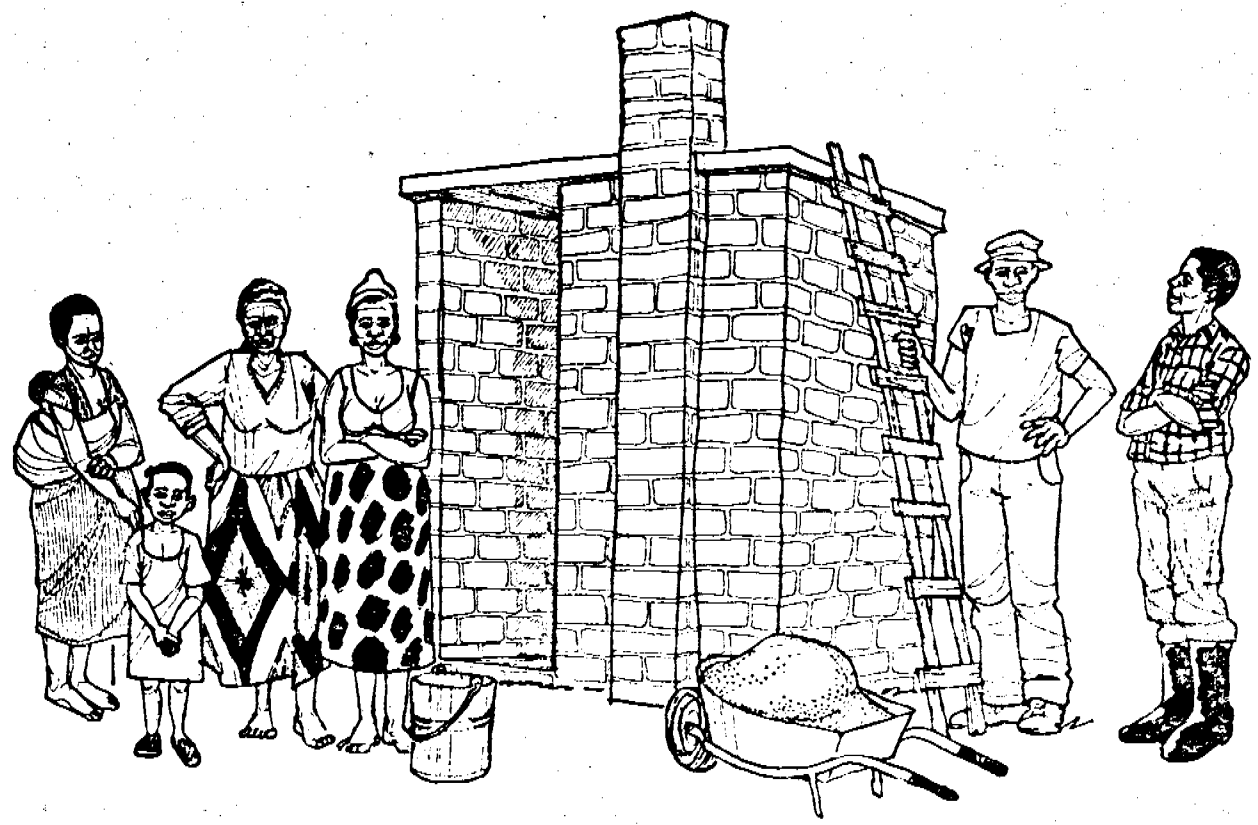


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# THE BLAIR LATRINE BUILDERS MANUAL

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SANITATION (IRC)



**BLAIR RESEARCH LABORATORY**  
**MINISTRY OF HEALTH**  
**ZIMBABWE**

## **ACKNOWLEDGEMENTS**

This manual describes the technique of building a single compartment Blair latrine, designed at the Blair Research Laboratory. It is an updated version of the original manual developed by Mrs Sue Laver for the Ministry of Health. The fine illustrations used in this manual are those of the artist Kors de Waard whose excellent work has appeared in several manuals developed for the Ministry.

Much credit is also due to the field teams who have trained large numbers of builders over the years. The techniques described are also in great part a result of the strong support given to the rural sanitation programme by the Department of Environmental Health.

Acknowledgement is also made to Piers Cross, the UNDP/World Bank Water and Sanitation Adviser for assistance in final production. The Norwegian Agency for International Development (NORAD) have assisted the Ministry in financing the printing of this manual.

**Peter Morgan**

**BLAIR RESEARCH LABORATORY.**

**May 1989**

# MANY PEOPLE IN ZIMBABWE ARE BUILDING BLAIR LATRINES !

People like Blair latrines because:

- ▲ They do not smell when properly constructed
- ▲ They do not breed flies when properly constructed
- ▲ They are easy to maintain
- ▲ They are private
- ▲ They are safe for children to use
- ▲ They can also be used as a washroom
- ▲ They can be built with bricks and local skills
- ▲ They will last for many years

It is the Government's wish that each family in the Communal Lands should have their own Blair latrine

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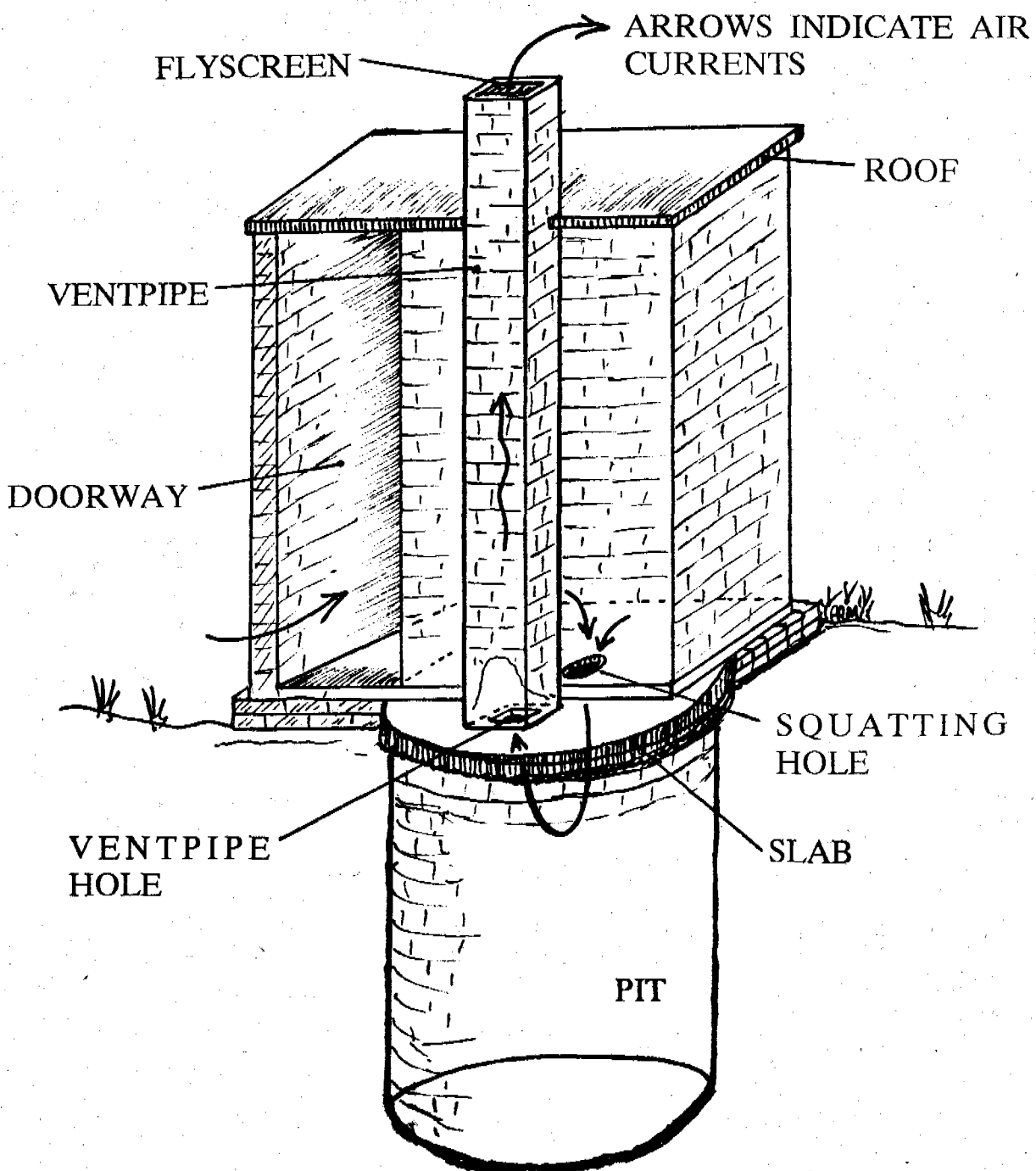


# HOW THE BLAIR LATRINE WORKS

The latrine slab is made with two holes, one for the squatting hole and one for the vent pipe. The vent pipe sucks air from the pit and fresh air is drawn down through the squat hole. The latrine itself is therefore odourless.

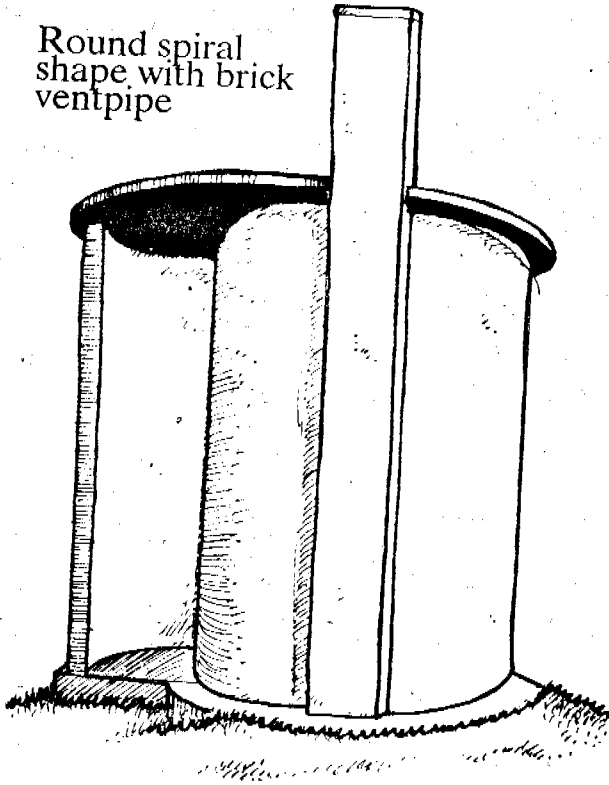
Flies approaching the latrine are attracted to odours coming from the pipe but cannot pass the screen to enter the pit. Flies escaping from the latrine are attracted to the light coming down the pipe but are trapped by the screen and cannot escape.

