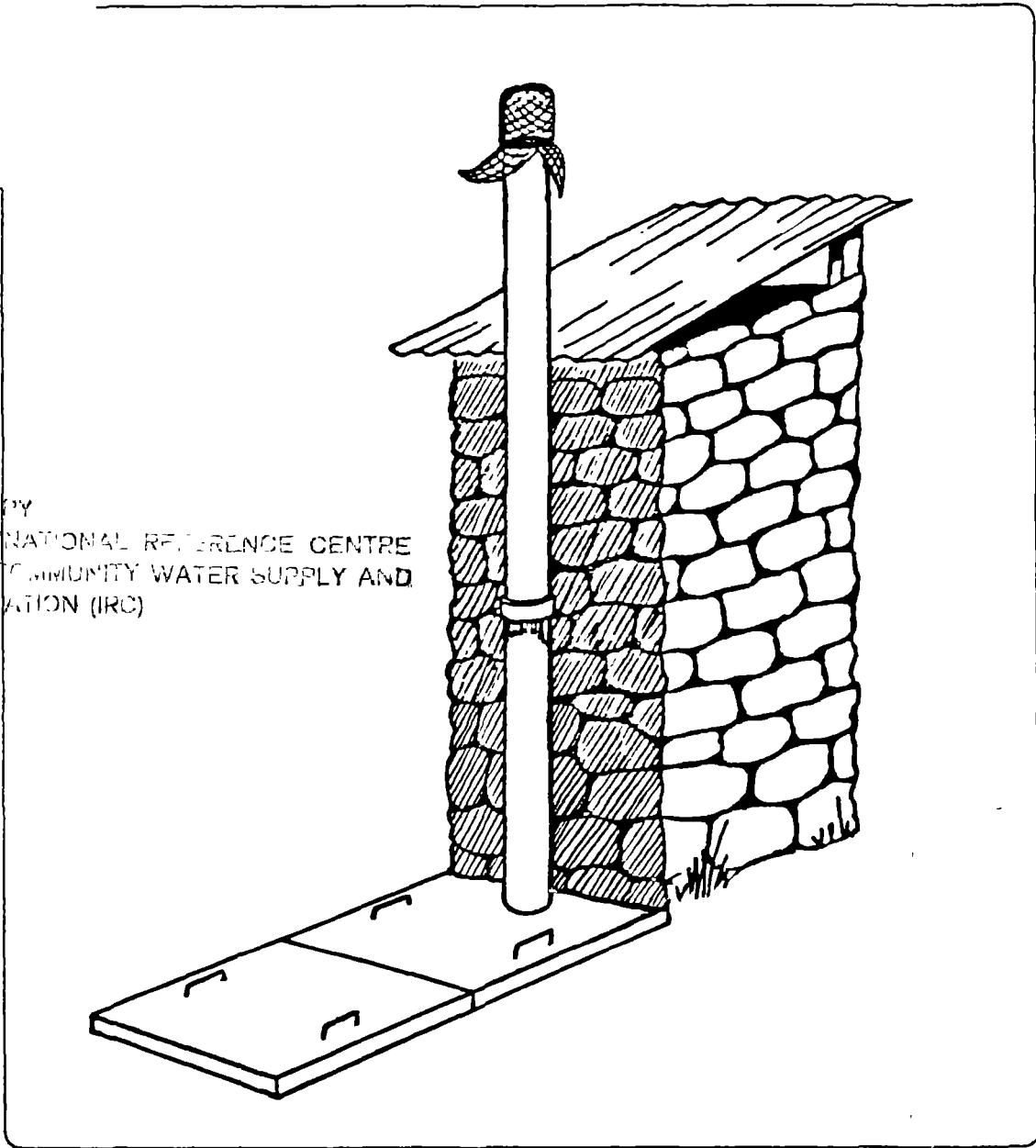


3 2 1. 4

8 8 V E

LIBRARY
INTERNATIONAL REFERENCE CENTRE
FOR COMMUNITY WATER SUPPLY AND
SANITATION (IRC)



A
VENTILATED IMPROVED PIT
(VIP)
LATRINE BUILDERS MANUAL

LIBRARY, INTERNATIONAL REFERENCE
SERIALS SECTION
UNIVERSITY OF TORONTO LIBRARY
40 St. George Street
Toronto, Ontario M5S 1A5
Tel. (416) 978-1412
Fax: (416) 978-1413

6326
LO: 321.4 88VE

MANY BASOTHO ARE BUILDING VENTILATED IMPROVED PIT (VIP) LATRINES

BECAUSE:

— THEY ARE STRONG AND SAFE

- * V.I.P. latrines are built on strong foundations and are unlikely to collapse.
- * V.I.P. latrines have concrete cover slabs and floors which are strong and safe.

— THEY DO NOT HAVE SMELLS

- * When the wind blows over the vent pipe all the bad smells are removed from the pit and also from the interior of the latrine shelter.

— THEY DO NOT HAVE FLIES

- * Since there is no smell, V.I.P. latrines do not attract flies. The fly-screen on top of the vent pipe also prevents flies from entering the pit through the vent pipe.

— THEY ARE CONVENIENT and GIVE PRIVACY

- * Since V.I.P. latrines do not have smells, they can be built near houses. This makes them very convenient especially, at night and during bad weather.

— THEY ARE BEAUTIFUL and AFFORDABLE

- * You can spend as much or as little as you want, depending on what kind of VIP latrine you prefer. V.I.P. latrines can be built from any locally available materials e.g.

stones
mudblocks
concrete blocks
mud and wattle
mortar and burlap
bricks
zinc sheets

**JOIN THE FIGHT AGAINST DIARRHOEAL DISEASES.
BUILD AND USE A V.I.P. LATRINE NOW.
BE MODERN AND STAY HEALTHY TOO.**

TABLE OF CONTENTS

INTRODUCTION	2
GUIDE TO THE MANUAL	3
PART 1 — VIP LATRINE CONSTRUCTION — A STEP BY STEP GUIDE	4
SUMMARY OF MAIN BUILDING STEPS	6
LOCATION AND ORIENTATION OF THE VIP LATRINE AND LAYING OUT OF THE PIT	11
HOW TO DETERMINE WIDTH OF RINGBEAM SHELF	12
CASTING SLABS	13
MIX PROPORTIONS FOR SLAB CASTING MORTAR	14
PIT EXCAVATION AND RINGBEAM CONSTRUCTION	17
INSTALLING THE PIT COVERS	19
SUPERSTRUCTURE CONSTRUCTION	20
CONSTRUCTING A DOUBLE PIT (VIDP) LATRINE	24
PART 2 — ADVICE ON THE MAINTENANCE AND USE OF VIP LATRINES	28
PROPER CARE OF A VIP LATRINE	29
RECOMMENDED HEALTHY PRACTICES	31
PART 3 — ANNEXES	33
CONSTRUCTING MORTAR ON BURLAP SHELTERS	34
ZINC SHELTERS	36
CONSTRUCTING OTHER PIT COVERS	37
TIMBER FRAMEWORK FOR ZINC OR MORTAR ON BURLAP SHELTERS	38

INTRODUCTION

Dear builder,

The purpose of this manual is to explain how a Ventilated Improved Pit (V.I.P.) latrine is built. As a builder, there is no doubt that you may be familiar with most building procedures. This manual is therefore a general guide and gives details only on the main aspects of V.I.P. latrine construction.

In order to simplify this manual, it focuses on the construction of a single pit stone shelter latrine. The principles remain the same no matter what other materials are utilised for either substructure or superstructure construction.

In the annexes you will find details of the following:

- a. constructing mortar on burlap shelters
- b. constructing zinc shelters
- c. constructing other pit covers
- d. timber framework for zinc or mortar on burlap shelters

Various educational materials are available for promoting the construction and use of V.I.P. latrines. You may collect some of these from the DISTRICT SANITATION CO-ORDINATOR for distribution.

After completing the construction of the latrine, do visit the latrine owner frequently to check on the maintenance of the latrine and to motivate the latrine owner to encourage all of his/her family to use the latrine at all times.

Join the fight against diarrhoeal diseases in your community by actively promoting the construction and use of V.I.P. latrines. Build one for yourself and use it regularly.

GUIDE TO THE MANUAL

This manual is organised into three parts.

- Part 1. deals with a step-by-step guide as to how to build a single pit stone shelter V.I.P. latrine. A short review of Ventilated Improved Double Pit (V.I.D.P) latrine construction is added to this section.
- Part 2. contains advice you should give to the latrine owner on the maintenance and use of the latrine.
- Part 3. contains details of certain aspects of V.I.P. latrine construction.

Before you start building a V.I.P. latrine read through this manual to refresh your memory on V.I.P. latrine building procedures. Reading through will also help you to remember where to look up certain details that might escape your memory during construction.

