDER'S MANUAL

4: Toilet buildings

Installing a UDS inside a house.

STEP 7 - IF THE PIT IS BELOW GROUND LEVEL

If pit is below **ground** level, as opposed to being below **floor** level, extend the pit outside of the house to enable bucket to be removed.



Note: In some houses there might be a difference between floor level and ground level. If floor level is higher than the ground level, there is no need to dig the pit under ground level. Instead one can break away the wall of the house under floor level, and create a chamber for the bucket on ground level.

STEP 8 - PIT COVER

Construct cover for the pit, using available material. The cover must be watertight.

STEP 9 - BUCKET

Place a 45 liter bucket under the toilet to catch the faeces.

STEP 10 - CONSTRUCTION OF A SOAKAWAY

1. Dig a pit at least 2 meters from the house, 500mm wide, 500mm long and 600mm deep.
2. Fill the pit with stones, to 100mm below ground level.
3. Lead the urine outlet pipe underground to the centre of the pit.
4. Cover the outlet pipe and stones with plastic.
5. Cover the pit with soil.

BUILDER'S MANUAL

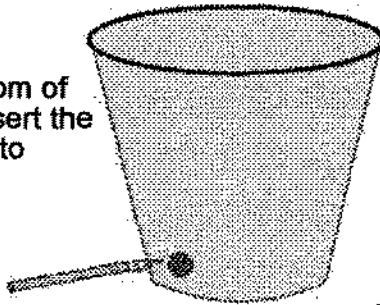
5: Additional facilities

Making a hand-wash facility

A cheap and easy to make hand-washing facility can be made using a 10 or 15 liter bucket and a screw-type box wine tap (either recovered from a box of wine or bought for 50c - currently only available from Mvula offices)

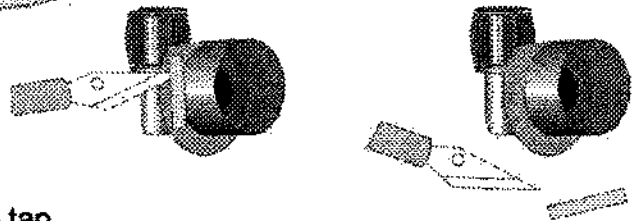
STEP 1

Cut a hole just above the bottom of the bucket, the right size to insert the wine tap. The fit must be tight to prevent leakage.



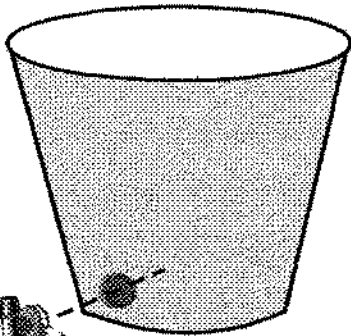
STEP 2

Cut the two edges flush off the back of the tap flange.



STEP 3

Put silicon sealer around the inside flange of the tap and push it through the hole in the bucket.



STEP 4

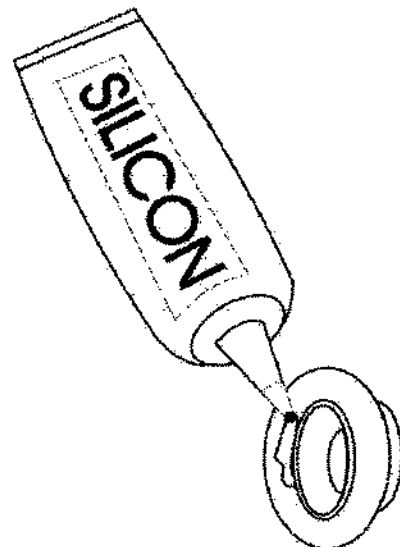
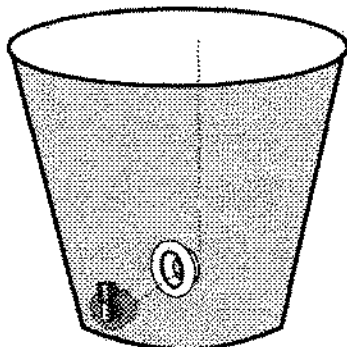
Warm up the white flange in hot water and dry it. The hot water will expand the flange so that the tap can slide in easier.

STEP 5

Put silicon sealer on the white flange and squeeze it onto the back of the wine tap on the inside of the bucket, pinching the bucket tightly between the two flanges.

STEP 6

Repair any possible gaps with more silicon and allow to dry before use.



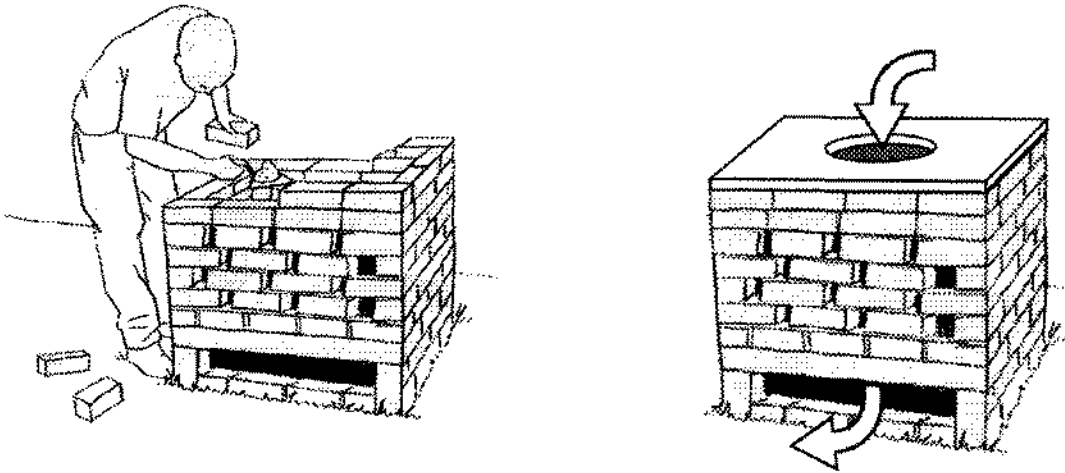
Building a composter

Faeces will have to be removed from your toilet once per month and placed in a composter until it has decomposed and is safe to handle.

The composter can be constructed in two ways.

○ SINGLE UNIT COMPOSTER

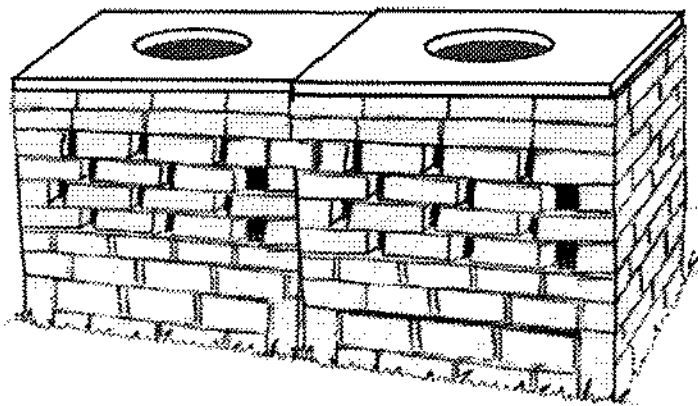
Build a single unit by constructing a square roughly 70cm x 70cm x 100cm. With the singly unit faeces is fed in from the top and taken out the bottom.



○ DOUBLE UNIT COMPOSTER

The double unit composter is basically two single units joined together and where one side is filled first, then the other.

When both are full the first side is emptied and re-used.



A composter can be built from anything so long as it prevents children and animals from getting in and allows plenty of air into it.