## THIS IS A CUT OPEN VIEW OF A BLAIR LATRINE

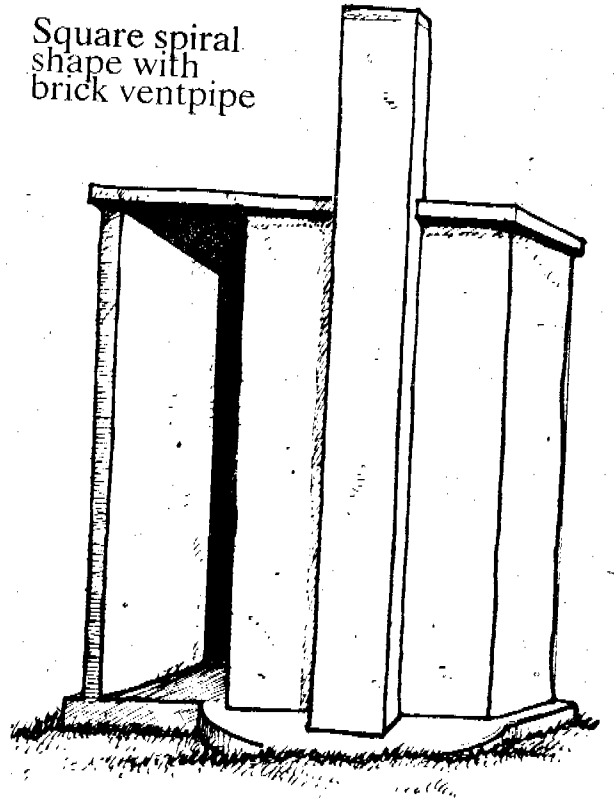


# MANY TYPES OF BLAIR LATRINE CAN BE BUILT

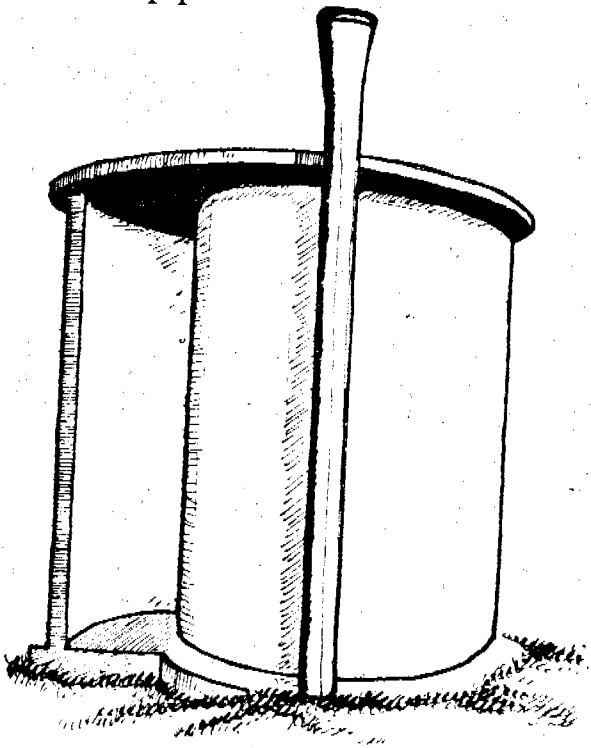
Round spiral  
shape with brick  
ventpipe



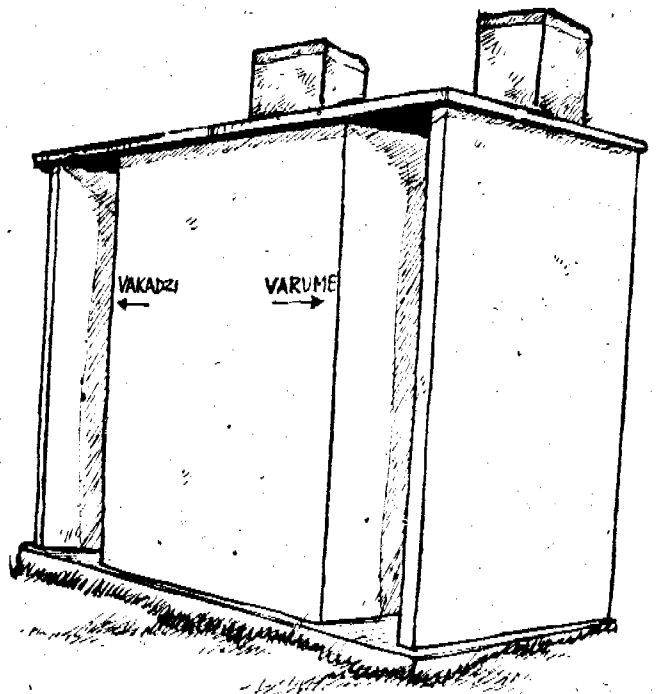
Square spiral  
shape with  
brick ventpipe



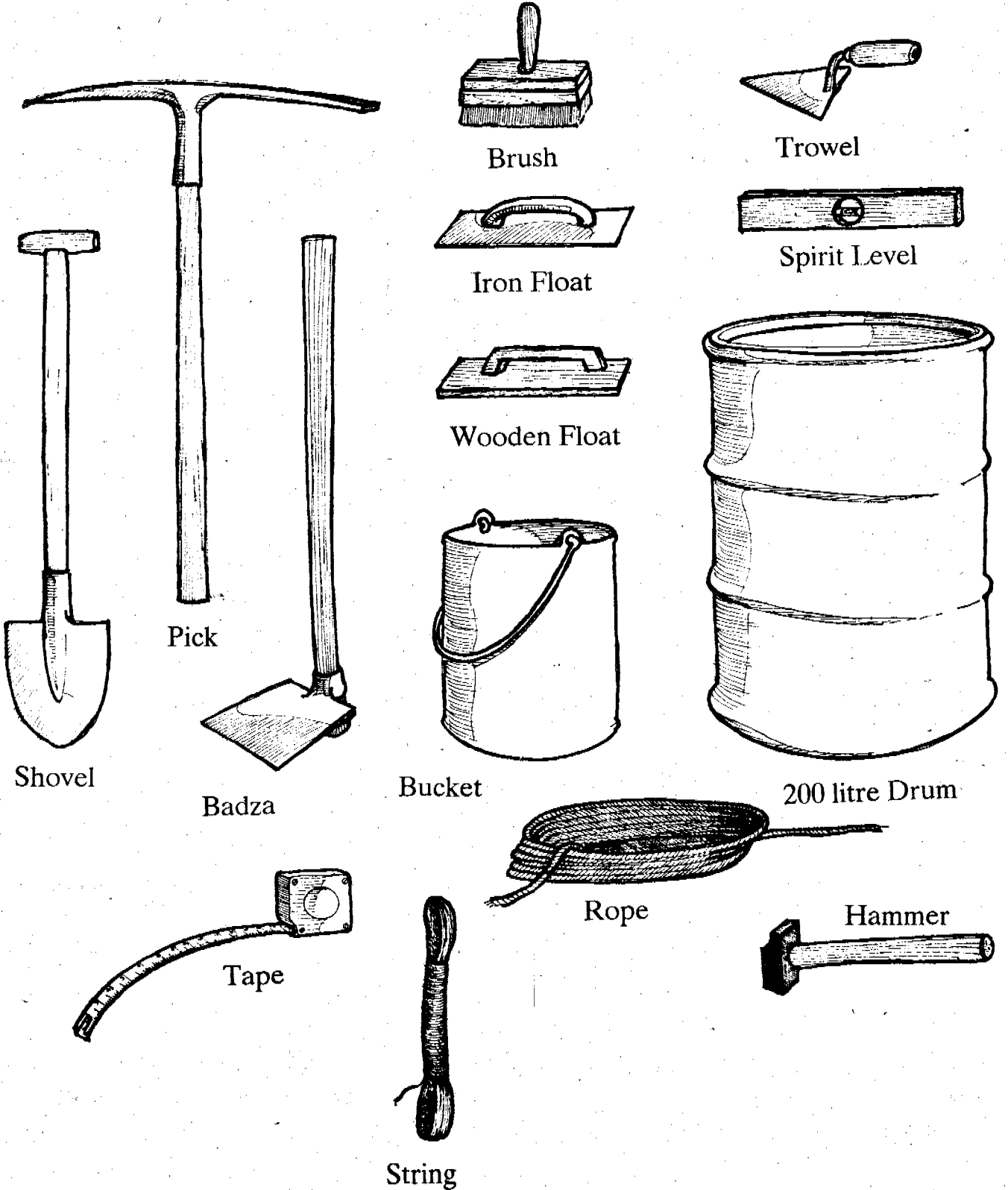
Spiral or square  
shape with PVC  
ventpipe



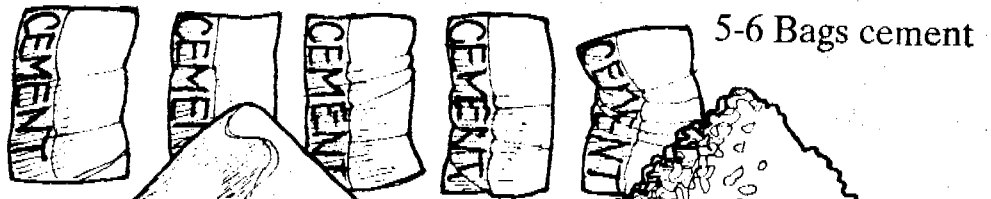
Square shape, double  
compartment or multi-  
compartment