In case of difficulty, contact your local

TECHNICAL ASSISTANT , HEALTH ASSISTANT

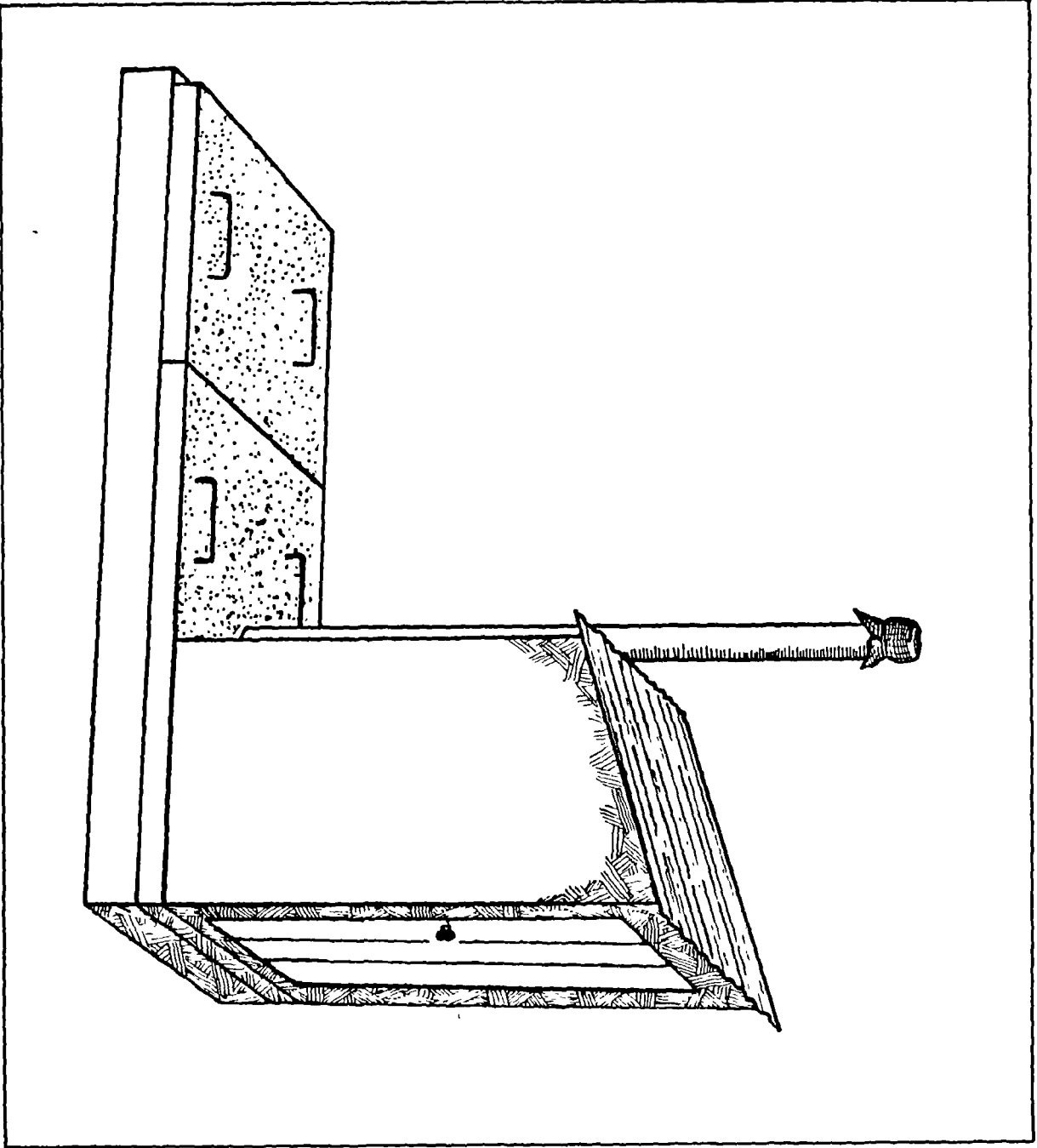
OR

DISTRICT SANITATION CO-ORDINATOR



PART 1

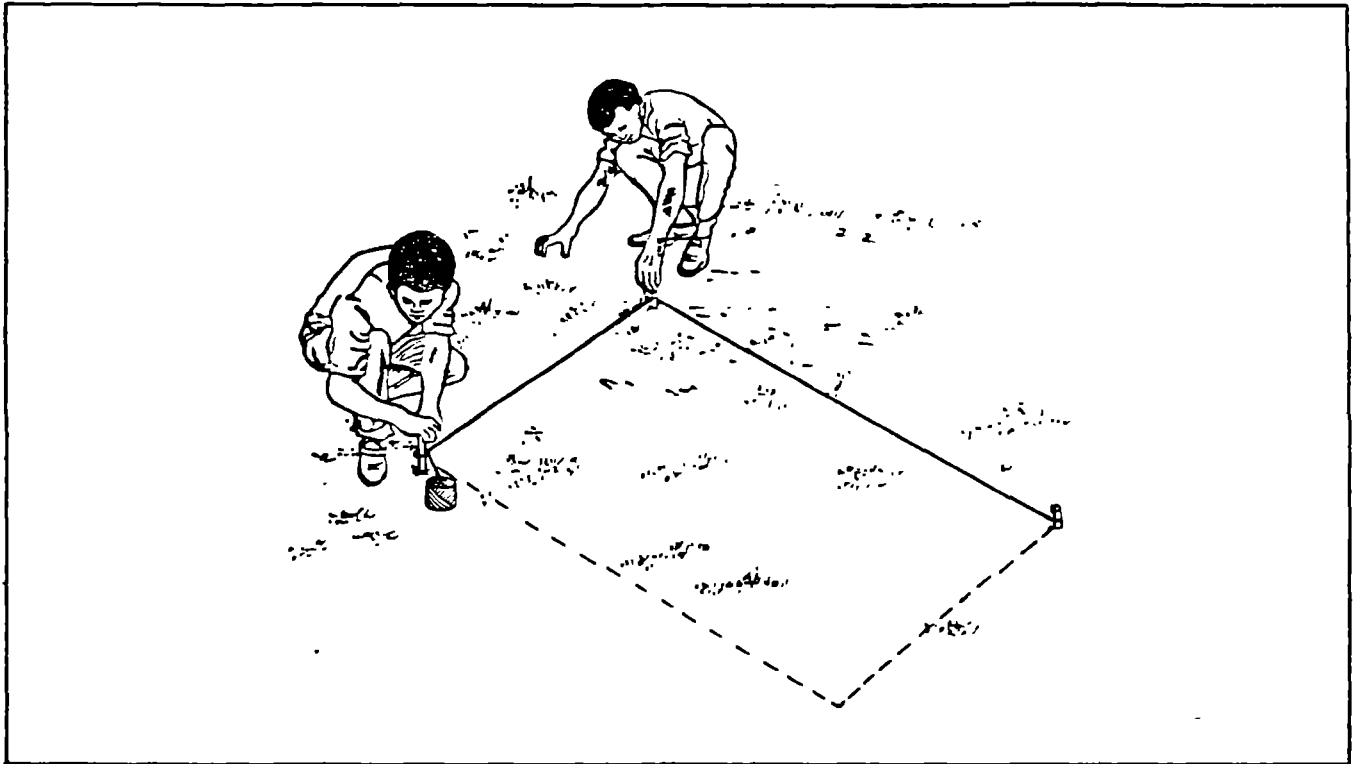
V.I.P.. LATRINE CONSTRUCTION — A STEP BY STEP GUIDE.



SUMMARY OF MAIN BUILDING STEPS

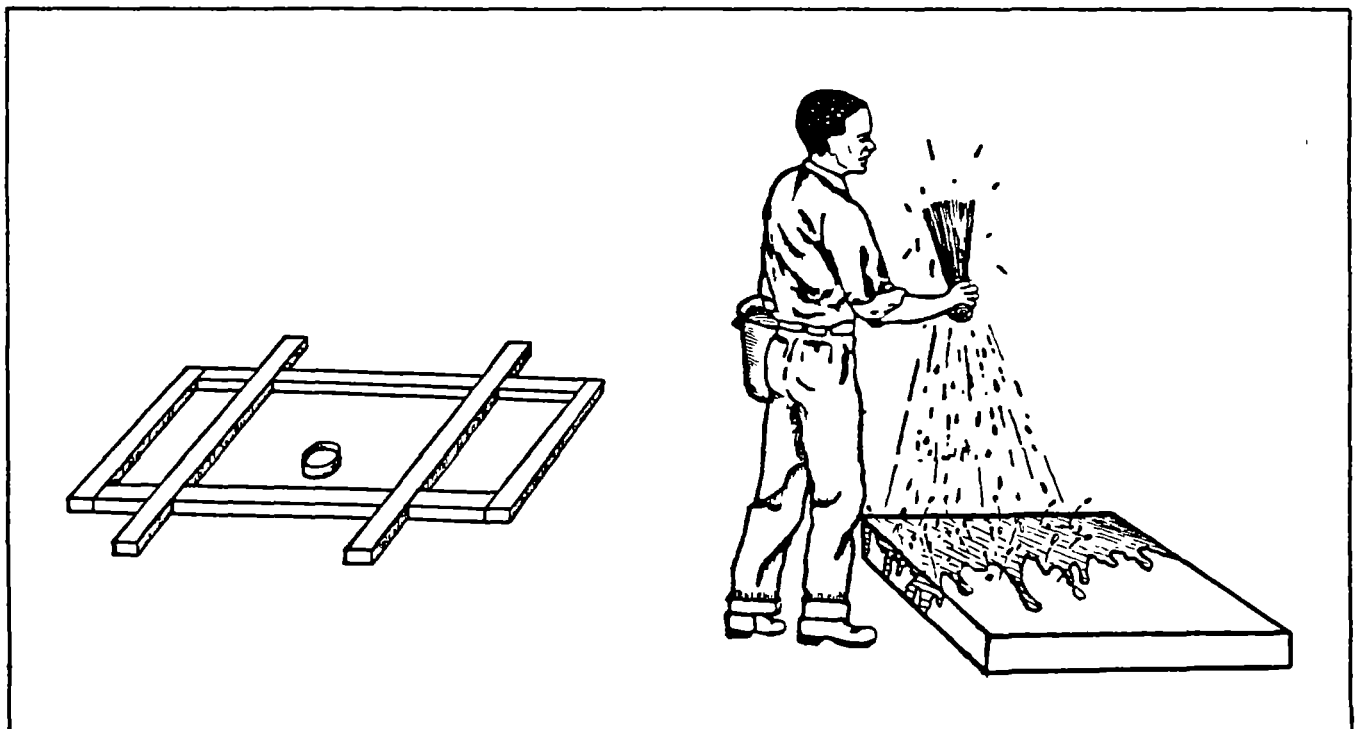
STEP 1

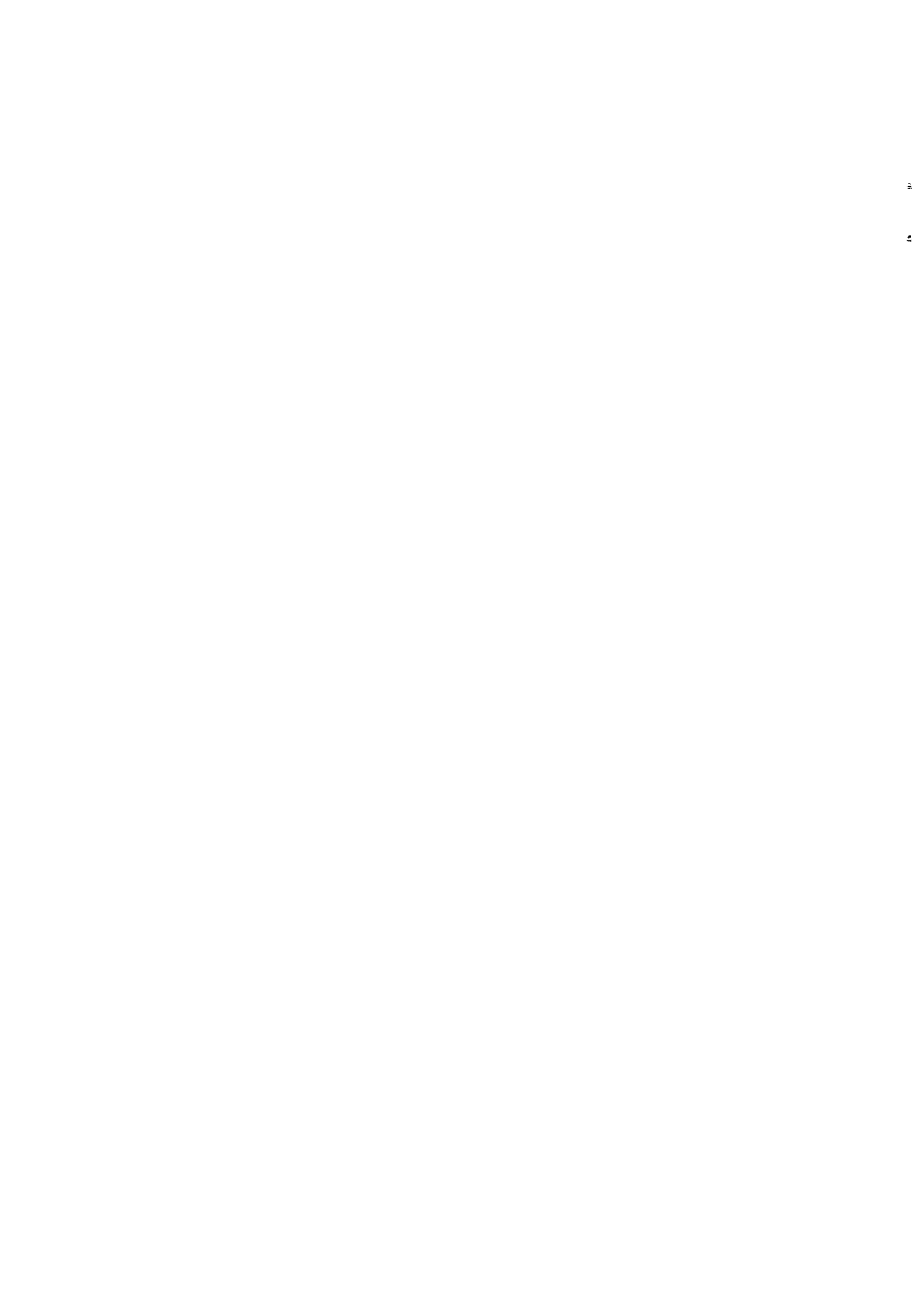
Site selection and layout measurement



STEP 2

Slab casting and Slab curing

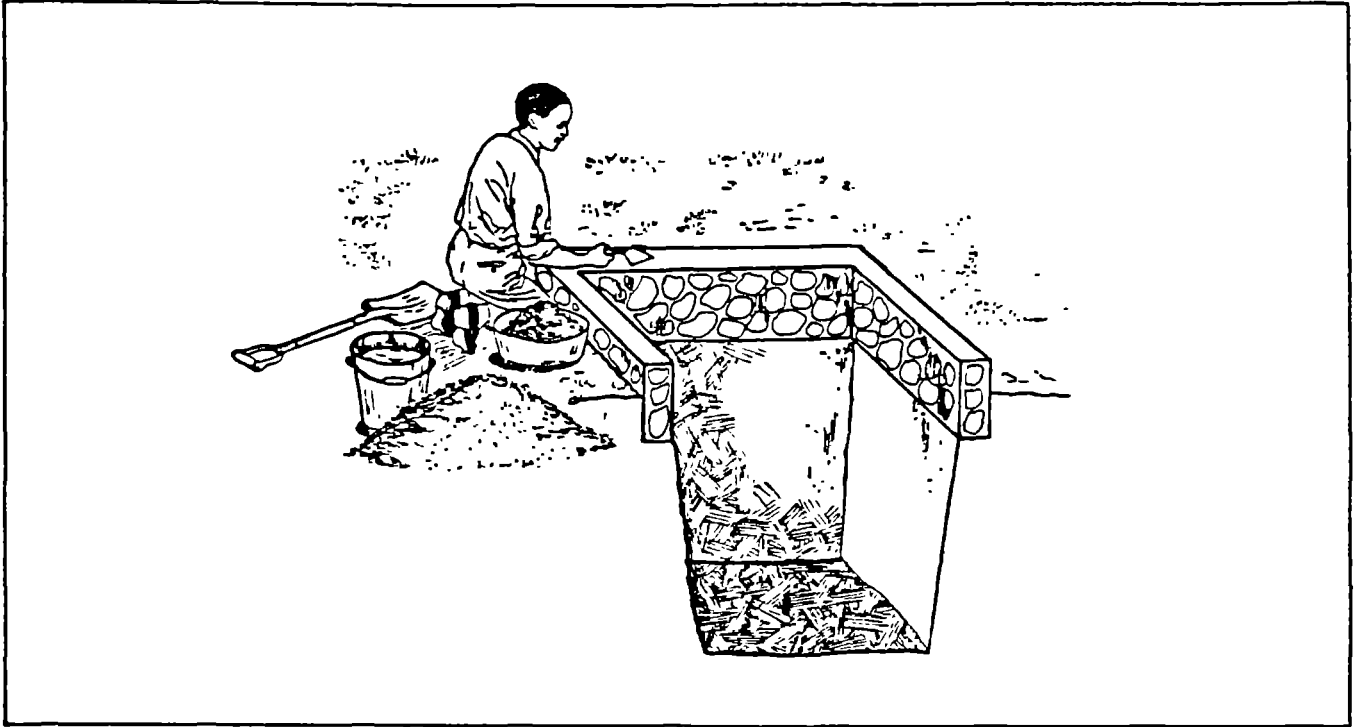




SUMMARY OF MAIN BUILDING STEPS (CONTINUED)