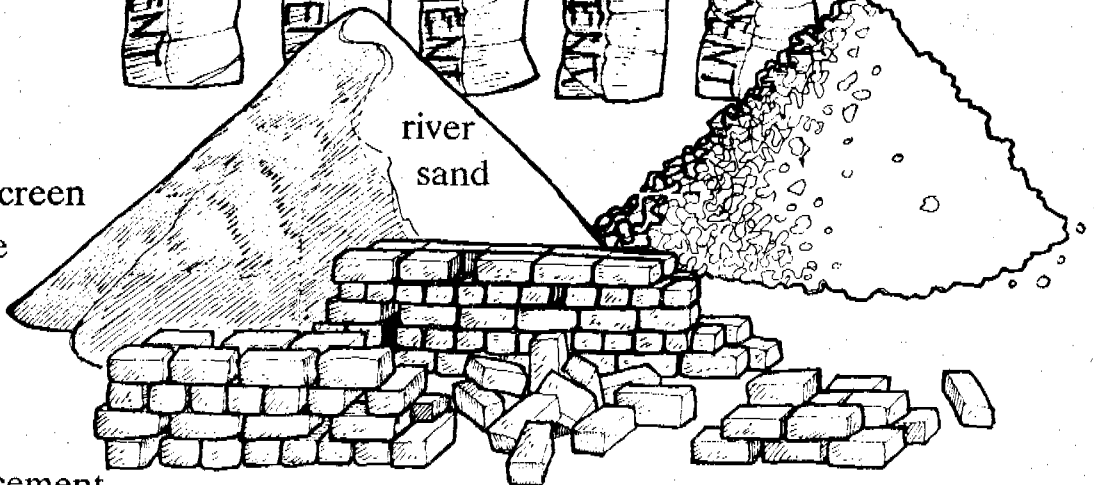
# TOOLS REQUIRED TO BUILD A BLAIR LATRINE



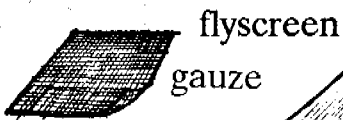
# MATERIALS REQUIRED TO BUILD A BLAIR LATRINE



5-6 Bags cement



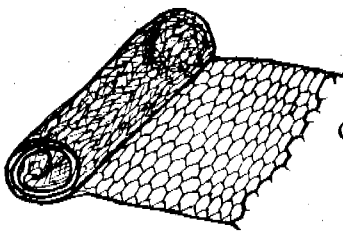
river  
sand



flyscreen  
gauze



reinforcement  
wire



chicken wire

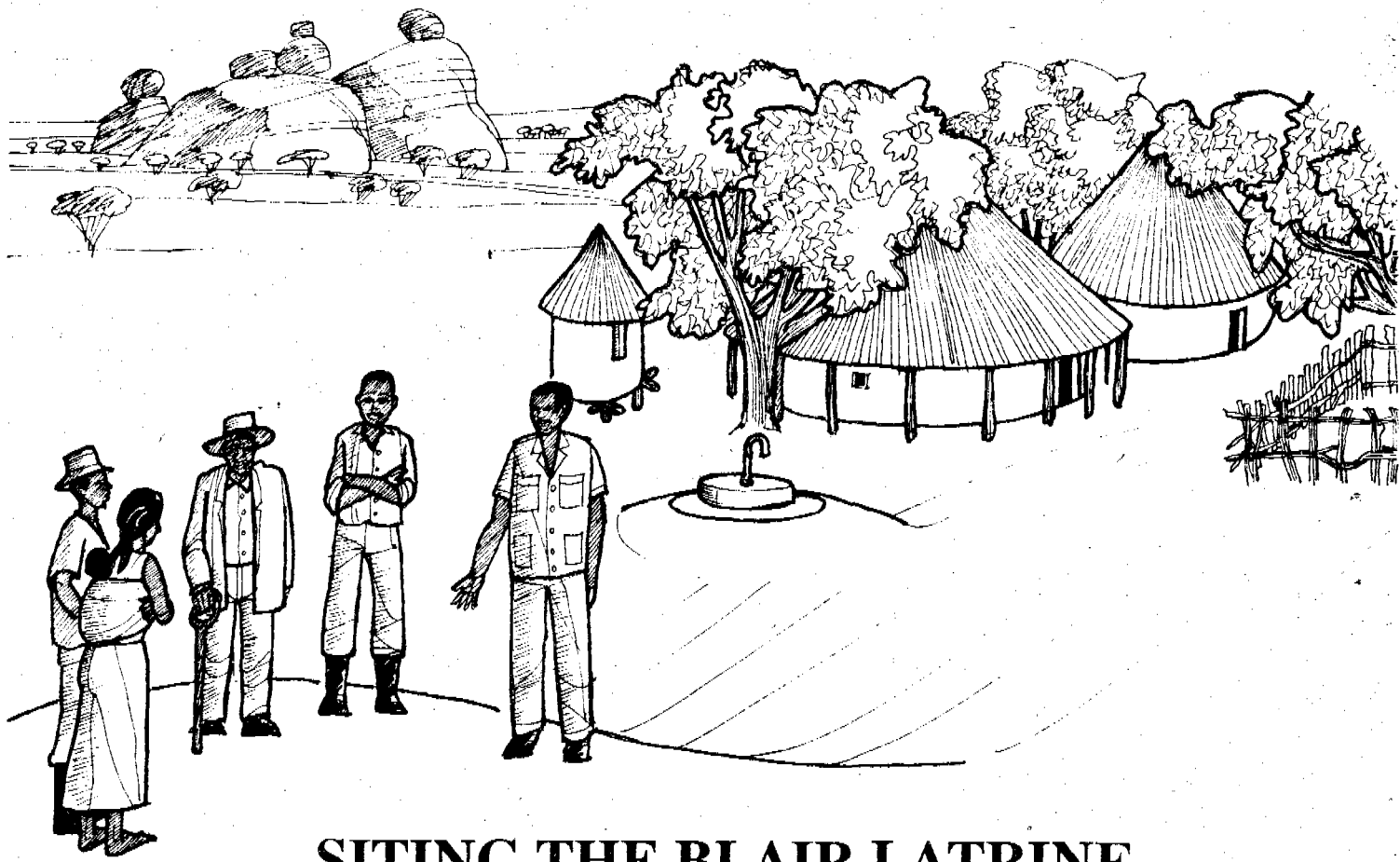
## NOTE

Use pit sand for ce-  
ment mortar and  
river sand for con-  
crete

The following materials are required to build a single Blair Latrine

- ▲ 5-6 bags of cement (depending on depth of pit)
- ▲ Bricks (1000-1200)
- ▲ River sand (approx. 1/2 cu m)
- ▲ Pit sand (approx. 1 1/2 cu m)
- ▲ Reinforcing wire (25m x 3mm)
- ▲ Chicken wire (1.7m x 2.0m of 25mm spacing)
- ▲ Flyscreen (300mm x 300mm - Aluminium or Stainless steel)

PVC vent pipes are also used in some building programmes - there are more efficient than bricks pipes. The minimum diameter for a PVC pipe is 110mm and should be about 2.5 metres long. These should be fitted with aluminium or stainless steel flyscreen.



## SITING THE BLAIR LATRINE

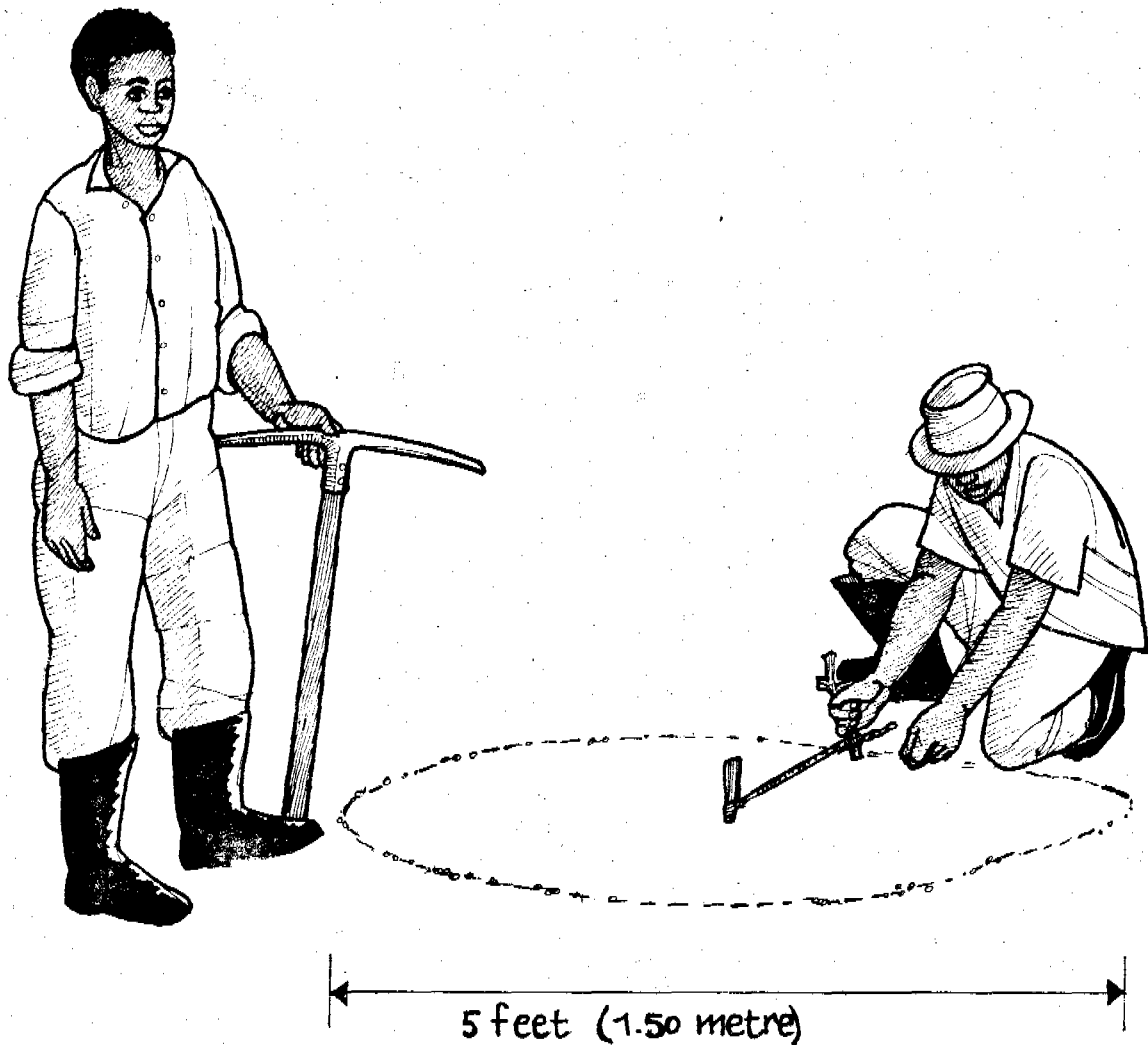
The site should be chosen by the family with assistance from a health worker and should be at least 30 metres from a well.

The site should be:

- ▲ **Downhill From A Well Or Borehole** - so that waste from the latrine does not drain into the water supply
- ▲ **Where The Soil Is Firm** - so that the latrine will not collapse
- ▲ **On Slightly Raised Ground** - so that the rainwater can drain away
- ▲ **Near The House** - so that the latrine can be used easily
- ▲ **Away From Trees** - so that air can flow freely over the pipe
- ▲ **Facing Into The Wind** - so that fresh air blows into the entrance



## STAGE 1. MARK THE SHAPE OF THE PIT



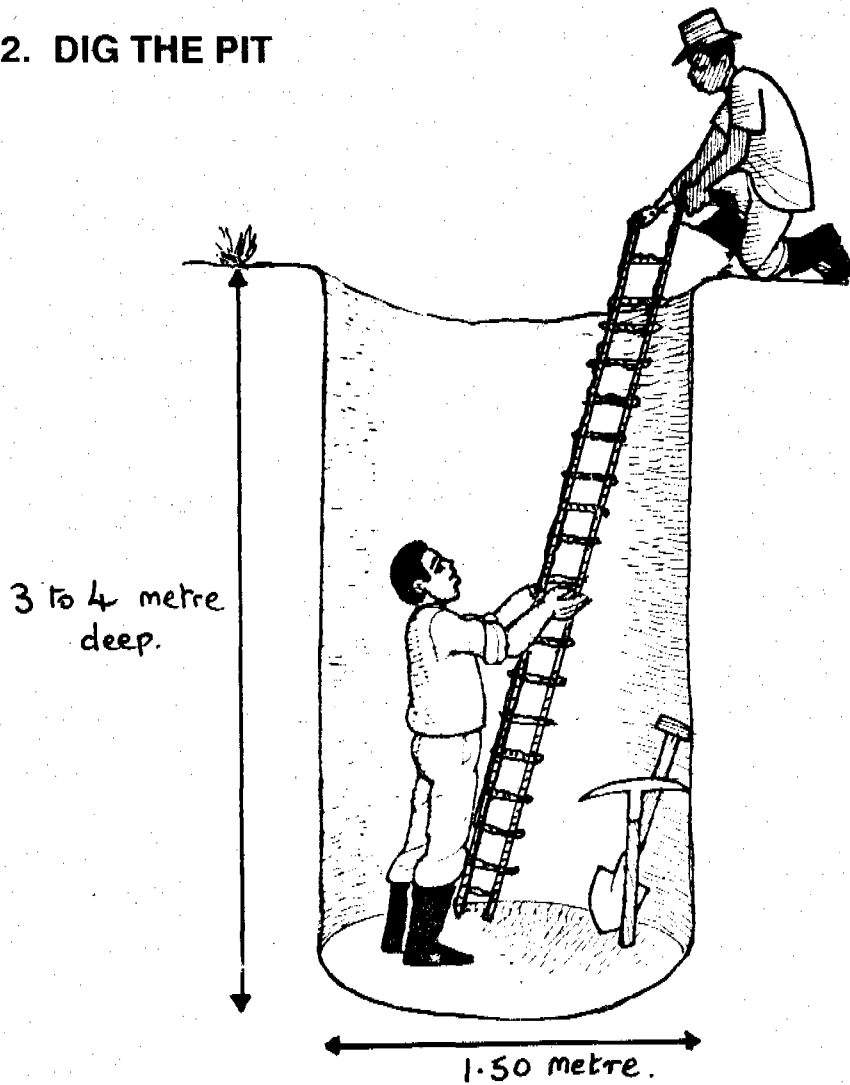
Mark the diameter of the pit before you start to dig.