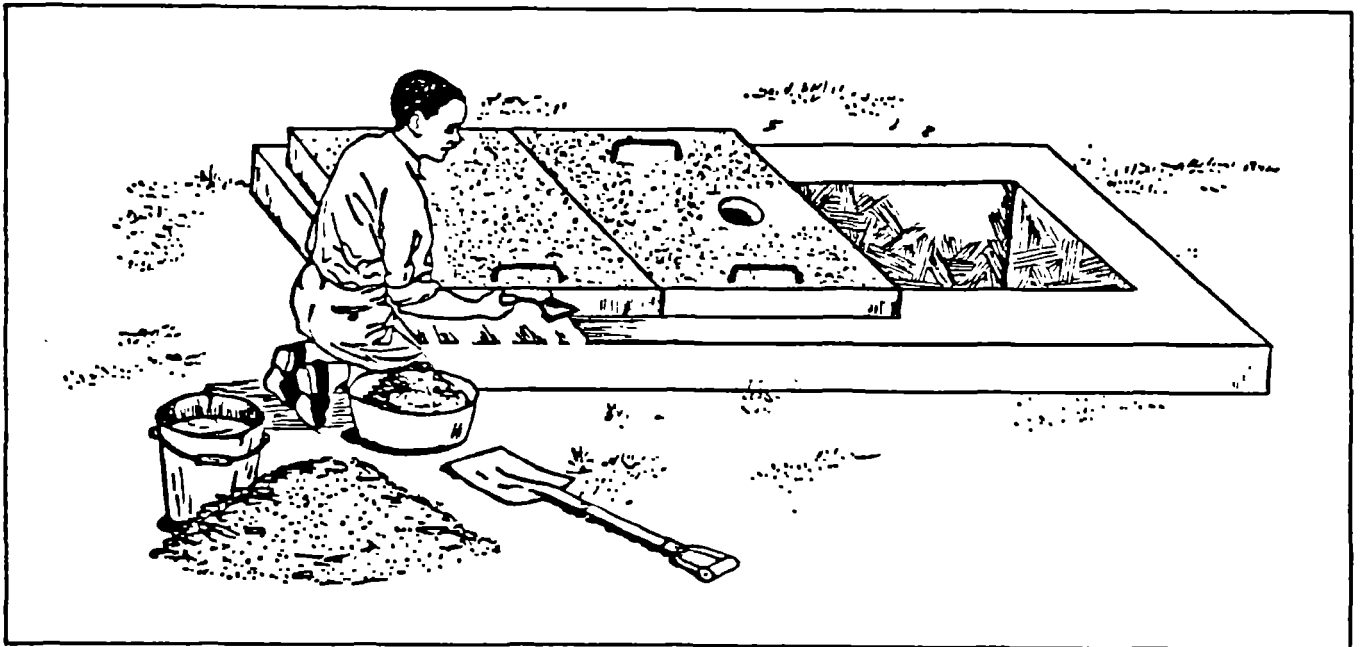
STEP 3

Pit excavation and ringbeam construction



STEP 4

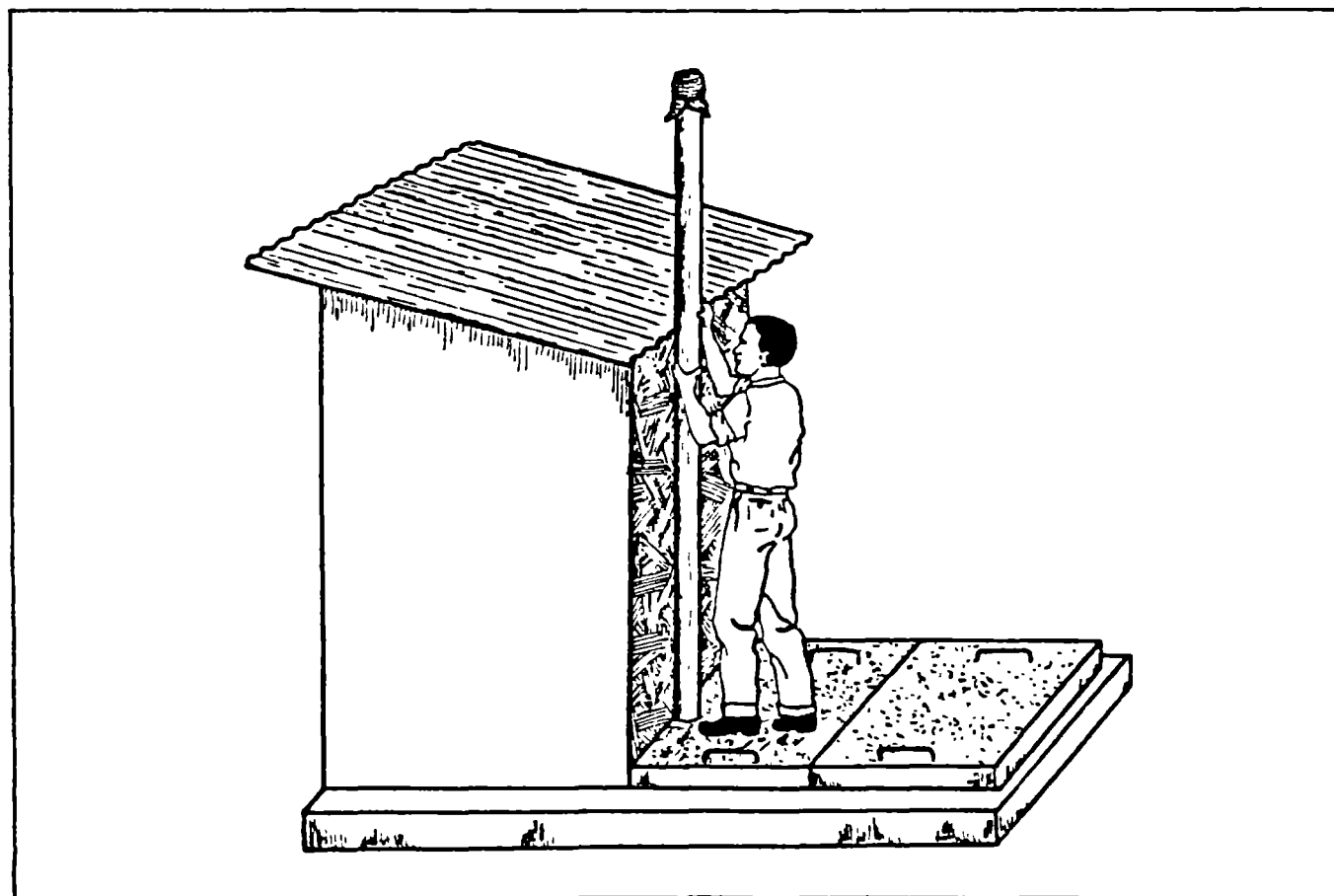
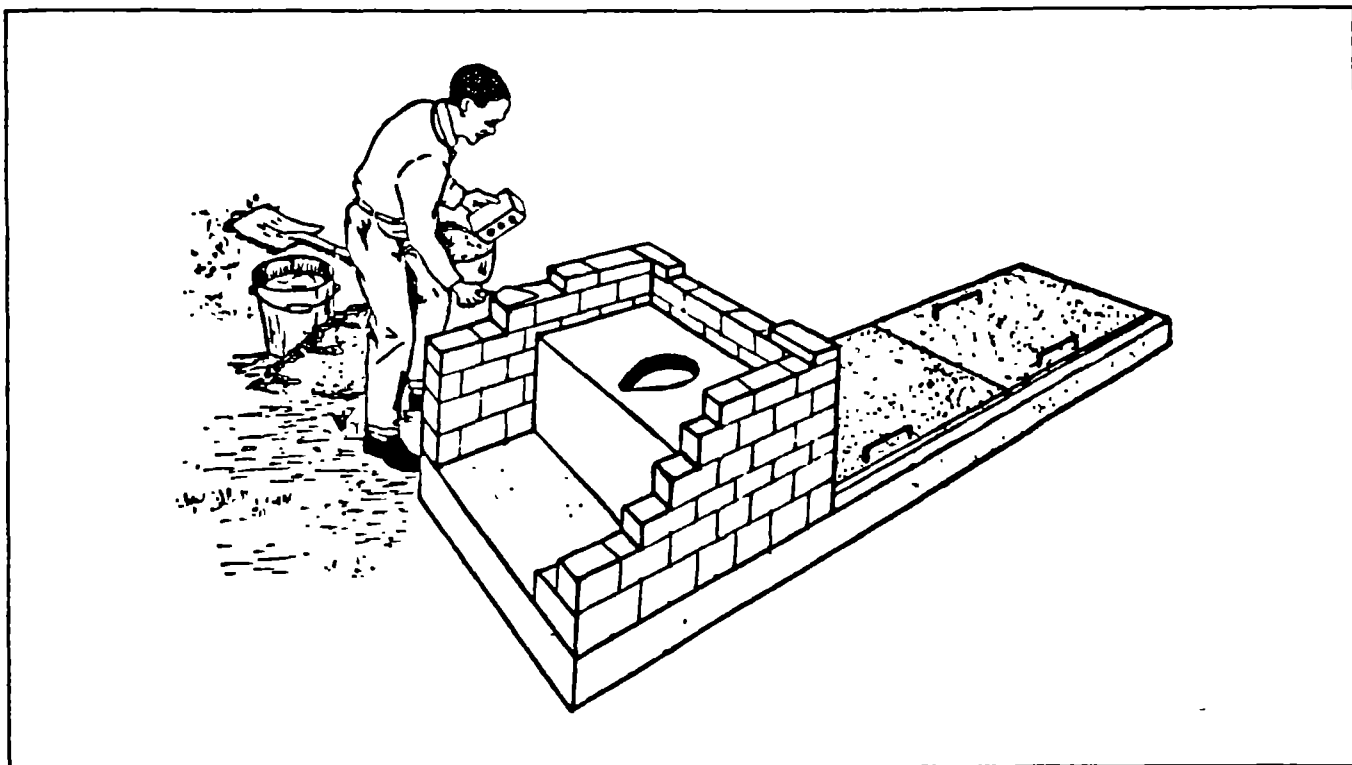
Installation of main pit covers
(cover and vent-pipe hole slabs)



SUMMARY OF MAIN BUILDING STEPS (CONTINUED)

STEP 5

Superstructure construction



BEFORE STARTING TO BUILD A V.I.P. LATRINE

A. EXPLAIN the following to the latrine owner:

- 1. The superstructure for the single pit will have to be moved to a new latrine site or replaced when the pit is full, whereas that for the double pit does not have to be moved.**
- 2. All V.I.P. latrines must have ringbeam foundation support for the concrete slabs. If the soil is unstable the pit will have to be fully lined from top to bottom.**
- 3. All double pit latrines also must be fully lined. This makes them slightly more expensive than single pit latrines but double pit latrines can be used for a very long time. When one pit is full, the other pit is used. After about two years the contents of the full pit can be removed and used as manure.**
- 4. It is cheap to use undressed stones for constructing the ringbeam, pit lining as well as superstructure construction because the householders can gather stones in their spare time. It is also easy to dismantle and relocate a stone superstructure when the pit is full.**
- 5. Mudblock superstructures may also save money. Materials like concrete blocks and zinc sheets are easier to use for construction but much more expensive.**
- 6. Mortar on burlap as well as zinc sheet shelters which have wooden frames usually have wooden bench seats.**
- 7. A VIP can protect your health only if everyone in the family uses it and keeps it clean and working properly.**