To do this:

- ▲ Place a peg in the ground
- ▲ Tie a piece of string, which measures 0.75 metres on to the peg
- ▲ Walk around the peg and mark a circle in the ground

This marks the shape and diameter of the pit.

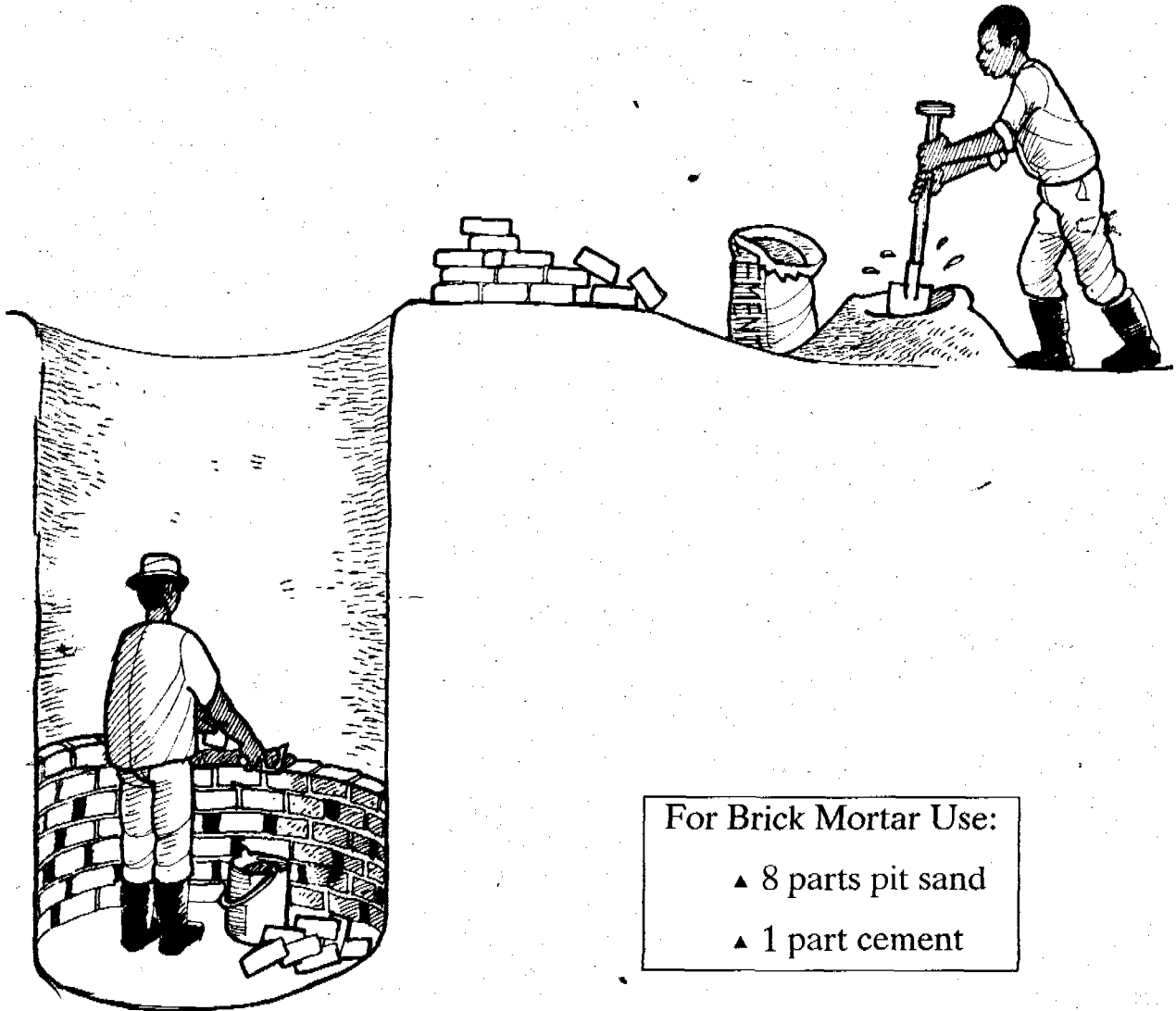
## STAGE 2. DIG THE PIT



- ▲ Keep the walls of the pit straight
- ▲ Dig as deep as possible and at least 3 metres
- ▲ Keep the pit diameter 1.5 metres
- ▲ Remove soil and rock from the pit as you dig

The pit for a latrine must be dug at least 3 metres deep and it is better to dig it 4 metres deep. The deeper a pit is dug the longer it will take to fill up!

### STAGE 3. LINE THE PIT

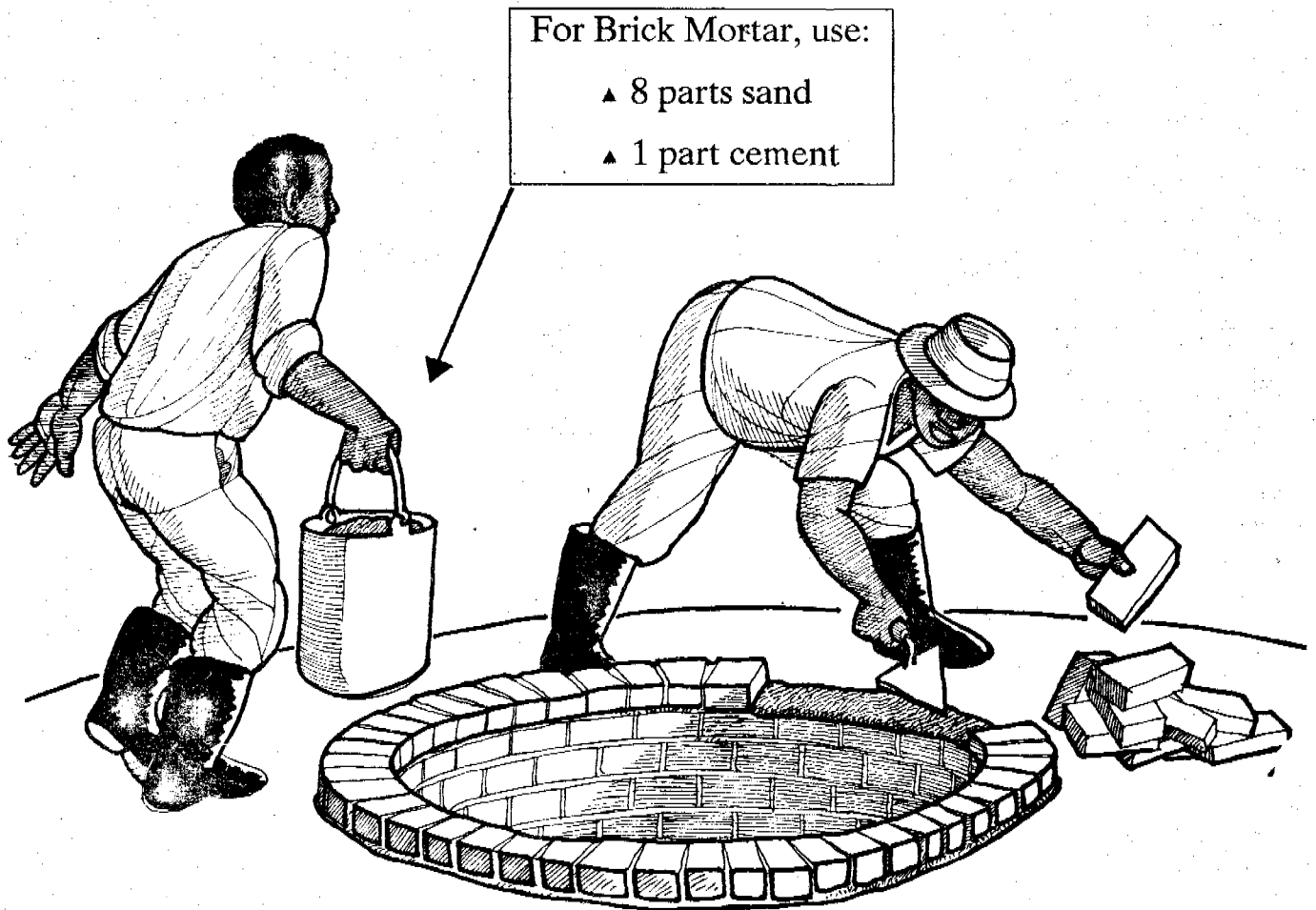


**For Brick Mortar Use:**

- ▲ 8 parts pit sand
- ▲ 1 part cement

- ▲ Line the pit from bottom to top with fired bricks and cement mortar in all soils, expect rock.
- ▲ Line the sides only, do not line the base of the pit
- ▲ As the brickwork is being built up, backfill the space between pit wall and brickwork with soil and ram firmly.

## STAGE 4. MAKE THE PIT COLLAR



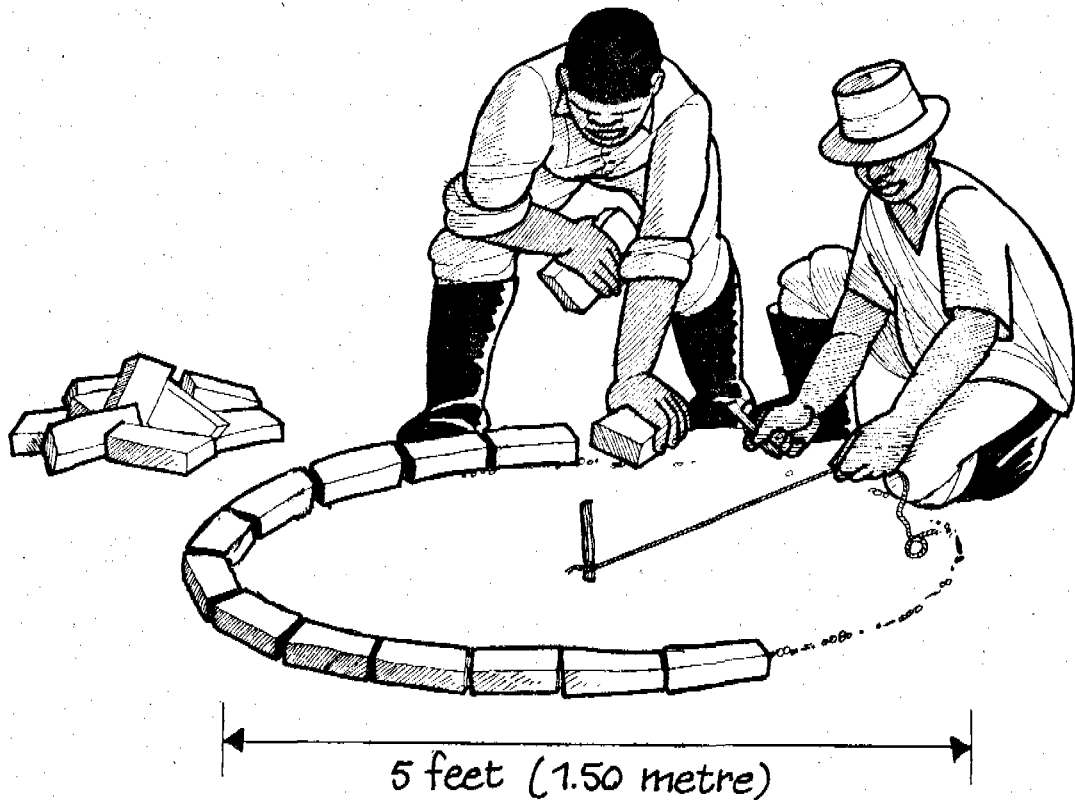
The pit collar is a ring of bricks cement mortared around the top edge of the pit. It is one course deep.