B. Consult with the latrine owner and **DECIDE** on:

A. Type of pit

single

double

B. Ringbeam material

stone

bricks

blocks

C. Type of seat

concrete

wood

D. Material for superstructure

stones

mudblocks

concrete blocks

bricks

zinc sheets

mortar on burlap

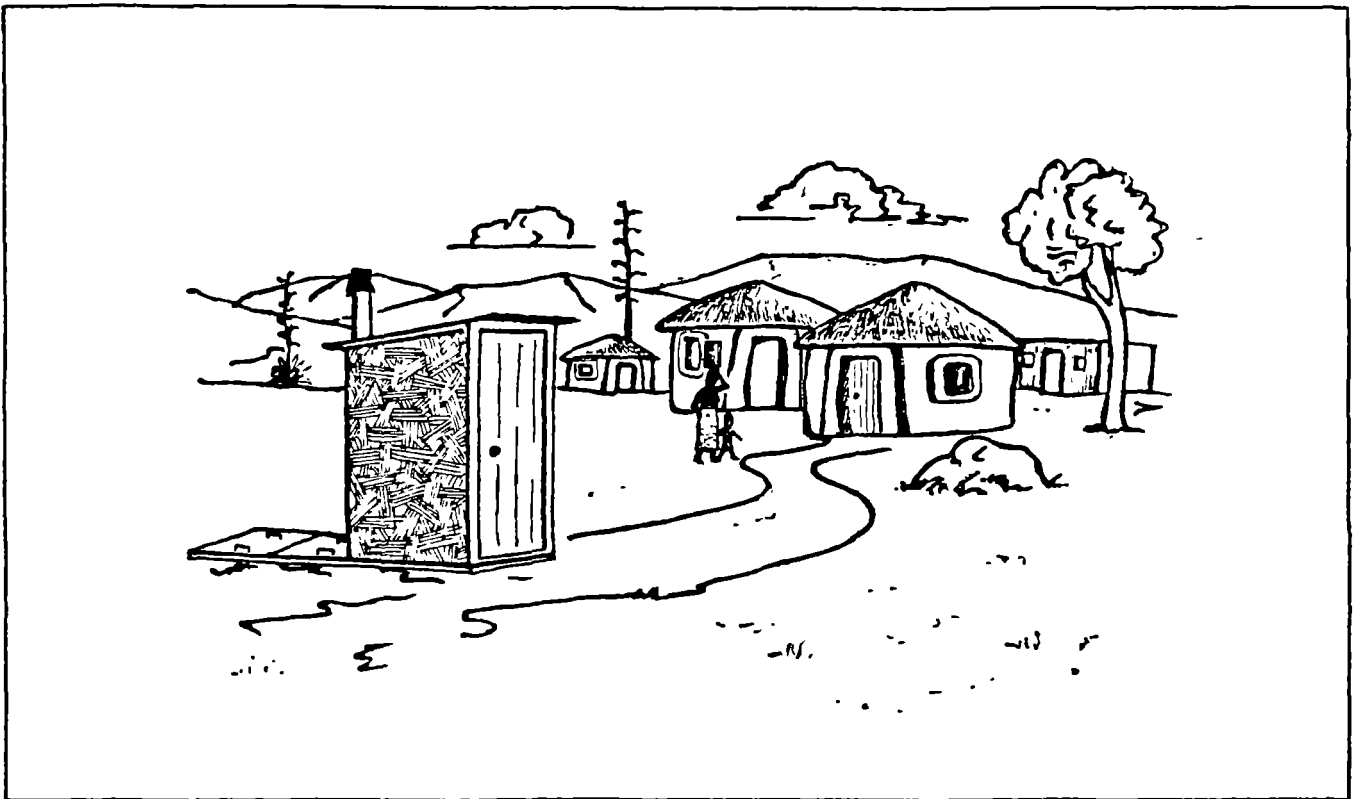
mud and wattle

STEP 1. LOCATION AND ORIENTATION OF THE VIP LATRINE AND LAYING OUT OF THE PIT

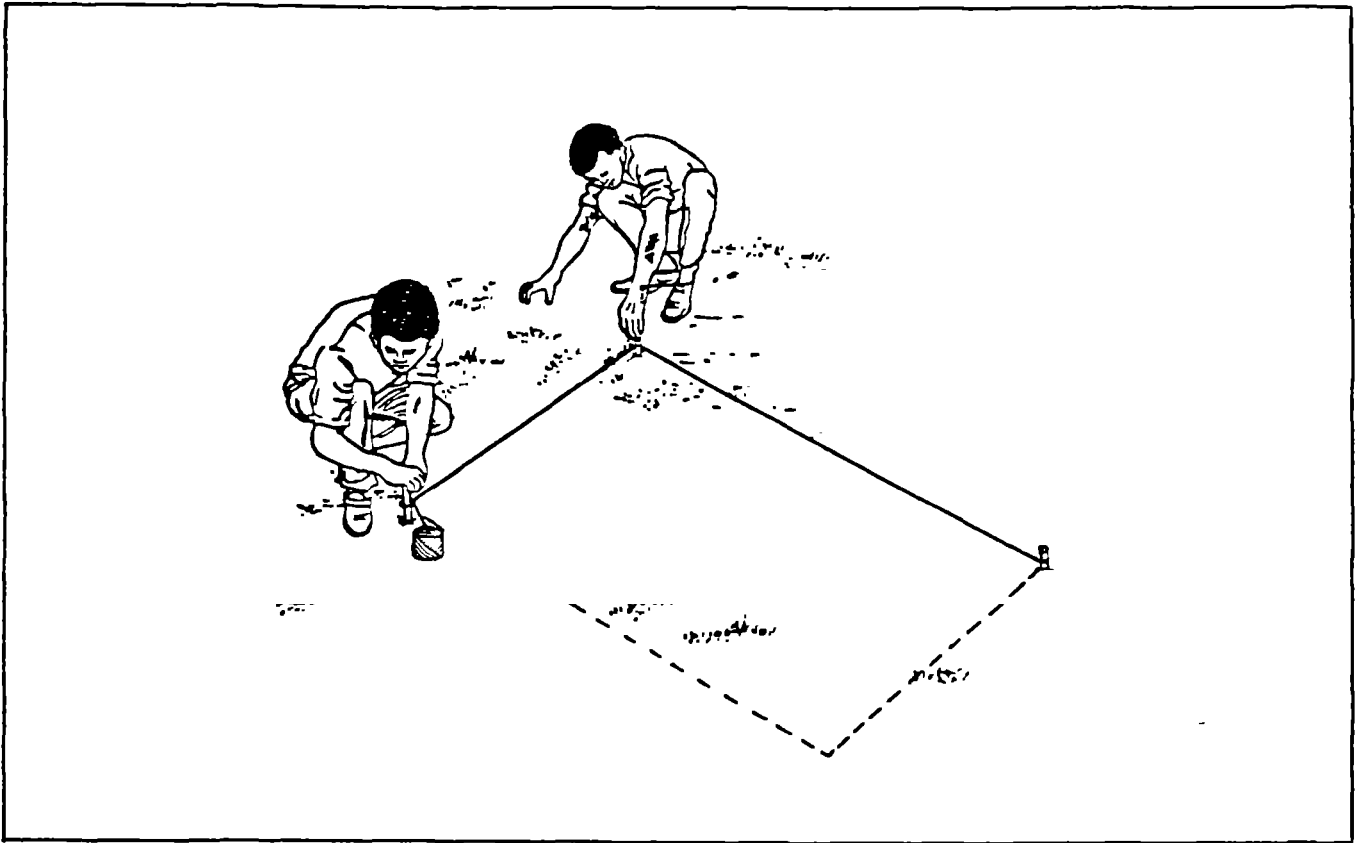
1 A Help the householder to select a site. Remember that V.I.P. latrines should be sited

- * far from obstacles such as trees but close to the house.
- * at least 30 meters from any source of ground water

If possible the latrine door should be oriented towards or against the prevailing wind direction.



- 1 B** Using string or template measure out and mark the outline of the pit.
The pit measures 220 cm by 80 cm.



- 1 C** Using stakes mark the layout for ringbeam shelf. Remember that ringbeam thickness differs with type of material used. From each of the sides of the pit outline measure and mark the width of the ringbeam shelf.

HOW TO DETERMINE WIDTH OF RINGBEAM SHELF

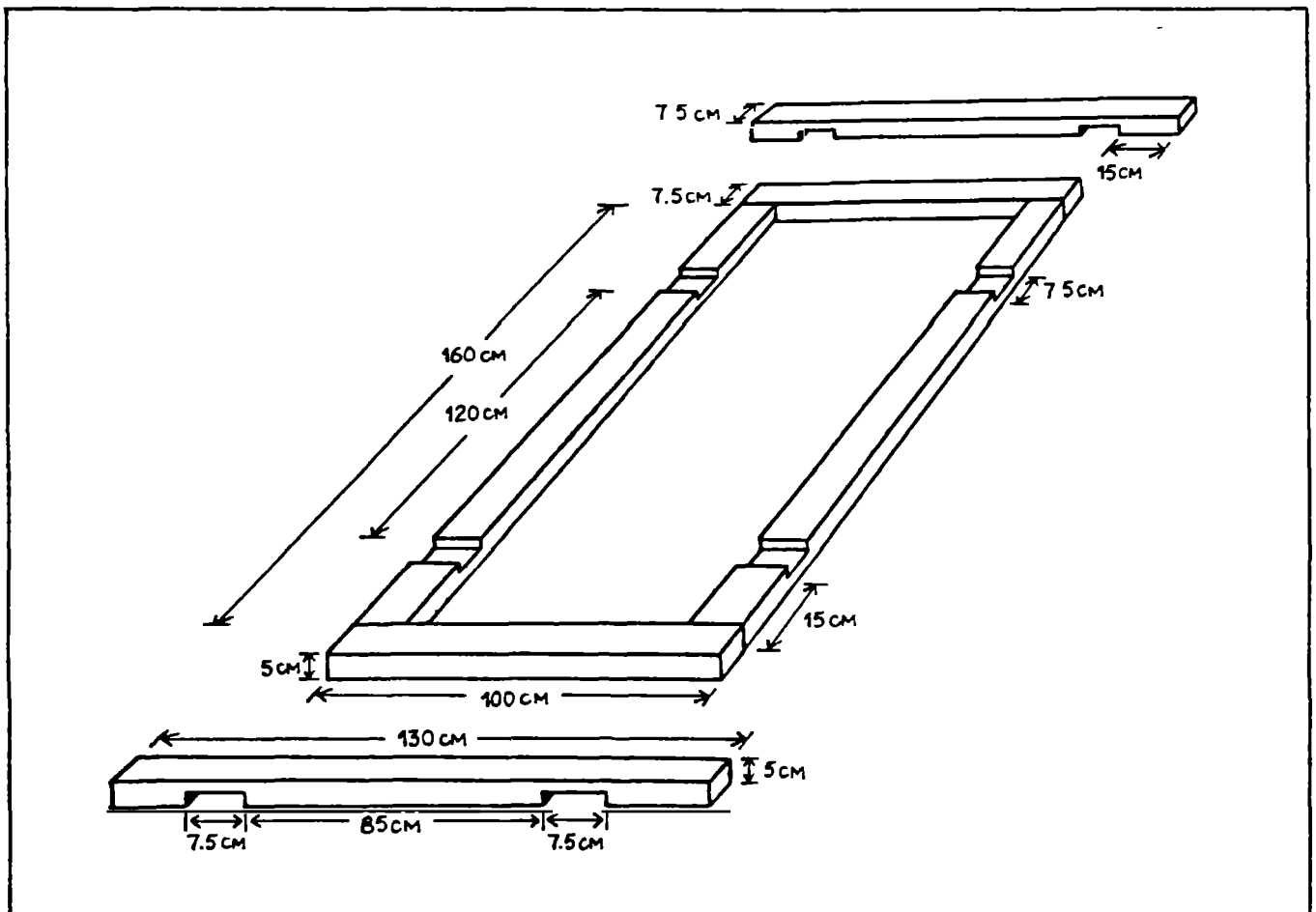
<u>TYPE OF MATERIAL</u>	<u>RINGBEAM THICKNESS</u>	<u>WIDTH OF RB SHELF</u>
Concrete blocks (small)	11.5 cm	15 cm
Concrete blocks (medium)	15.2 cm	20 cm
Concrete blocks (large)	23 cm	30 cm
Boulders	25 cm	30 cm
Rocks	25 cm	30 cm
Burnt bricks	27 cm	32 cm

STEP 2 CASTING SLABS

REMEMBER: that you need three slabs for any latrine unless you intend to use a wooden bench seat. (In that case you would need only two slabs.)

2 A ASSEMBLE WOODEN SLAB CASTING FRAME as follows:

- * Cut long pieces of purlin (5cm x 7.5cm)
- * Make a wooden frame by nailing together 4 pieces of purlin so that inner dimensions of wooden frame are 120cm x 85cm x 5cm. Use 10cm nails, two on each side.
- * Cut 2 pieces of purlin 130cm long. Cut notches on 160cm & 130cm timber members so that when the frame is assembled, the slab casting portion would measure 120cm x 85cm. The depth of the notches on each member should be 2.5 cm.



2 B LEVEL GROUND AND COVER WITH SAND, PLASTIC, PAPER OR FLAT IRON SHEET. PLACE FRAME ON IT.

2 C CUT PIECES OF 6mm STEEL BARS TO THE FOLLOWING DIMENSIONS FOR REINFORCING EACH SLAB.

118cm — 8 pieces

83cm — 6 pieces

2 D MIX MORTAR

MIX PROPORTIONS FOR SLAB CASTING MORTAR

1 part cement : 2 1/2 parts rough sand

or

1 bucket cement : 2 1/2 buckets rough sand

Add enough water for the mortar to be workable (neither too wet nor too dry)

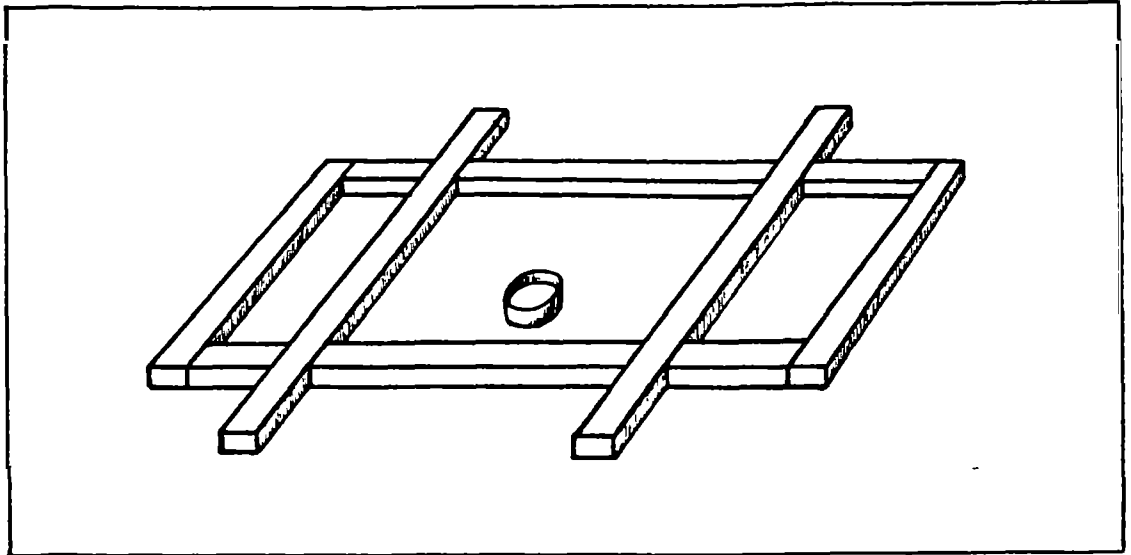
MAKE SURE THAT CEMENT AND SAND ARE THOROUGHLY MIXED BEFORE ADDING WATER. THIS WILL MAKE A UNIFORM MIX.

2 E CAST SLABS AS FOLLOWS

REMEMBER:

- * first slab has no hole
- * second slab has small vent-pipe hole
- * third slab has one oval seat hole

- i. Place a template mould for the seat slab or a vent pipe ring for the vent-pipe hole in the appropriate place within the wooden frame.
- ii. Lay mortar in the frame to a depth of about 2cm and compact well.
- iii. Place steel bars on the layer of mortar.
Make sure that the bars do not touch any side of the wooden frame (allowance should be at least 1 cm).
If any bars overlap holes, trim accordingly.

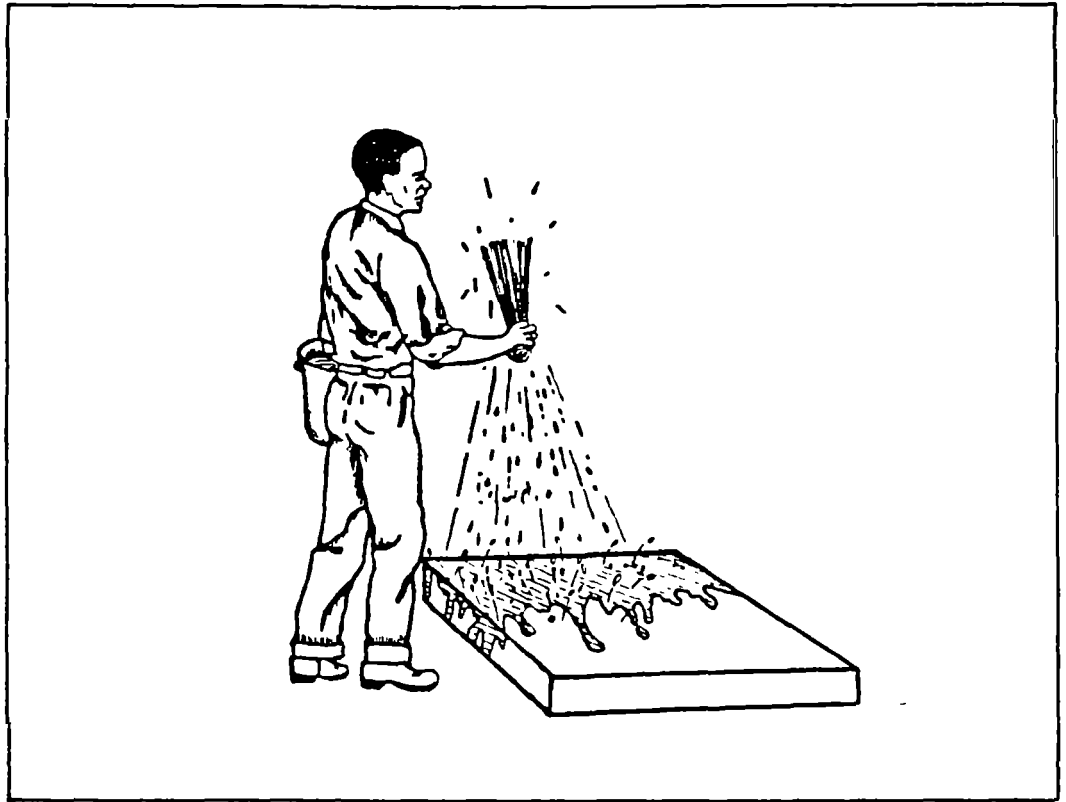


- iv. Tie the steel handles to the bars with wire (only for cover and vent pipe slabs).
- v. Place wood inserts in seat slab to enable installation of seat cover.
- vi. Cover steel bars with mortar to level with frame.
- vii. Make the slab surfaces smooth.

2 F ALLOW THE SLAB TO CURE. THIS IS VERY IMPORTANT.

- * Cover with wet paper or wet sand or wet Hessian sack after one day. (On hot summer days, place wet cover two hours after casting to prevent cracking of surface.

- * Remove wooden frame after one day but allow slab to stay on the ground for at least 7 days.
- * Sprinkle with water two or three times each day for at least 7 days.



2 G TEST VENT PIPE AND COVER SLABS FOR STRENGTH AFTER 14 DAYS.

- * Place slab on 4 pieces of bricks (or wood) at the corners.
- * Allow 4 men to stand on the slab.
- * Check that the slab is not broken.

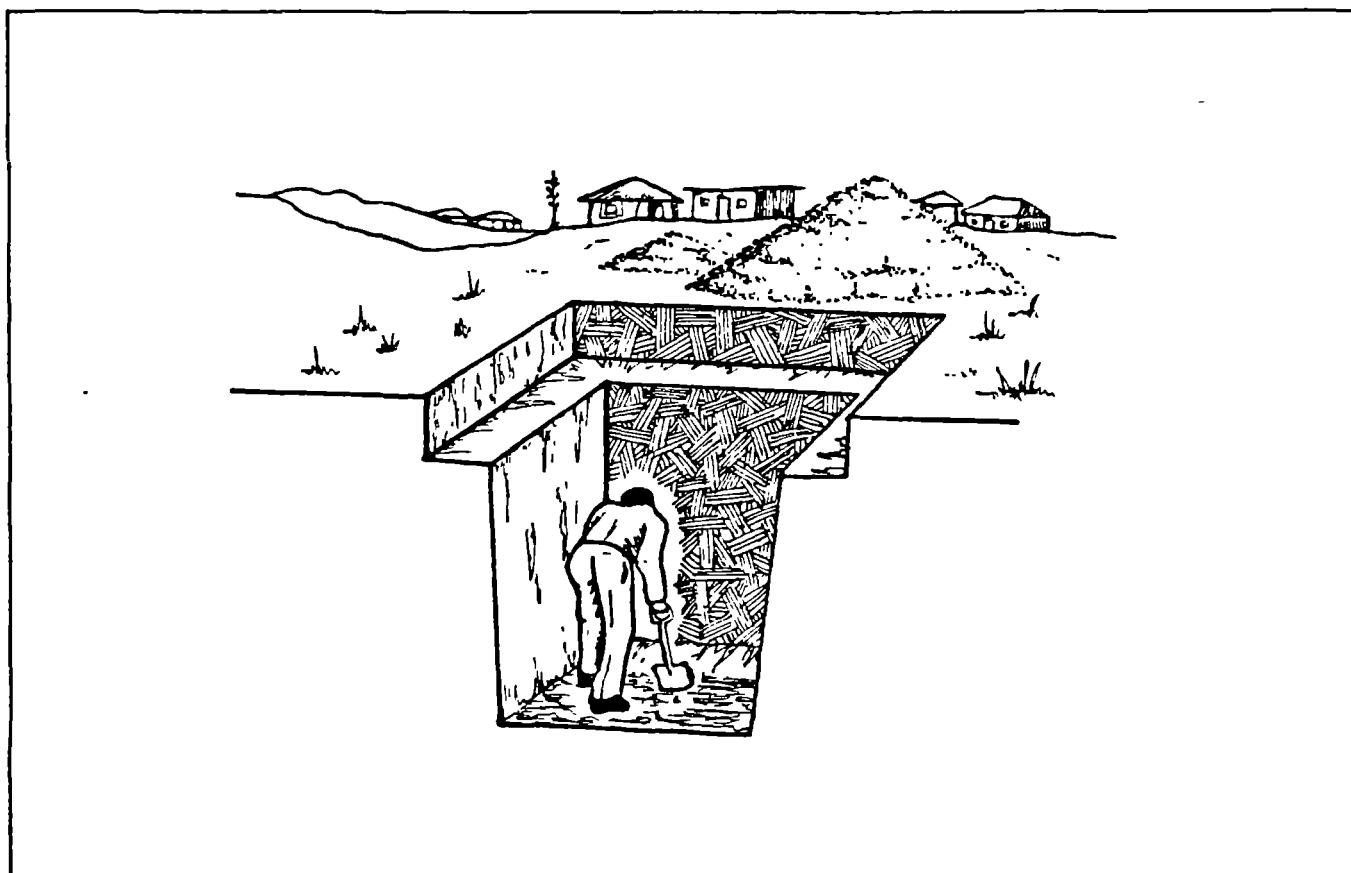
STEP 3 PIT EXCAVATION AND RINGBEAM CONSTRUCTION

3 A DIG THE MAIN PIT

Slope the walls of the pit slightly if a pit lining is not to be constructed, (unstable soils need gentler slopes).

- * Starting from the centre of the outline proceed outwards and deepen the pit to a depth of about one (1) metre.

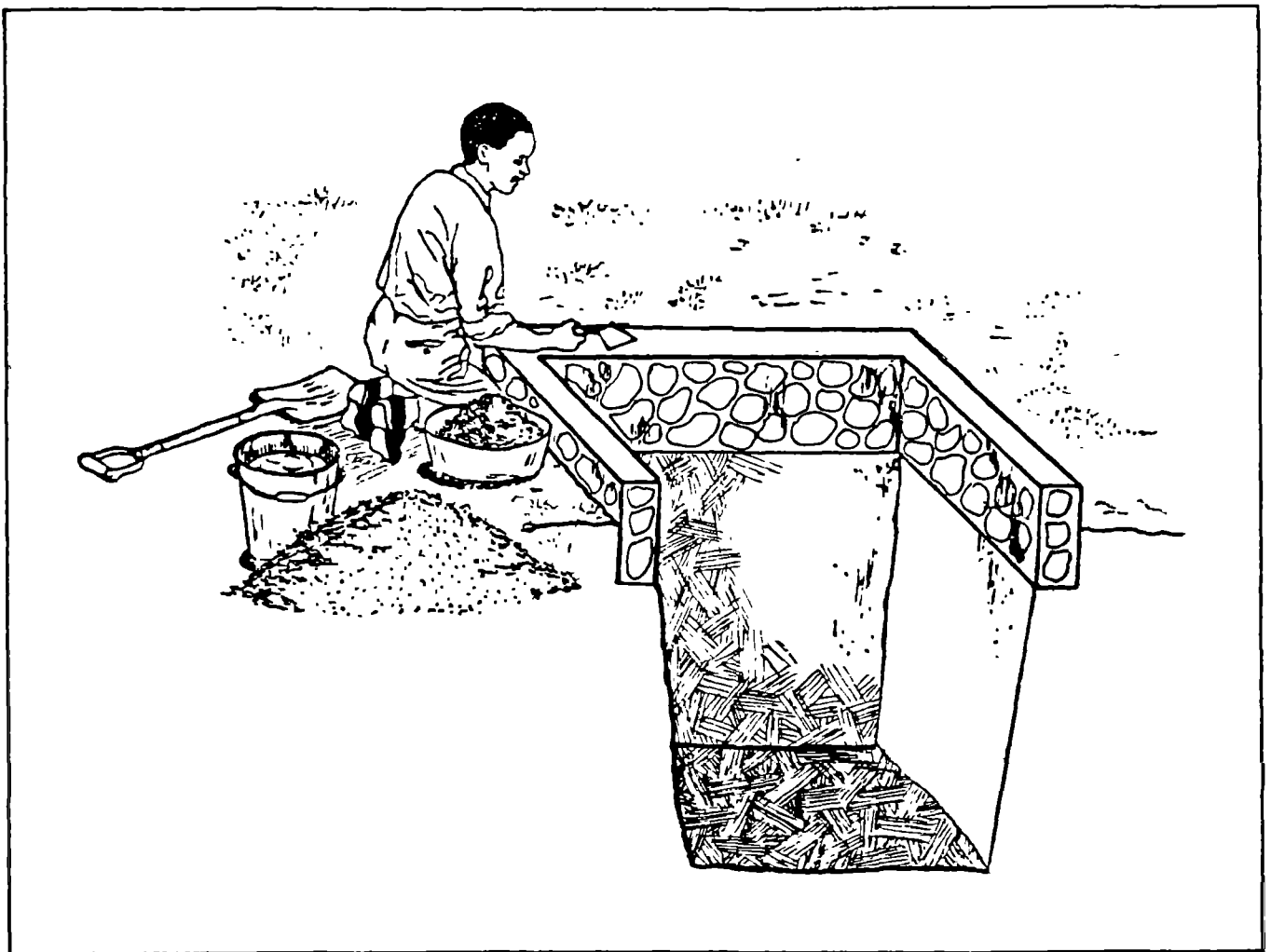
3 B DIG THE FOUNDATION SHELF FOR THE RINGBEAM TO A DEPTH BETWEEN 15 - 30 cm.



BE SURE THAT THE BASE OF THE FOUNDATION SHELF IS LEVEL AND SIDES VERTICAL.

3 C CONSTRUCT THE RINGBEAM AS FOLLOWS

- * Spread layer of mortar 1 cm thick on shelf. Place first course of stones on this layer and cover spaces between stones with mortar.
- * Lay stones with mortar
- * Continue laying stones with mortar until level of stacked stones is at least 20cm above ground.
- * With mortar and small stones level the surface of ringbeam.