- ▲ Use a mixture of 8 parts pit sand and 1 part cement to mortar the bricks together.

The brick collar is very important. It provides:

- ▲ A strong foundation for the cover slab
- ▲ A good airtight and fly tight seal under the slab.

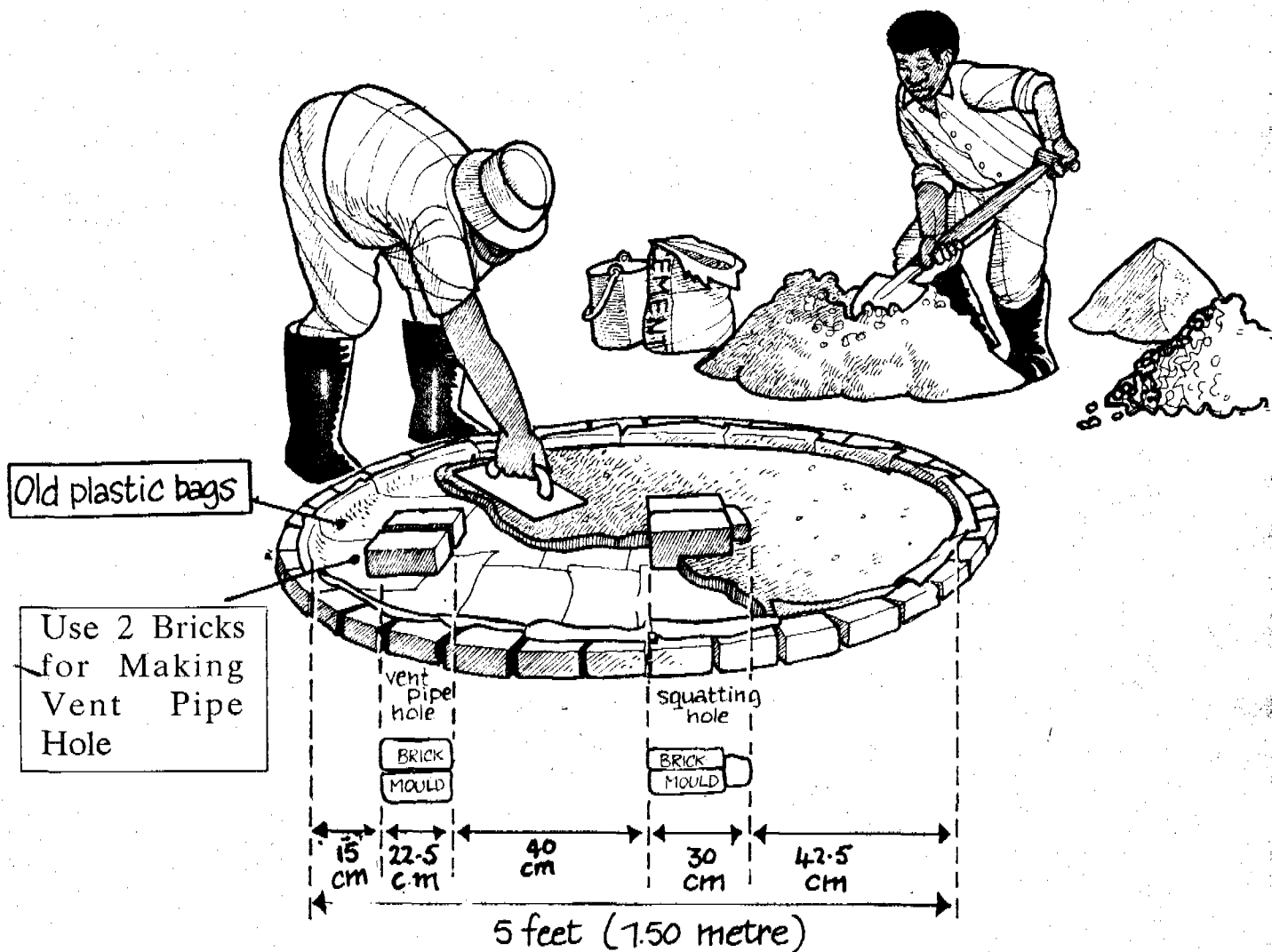
## STAGE 5 MAKE THE COVERSLAB MOULD



- ▲ Choose a level place near the pit
- ▲ Mark a circle 1.5 metres in diameter
- ▲ Place a ring of bricks around the circle

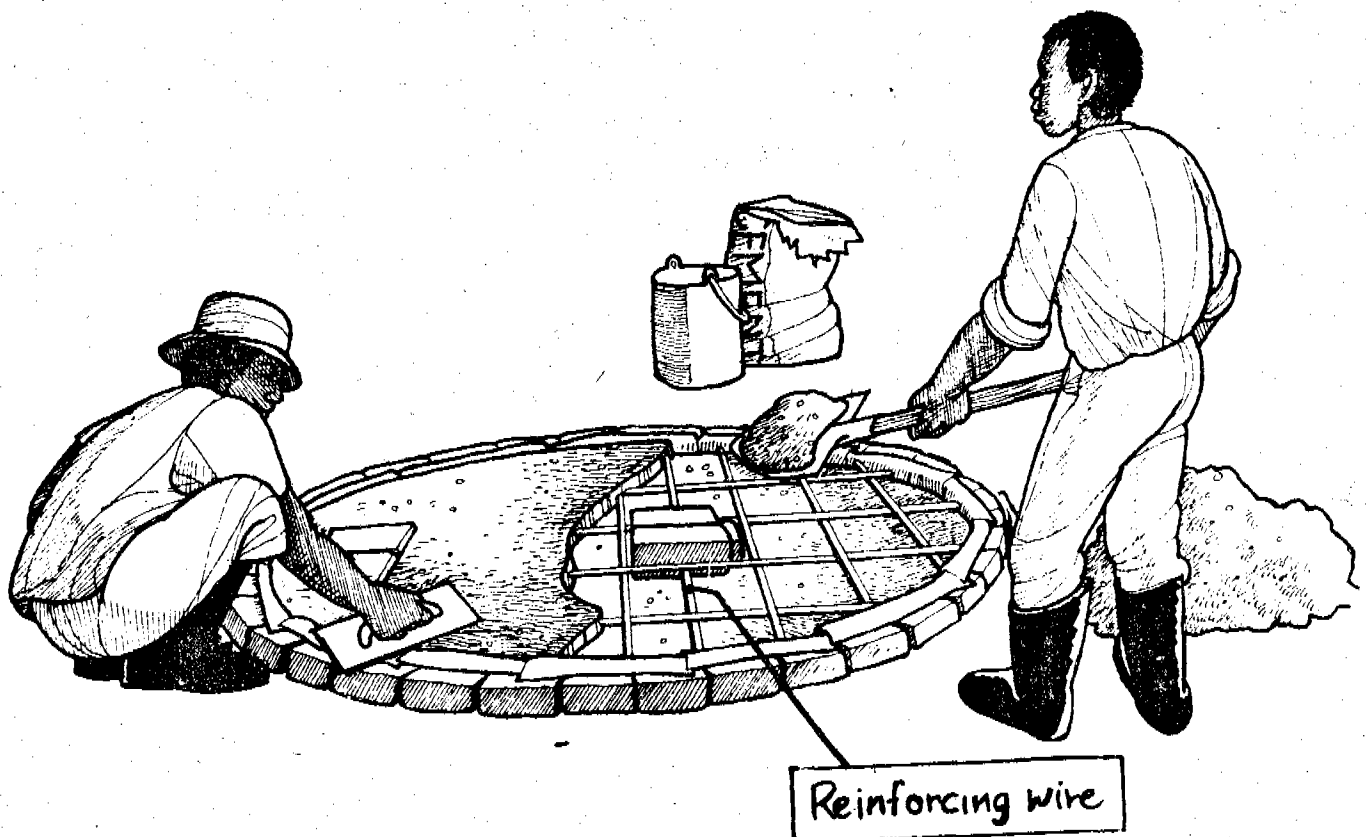
To stop concrete sticking to ground, add old cement bags or plastic sheet inside the mould or add river sand inside the mould and level off.

## STAGE 6. MAKE THE COVERSLAB



- ▲ Use bricks to make the holes for squatting hole and vent pipe (If a PVC vent pipe is used, this can be used to make vent hole)
- ▲ Use the measurements shown in the diagram
- ▲ Make the concrete mixture for the cover slab using:
  - 5 parts washed river sand
  - 1 part cement
- ▲ If gravel or small stones are available the mixture should be made with 4 parts gravel, 2 parts river sand and 1 part cement.
- ▲ Place half the concrete mixture into the mould and stamp down well, especially around the holes made for the squatting hole and vent pipe.

## STAGE 7. COMPLETE THE COVERSLAB



- ▲ Place reinforcing wire on top of concrete inside mould and cut to size to form a grid pattern with wires 10 cm apart
- ▲ Remember to add extra reinforcing around vent pipe and squat holes
- ▲ Place remaining concrete over reinforcing wire
- ▲ The thickness of the completed slab is 75mm
- ▲ Loosen and remove bricks for vent and squat holes after 1 hour
- ▲ Shape the squatting hole correctly so that it is a suitable size for children and adults. It should be about 300mm long and 150mm wide
- ▲ Cover the completed slab with wet sacks, wet sand or grass. Keep wet and allow to cure for at least 5 days

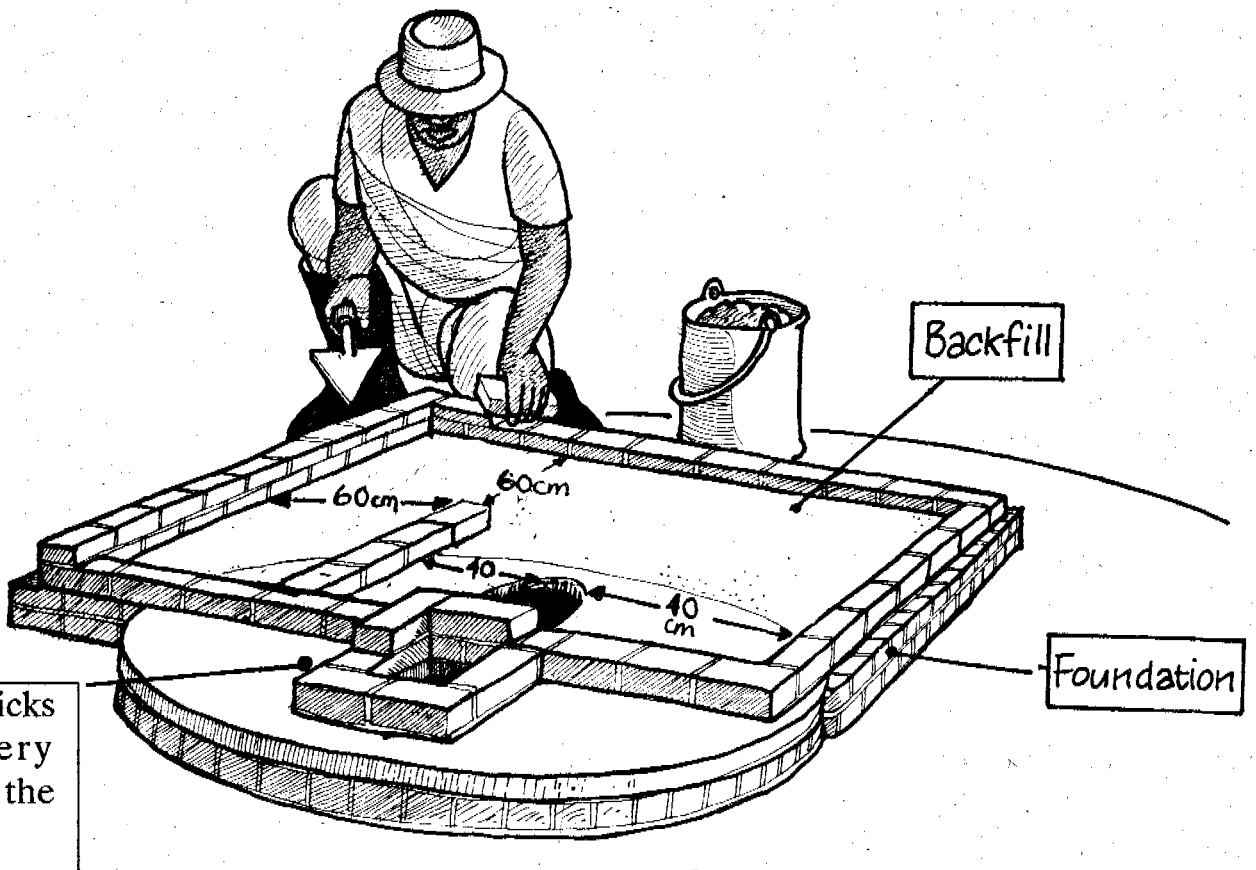
## STAGE 8. POSITION THE COVER SLAB



- ▲ First put cement mortar on to the brick collar. Then place the cover slab over the collar above the pit. The cover slab and collar must fit tightly together
- ▲ Position the slab so that the vent pipe hole faces the correct position. This is normally towards the homestead and towards the wind. The vent pipe hole is on the same side as the doorway
- ▲ Make sure that the vent pipe hole is over the pit
- ▲ A good seal between the cover slab and the collar prevents flies from entering and leaving the pit other than through the squat and vent pipe holes. It also prevents smells coming up from inside the pit



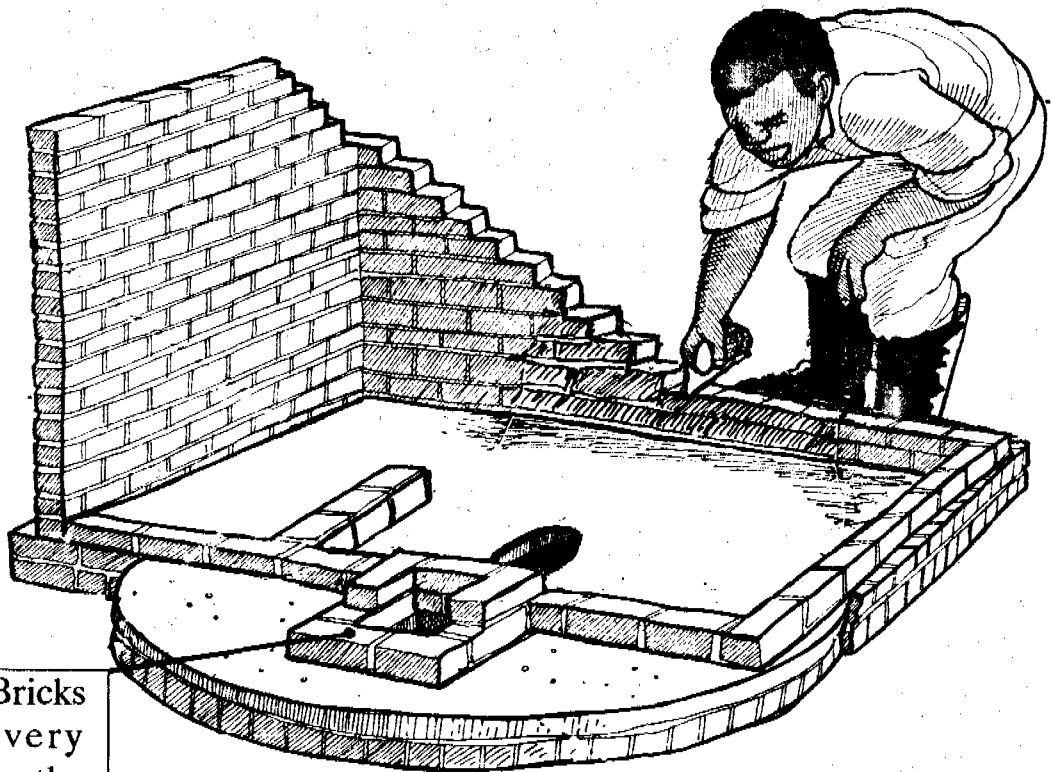
## STAGE 9. BUILD THE FOUNDATION



Over the pit, the structure is built up on the cover slab. Outside the pit the structure is built up on a solid brick foundation.

- ▲ Build a 225mm wide brick foundation to a height which is level with the coverslab. This will require at least 2 courses of bricks. Take exact measurements from the latrine plan in this manual
- ▲ Backfill the space between the foundation and the coverslab with half bricks, stones or well rammed soil. Level off to height of the slab
- ▲ Start to build up the brickwork for walls and vent pipe

## STAGE 10. BUILD THE WALLS AND VENT PIPE



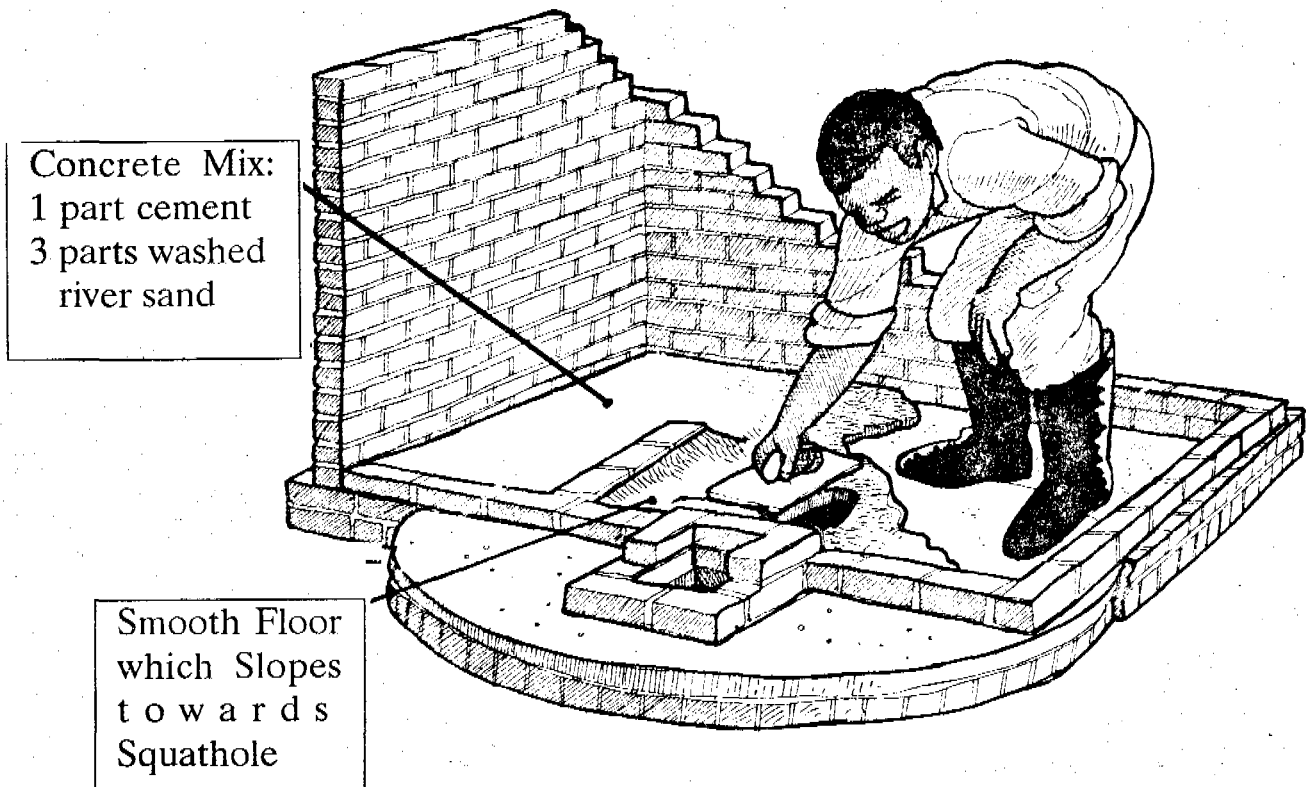
Use 6 Bricks  
for every  
course in the  
vent pipe

- ▲ Build the latrine walls with fired bricks and cement mortar to a height of 1.8 metres above the slab level
- ▲ At the same time build the vent pipe to a height of 2.7 metres above slab level
- ▲ When completed the vent pipe rises 0.9 metres above the wall
- ▲ Use 6 bricks for every course in the vent pipe
- ▲ Smooth down cement mortar inside wall of vent pipe
- ▲ Plaster inside walls of structure with cement mortar

### IMPORTANT

Air needs to move freely through the vent pipe. Do not block it with mortar when building.