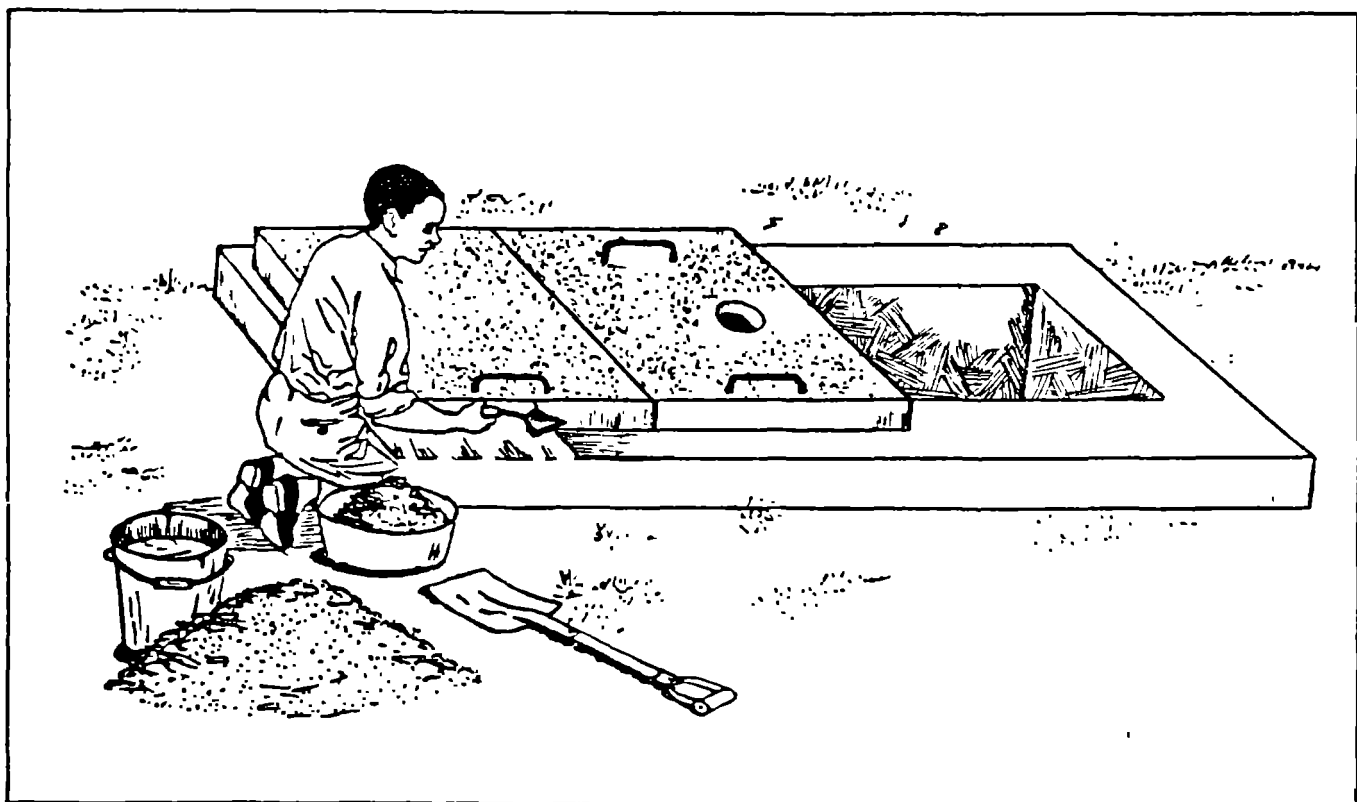
3 D DEEPEN THE PIT TO A DEPTH OF 2.0 METRES AT LEAST (IF POSSIBLE).

STEP 4 INSTALLING THE PIT COVERS
(Vent pipe and pit cover slabs.)

4 A Test the slabs for strength again.

4 B Lay weak mortar mix on the ringbeam and then install pit cover and vent pipe slabs as shown.

4 C Seal the edges of the pit with weak mortar mix.



STEP 5 SUPERSTRUCTURE CONSTRUCTION

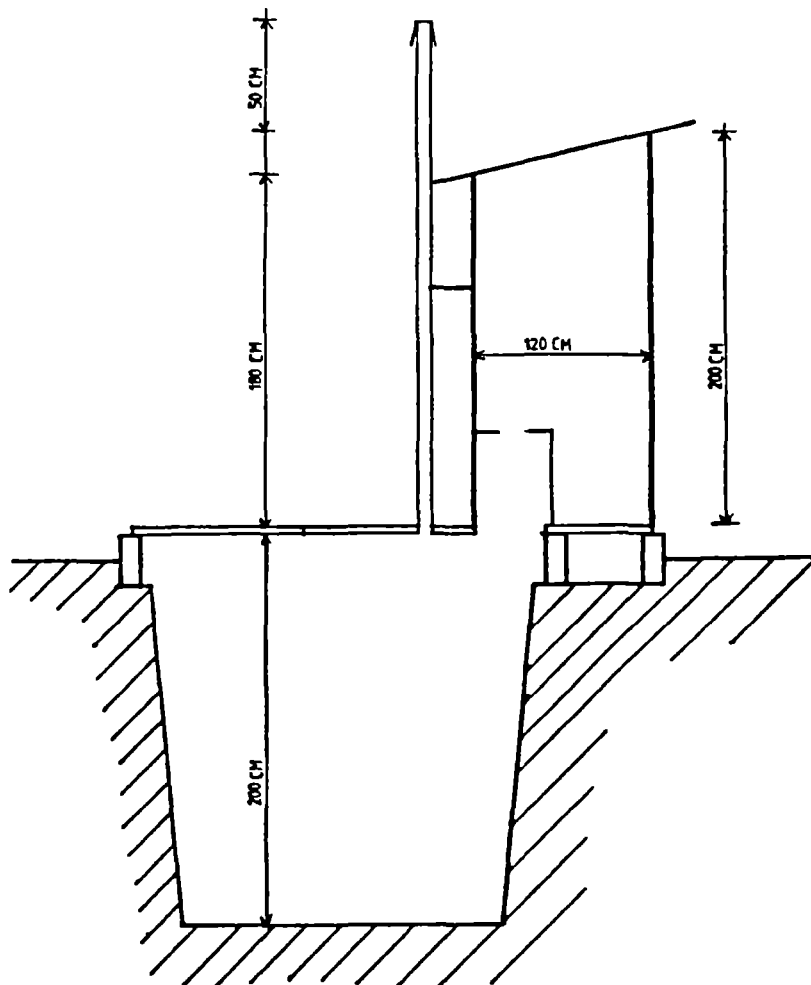
Internal dimensions of latrine superstructure

Length — 120 cm

Width — 80 cm

Height — 200 cm at front

— 180 cm at rear



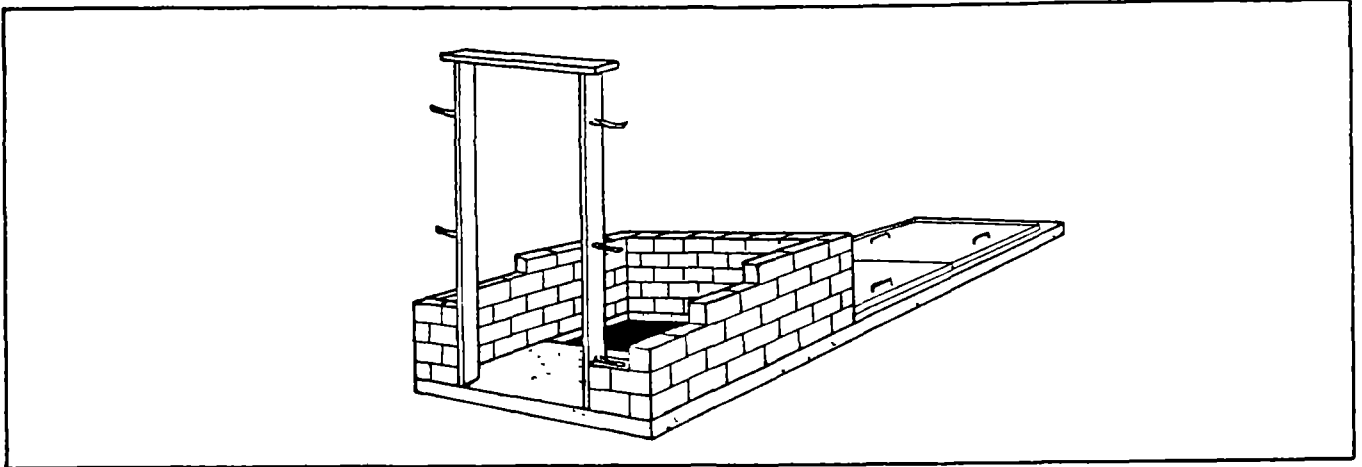
Longitudinal cross section of latrine

5 A ASSEMBLE DOOR FRAME AND PLACE IN THE ENTRANCE OF THE SUPERSTRUCTURE.

- * Ensure that it is straight and vertically plumb.

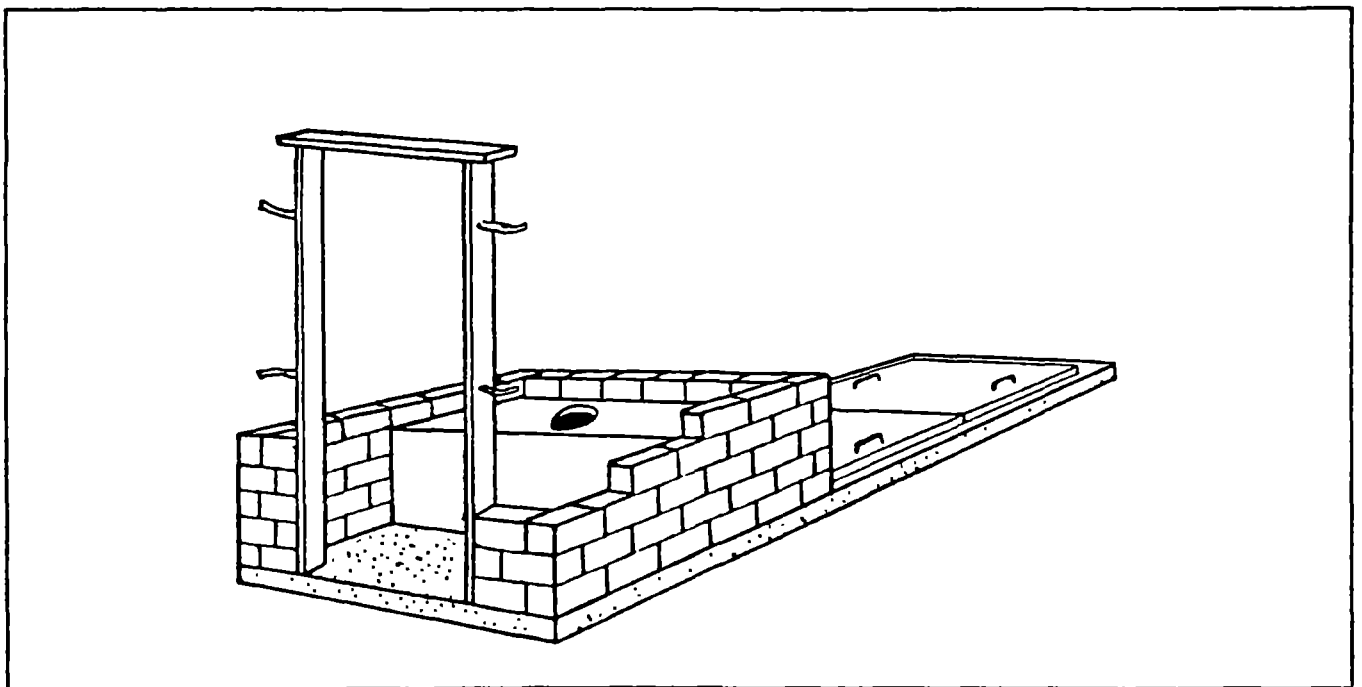
5 B LAY STONES WITH MORTAR UP TO ABOUT 35 cm HIGH

- * Ensure that zinc anchors are mortared between the stones to fix them firmly thus stabilising the frame.