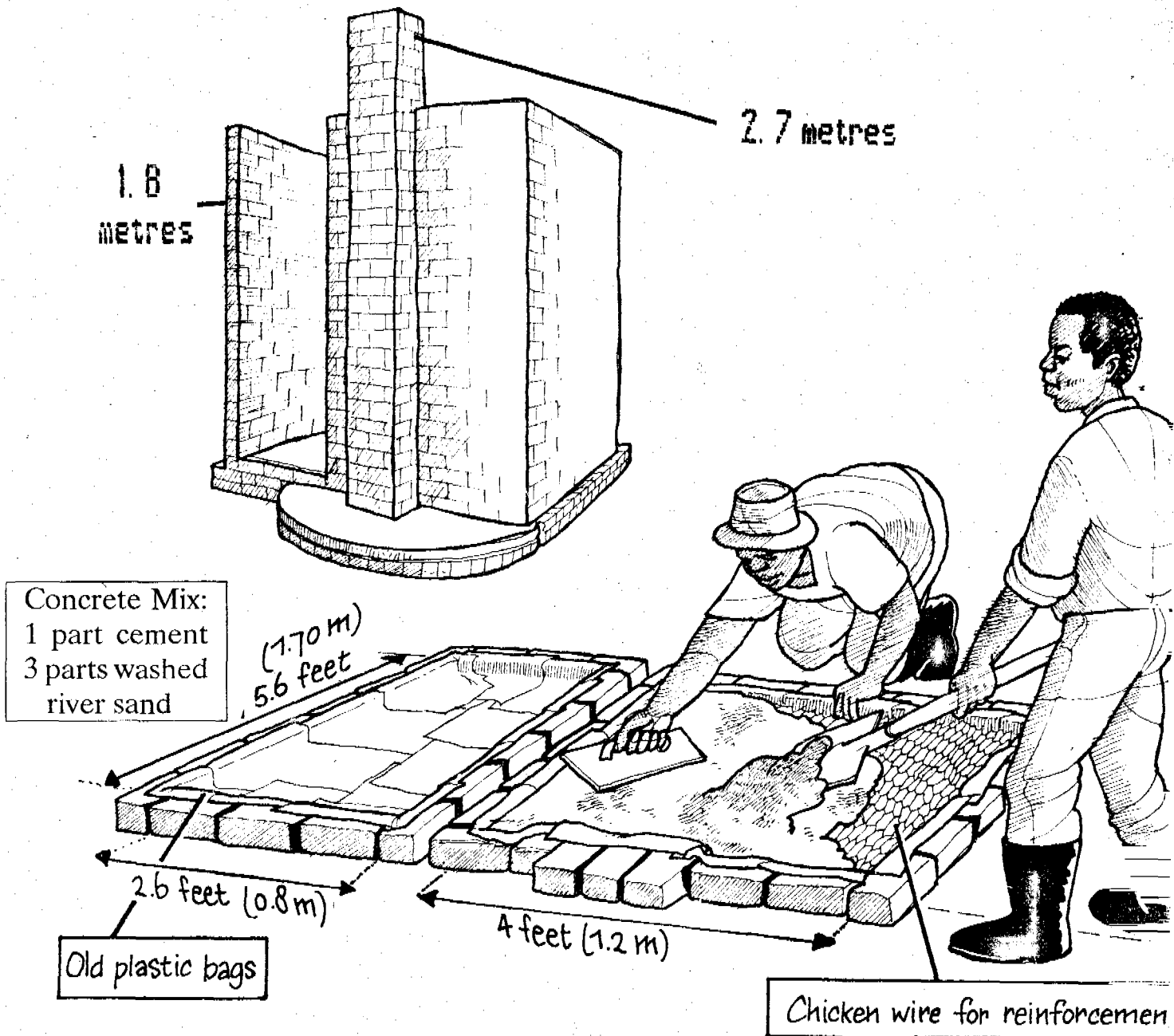
## STAGE 11. MAKE THE LATRINE FLOOR



A well made sloping latrine floor with a hard working surface is easy to keep clean and is an essential part of the Blair Latrine.

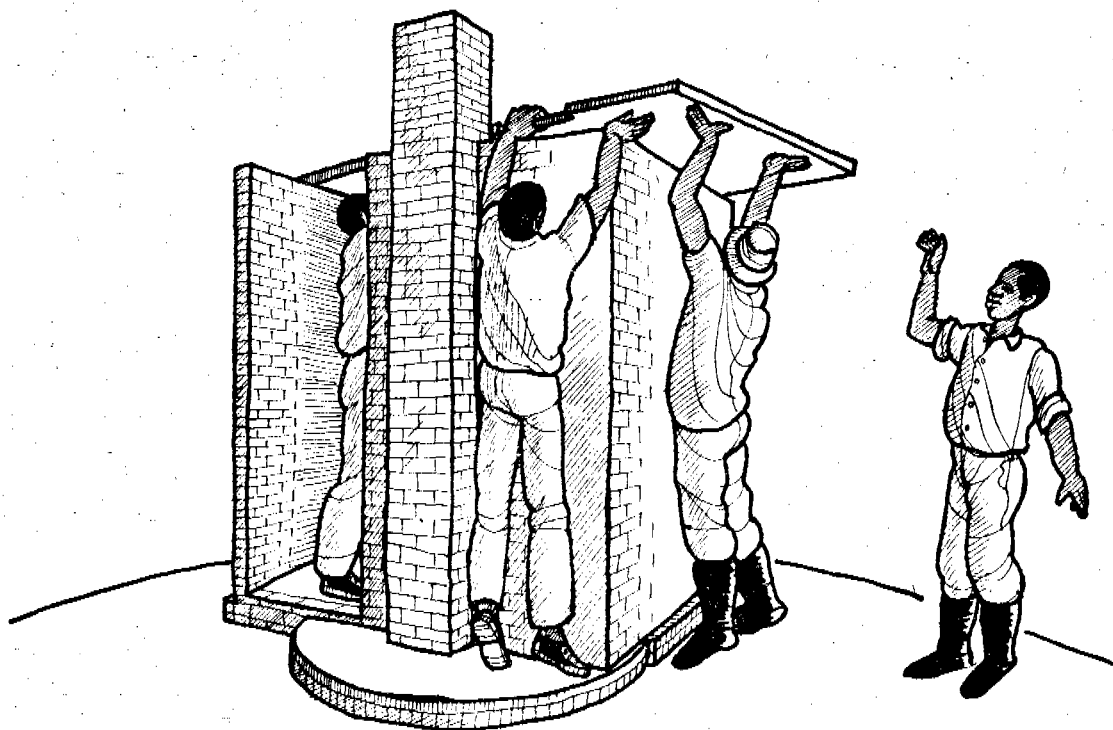
- ▲ The latrine floor is made with a mixture of 3 parts river sand and 1 part cement
- ▲ Build up one course of bricks at the entrance to the latrine
- ▲ The latrine floor is made by adding the concrete mixture from the brick step at the entrance so that it slopes down towards the squat hole
- ▲ Smooth the concrete work on the floor. The floor is then easier to keep clean

## STAGE 12. MAKE THE ROOF SLAB



- ▲ Prepare the roof slab in the same way as the cover slab, but take exact measurements from the structure and make in two pieces. Use chicken wire cut to size for reinforcement (1.7m x 2.0m)
- ▲ The slab pieces usually measure 0.8m x 1.7m and 1.2m x 1.7 m. This makes a roof of 2.0m x 1.7m with an allowance for overhang
- ▲ The mixture used for the roof slab is 3 parts river sand and 1 part part cement
- ▲ The roof thickness lies between 25mm and 30mm when complete
- ▲ Keep the roof covered and wet, and allow to cure for at least 5 days

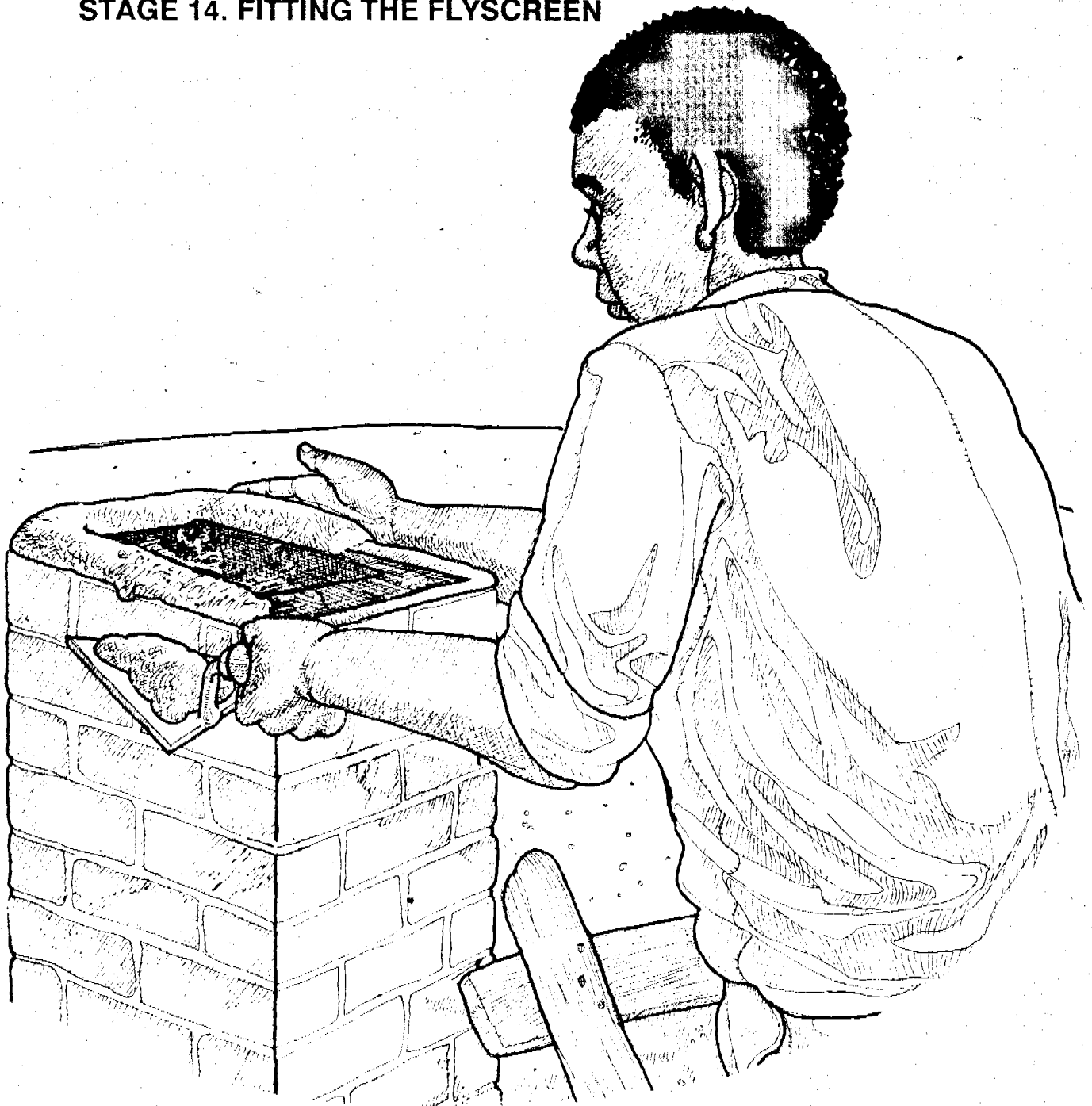
## STAGE 13. FIT THE ROOF



▲ Use mortar to fix the roof slabs in position

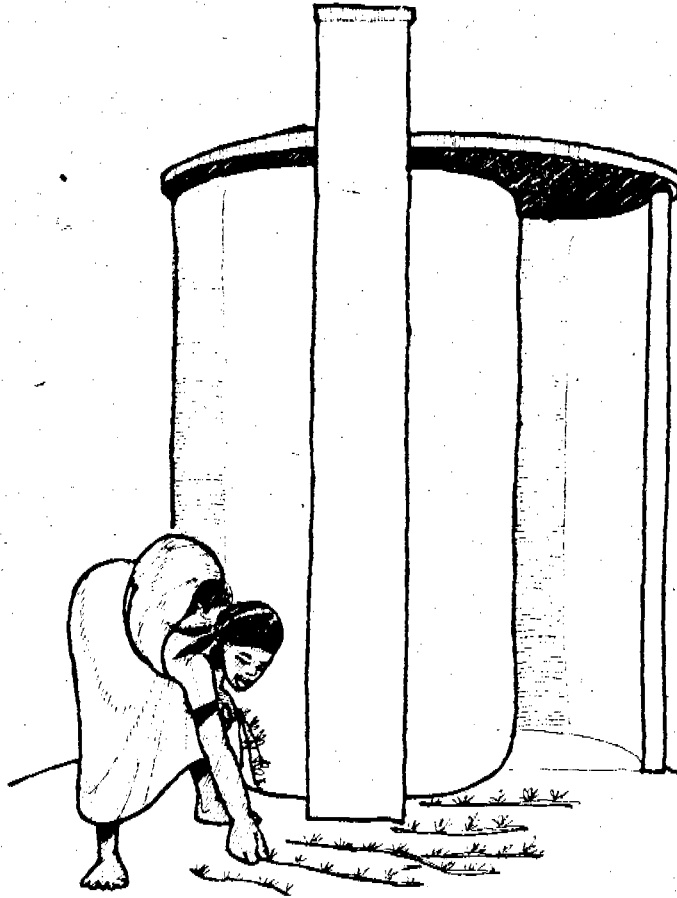
▲ Lift the slabs carefully to avoid cracking

## STAGE 14. FITTING THE FLYSCREEN



- ▲ This is a very important part of the latrine and controls flies
- ▲ Ideally stainless steel or aluminium screen should be used
- ▲ If these are not available use PVC coated fibreglass screen
- ▲ The screen size is 300mm x 300mm
- ▲ The flyscreen is fitted to the head of the vent pipe in strong cement mortar.

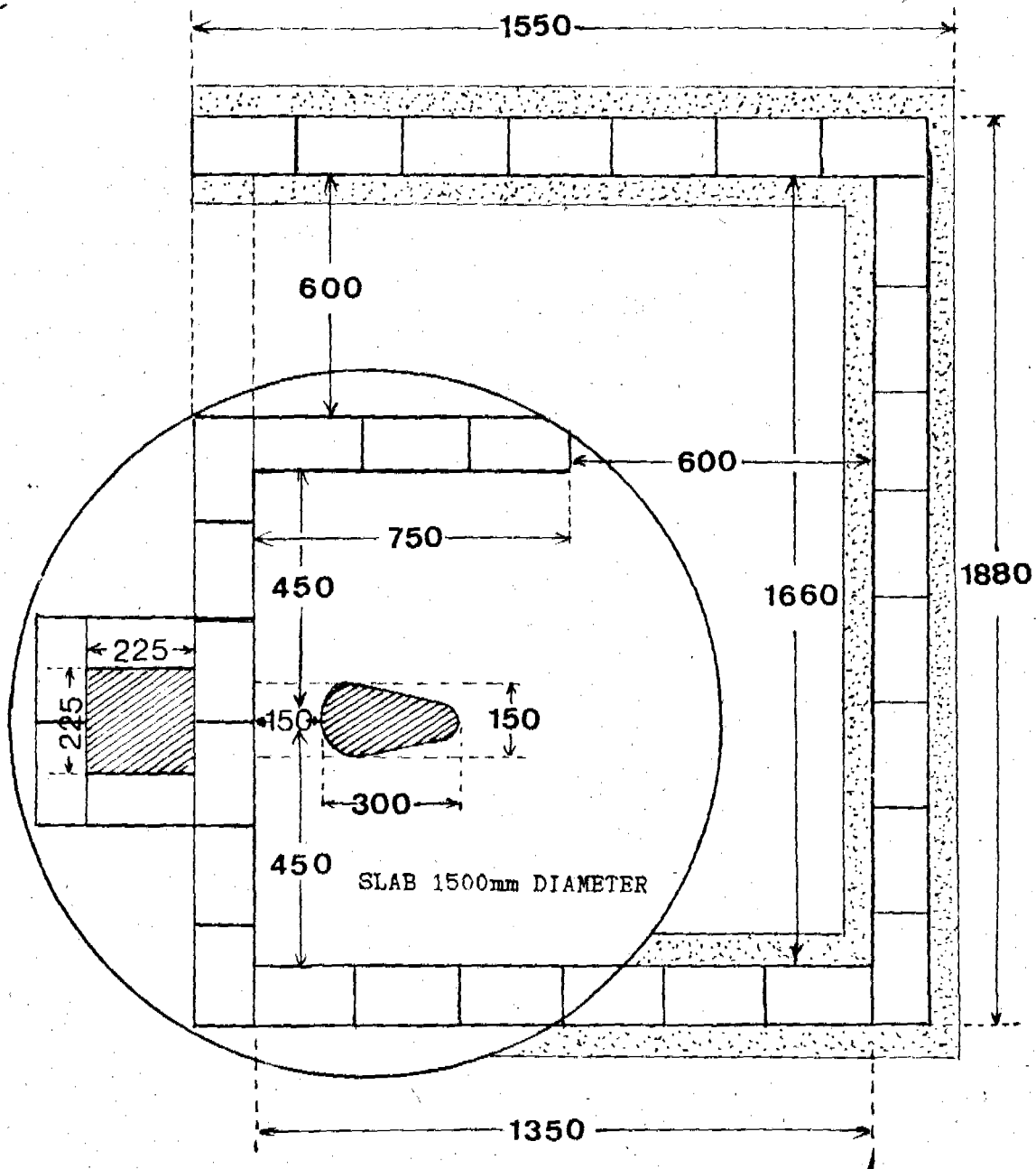
## STAGE 15. FINISH OFF THE LATRINE



- ▲ Build up soil around the latrine so that rain water will run away from the site
- ▲ Plant grass around the latrine to reduce erosion
- ▲ Plaster the walls of the latrine
- ▲ Paint and decorate the walls of the latrine to improve appearance.

# THE BLAIR LATRINE:

## DIMENSIONS OF SLAB AND STRUCTURE

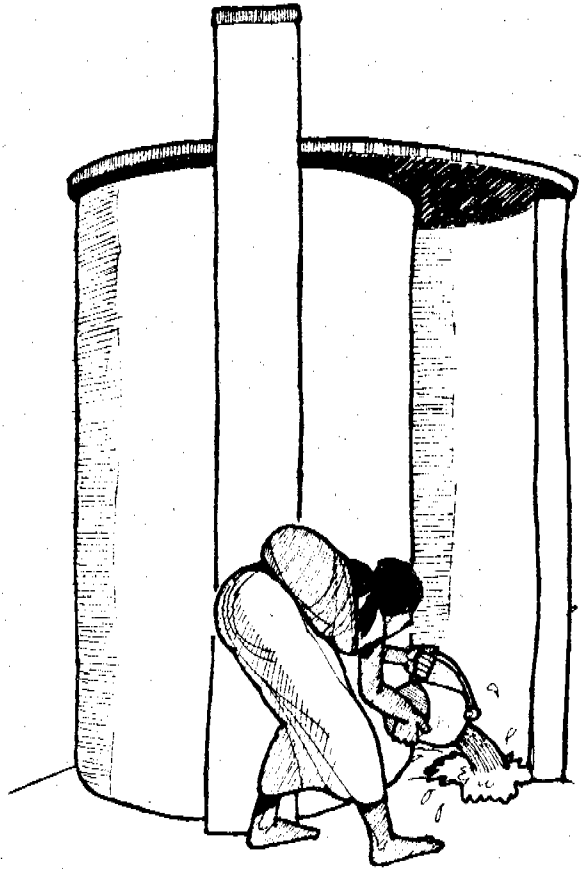


Where a PVC or asbestos pipe is used the vent pipe hole should be made to suit this. It is important to keep close to the measurements in the diagram. Note the size of the vent hole for a brick pipe and the size of the square spiral superstructure. The dotted area shows the brick foundation for the superstructure walls.

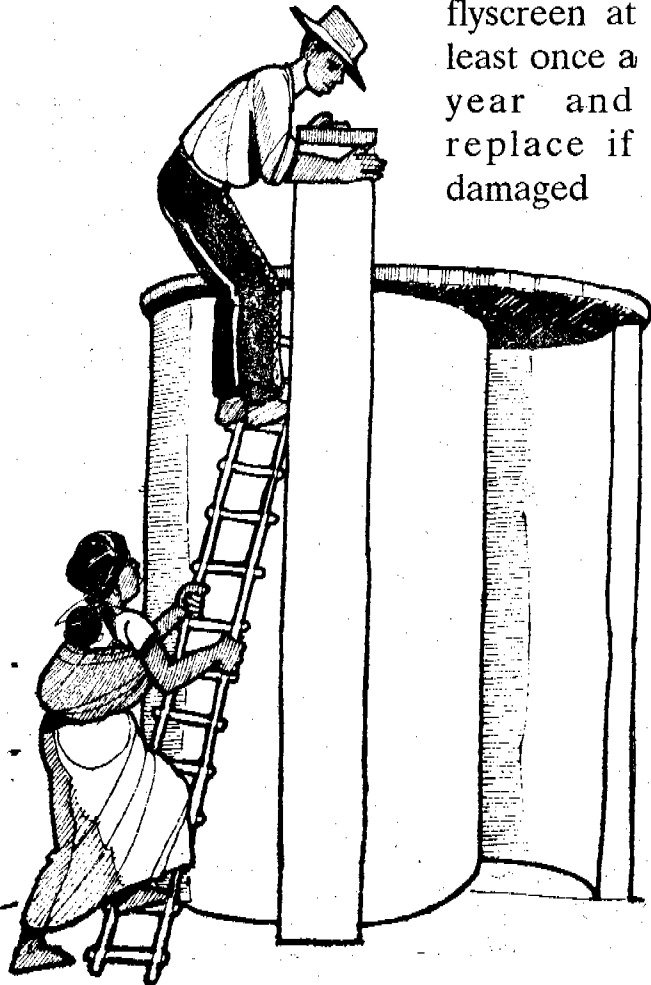


# CARE FOR YOUR BLAIR LATRINE

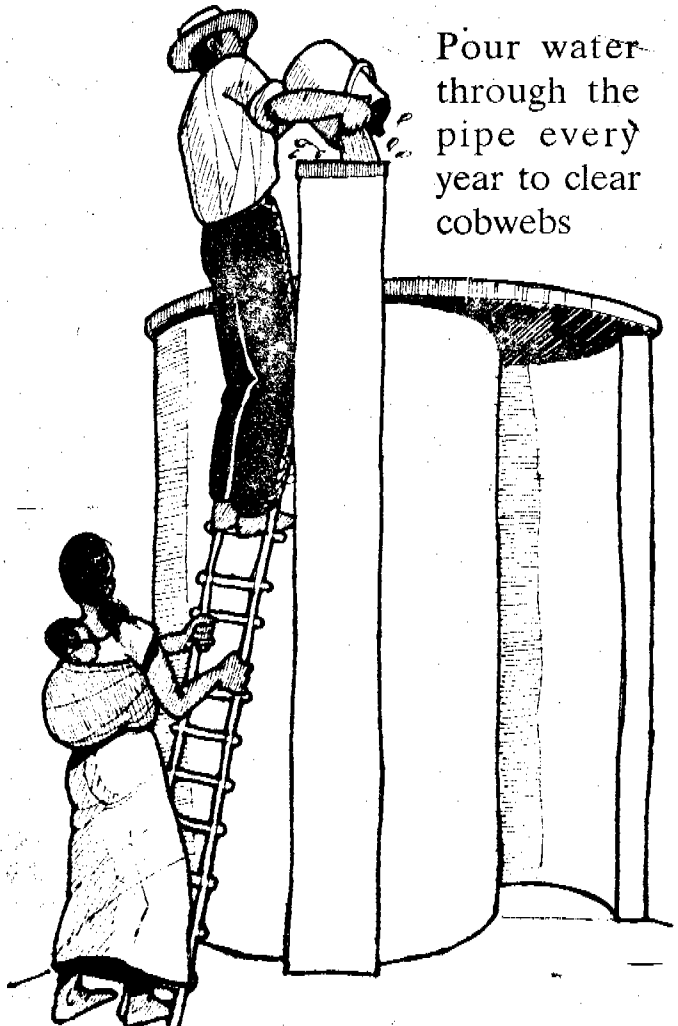
Clean the inside of the latrine with water every day



C h e c k  
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# CARE FOR FAMILY HYGIENE



Help young children to use the latrine.

Always wash your hands after using the latrine.



A well kept family latrine is something to be proud of!