5 C ERECT 10cm THICK WALL FROM FLOOR TO FLUSH WITH PROPOSED FRONT BOTTOM EDGE OF SEAT SLAB.

5 D INSTALL SEAT SLAB INTO SUPERSTRUCTURE WALL



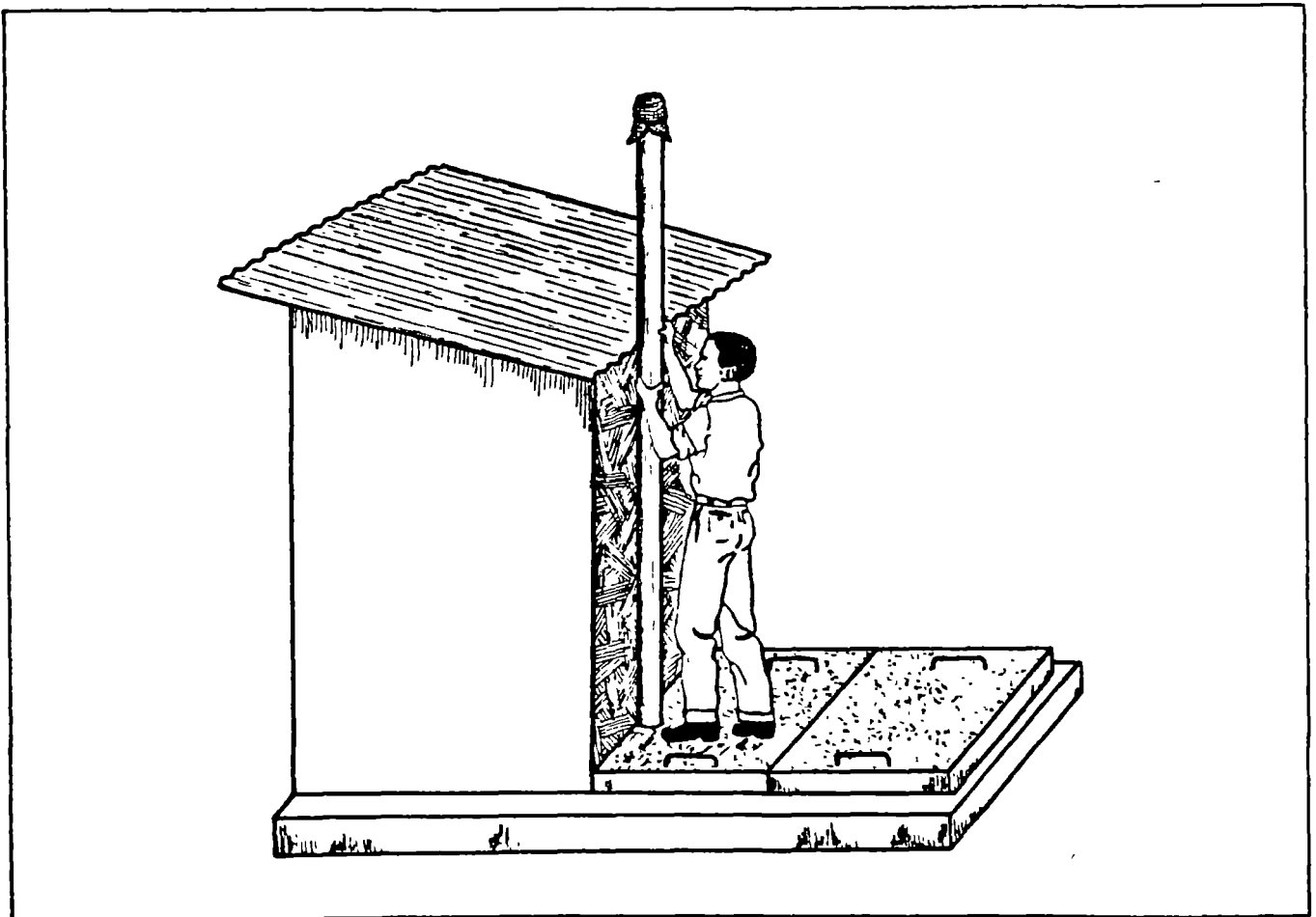
5 E CONTINUE LAYING STONES FOR SUPERSTRUCTURE WALLS.

When rear wall reaches height of about 160cm, insert pieces of wire (4 mm diameter) into this wall and install rear rafter. Secure rafter with wires.

5 F CONSTRUCT ROOF AND INSTALL DOOR.

5 G TIE FLY-SCREEN ON VENT-PIPE AND INSTALL VENT PIPE IN HOLE AS FOLLOWS:

- * Check whether vent-pipe hole is clear
- * CAREFULLY drive a 15 cm nail into vent pipe about 15 cm from the bottom end.
- * Place vent pipe firmly in hole.



- * Ensure that the vent-pipe:
 - is truly vertical
 - extends above superstructure by at least 50 cm
 - fits snugly over hole in the rear slab.

- * Fasten securely with wire to the rear rafter at the back of the roof.

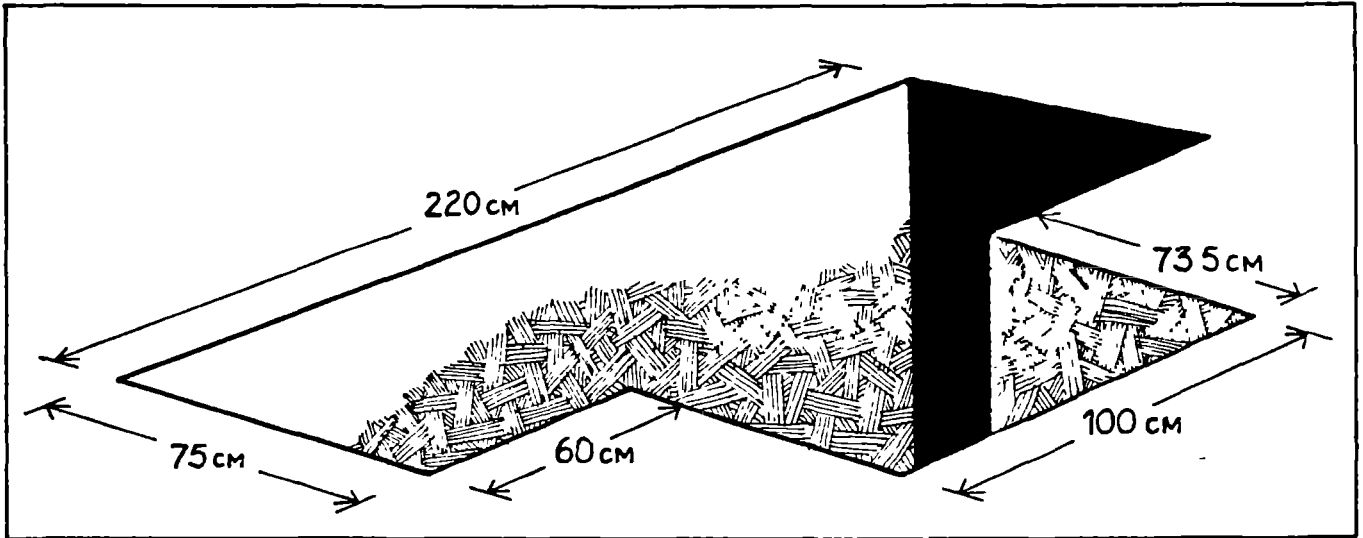
- * Seal vent-pipe hole edges with cement.

5 H HAND OVER V.I.P. LATRINE AND ADVISE OWNER ON ITS MAINTENANCE AND USE (SEE PART 2).

CONSTRUCTING A DOUBLE PIT (V.I.D.P) LATRINE

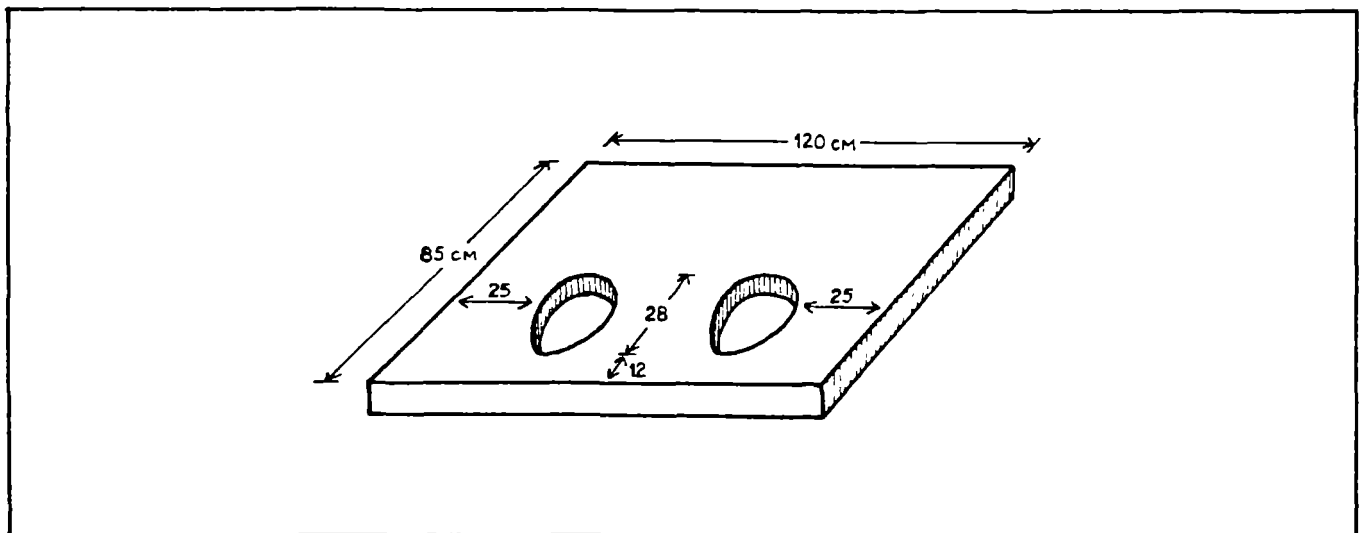
1. Select site in consultation with householder
2. Mark layout and dig the pit to a depth of between one and two metres.

Note: These are internal dimensions. So it is necessary to dig a slightly bigger pit. The actual size will be determined by the materials to be used for the ringbeam.



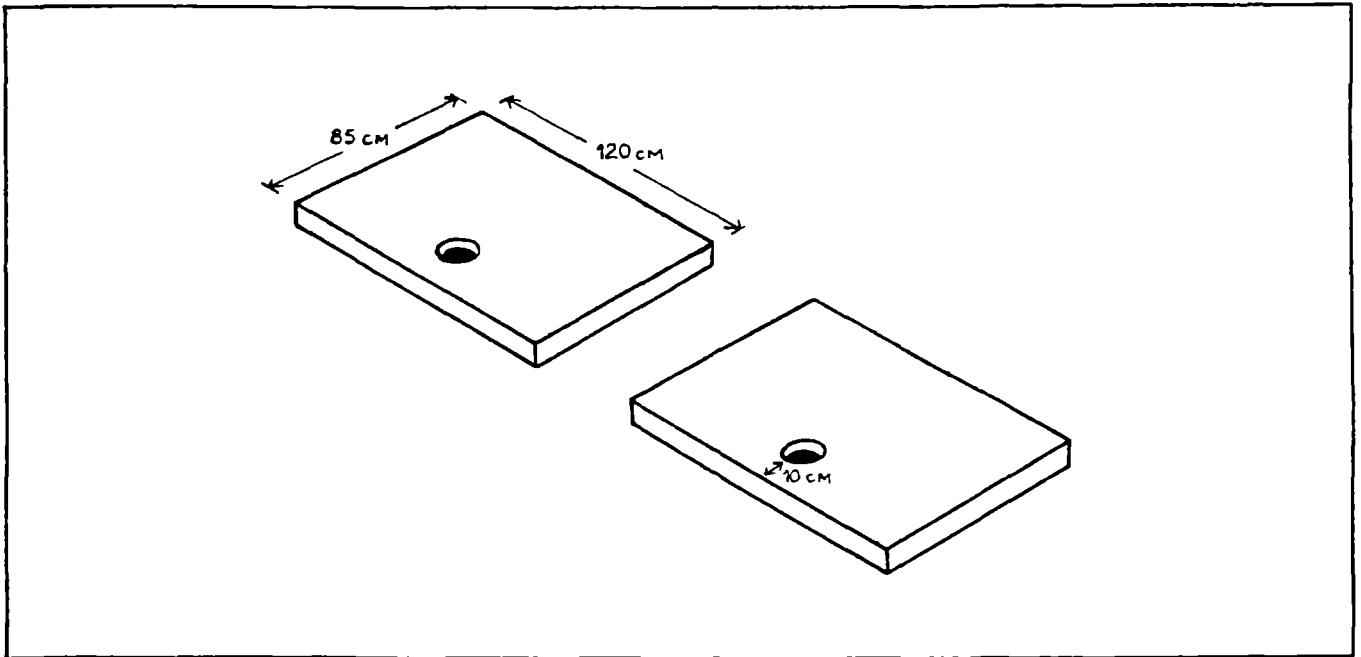
3. Cast three slabs (2 cover slabs and one seat slab)

* Remember that the seat slab has 2 seat holes.



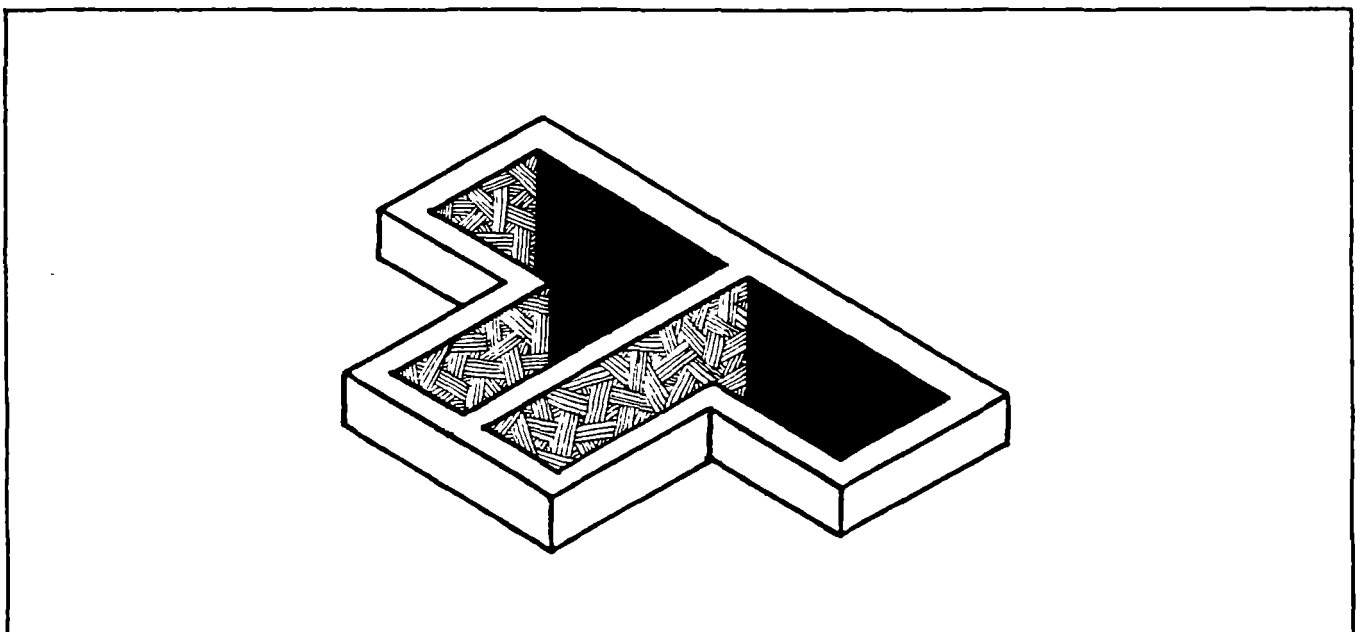
VIDP LATRINE SEAT SLAB
(Measurements in centimetres)

- * Remember also that each of the two cover slabs has a vent-pipe hole.

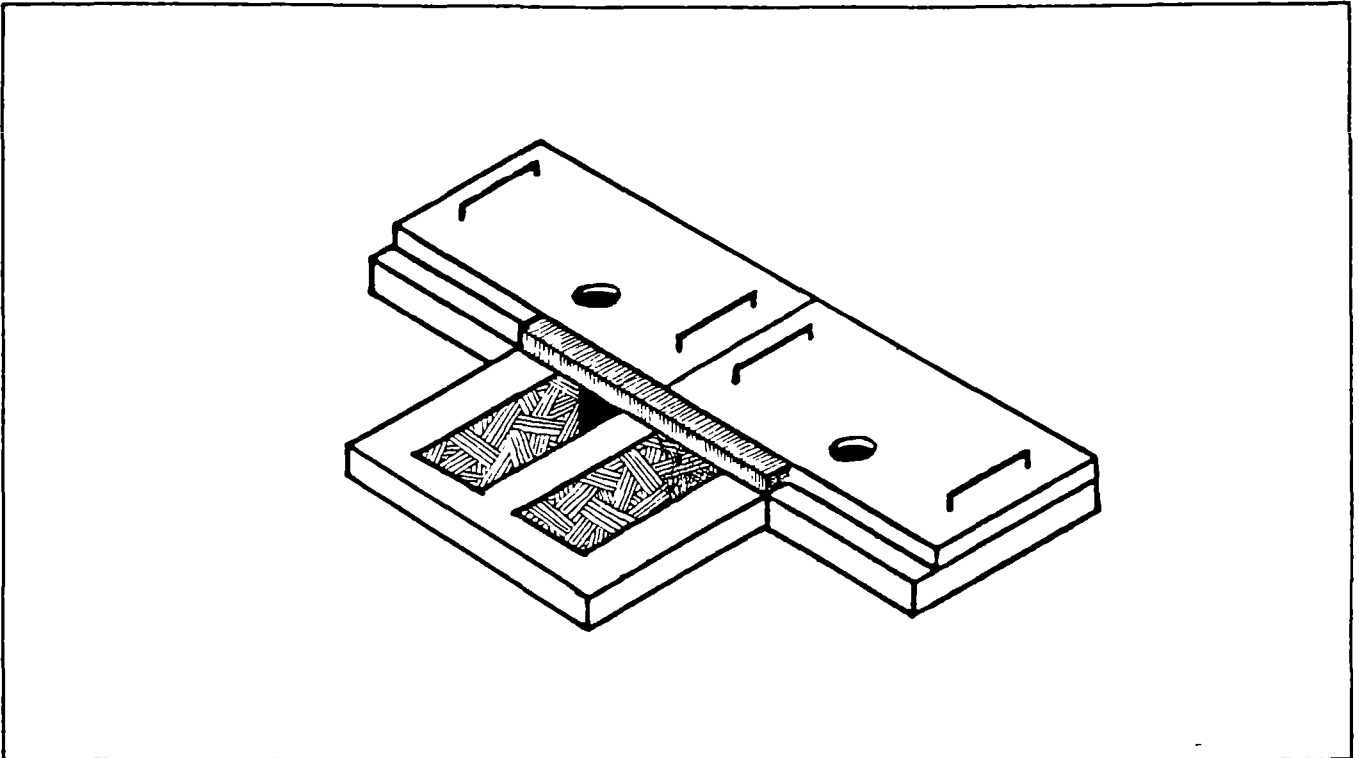


VIDP COVER SLABS
(Measurements in cm)

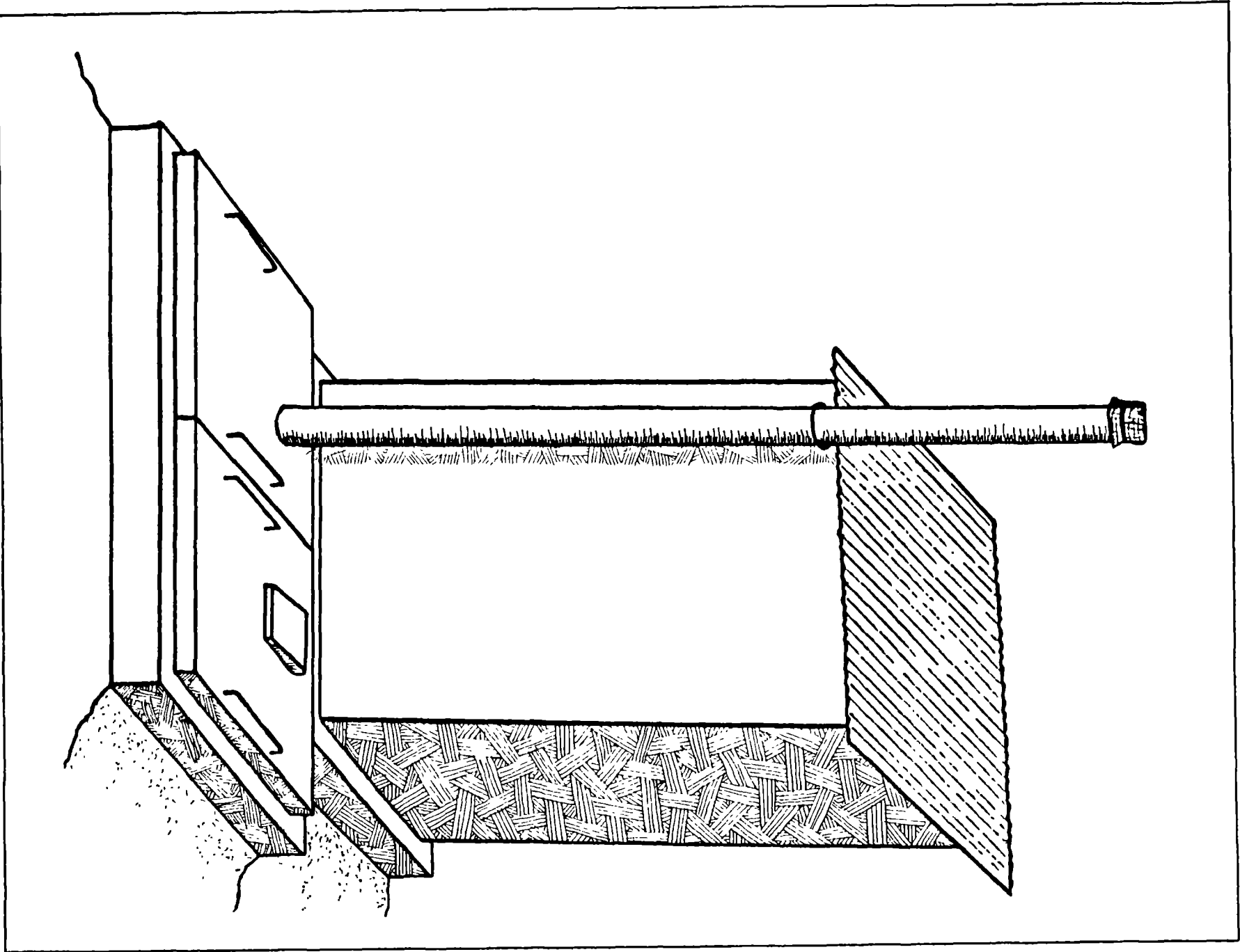
4. Line the pit walls from top to bottom .
Pit dividing wall and pit lining should be constructed at the same time so that they could bond properly. Dividing wall must be well sealed with cement plaster to ensure that it is watertight. Allow the pit lining to project at least 20 cm above ground level. Pit dividing wall should be 15 to 23 cm thick.



5. Install the cover slabs and construct foundation for the superstructure
6. Place a lintel across edge of the slabs and start constructing superstructure.



7. Install seat slab when superstructure wall reaches height of 35 cm.
8. Complete superstructure construction.
9. Tie fly-screen on vent-pipe and install in one of the vent-pipe holes after checking that the hole is clear. Ensure that the vent-pipe is straight and then fasten securely with wire to the rear rafter at the back of the roof.
10. Seal vent-pipe edges with mortar.
11. Place covers on other vent-pipe hole and corresponding seat hole.
12. Hand over V.I.P. latrine and advise owner on maintenance and use.



PART 2

ADVICE ON THE MAINTENANCE AND USE OF V.I.P. LATRINES

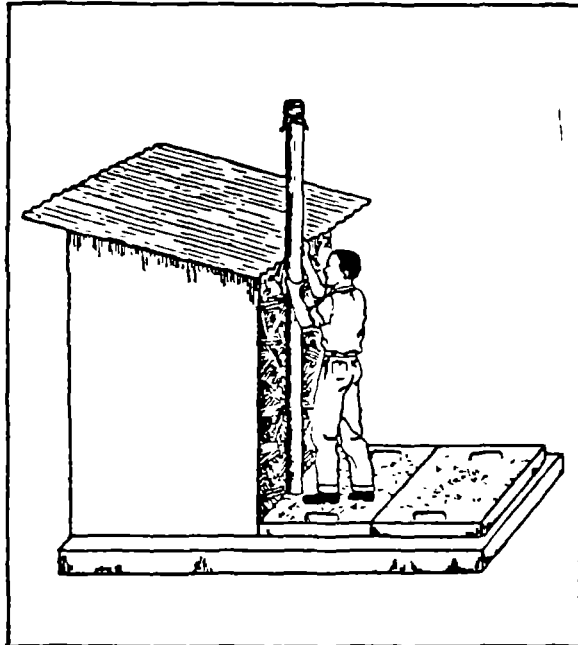
Do remind the latrine owner and the householders about the need for the proper maintenance and use of the V.I.P. latrine.

1.

PROPER CARE OF A V.I.P. LATRINE.

In order to maintain the V.I.P. latrine in good condition at all times the latrine owner should endeavour to undertake the following:

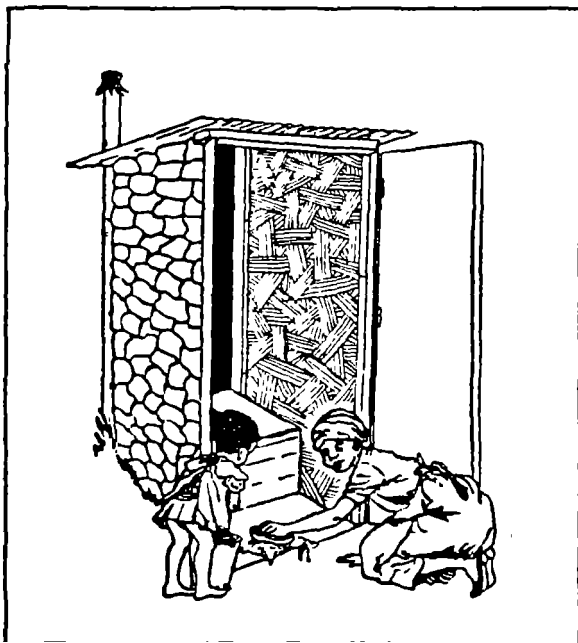
a. Check the vent pipe regularly to ensure that it is still straight.



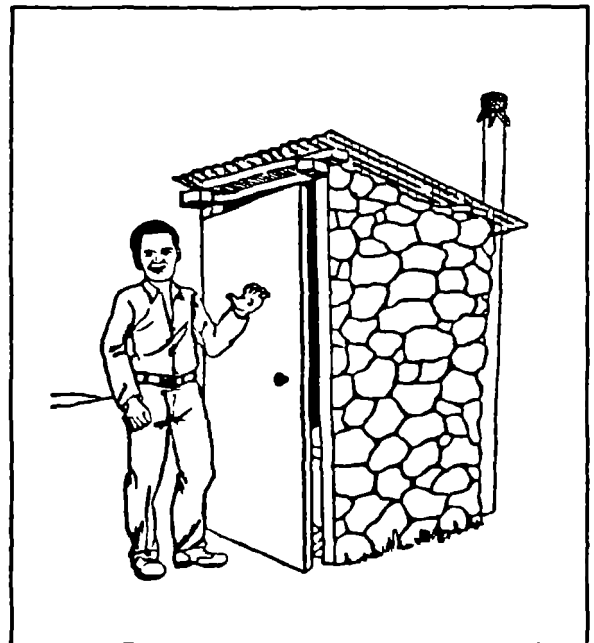
b. Check the fly-screen regularly and replace it if torn or damaged.



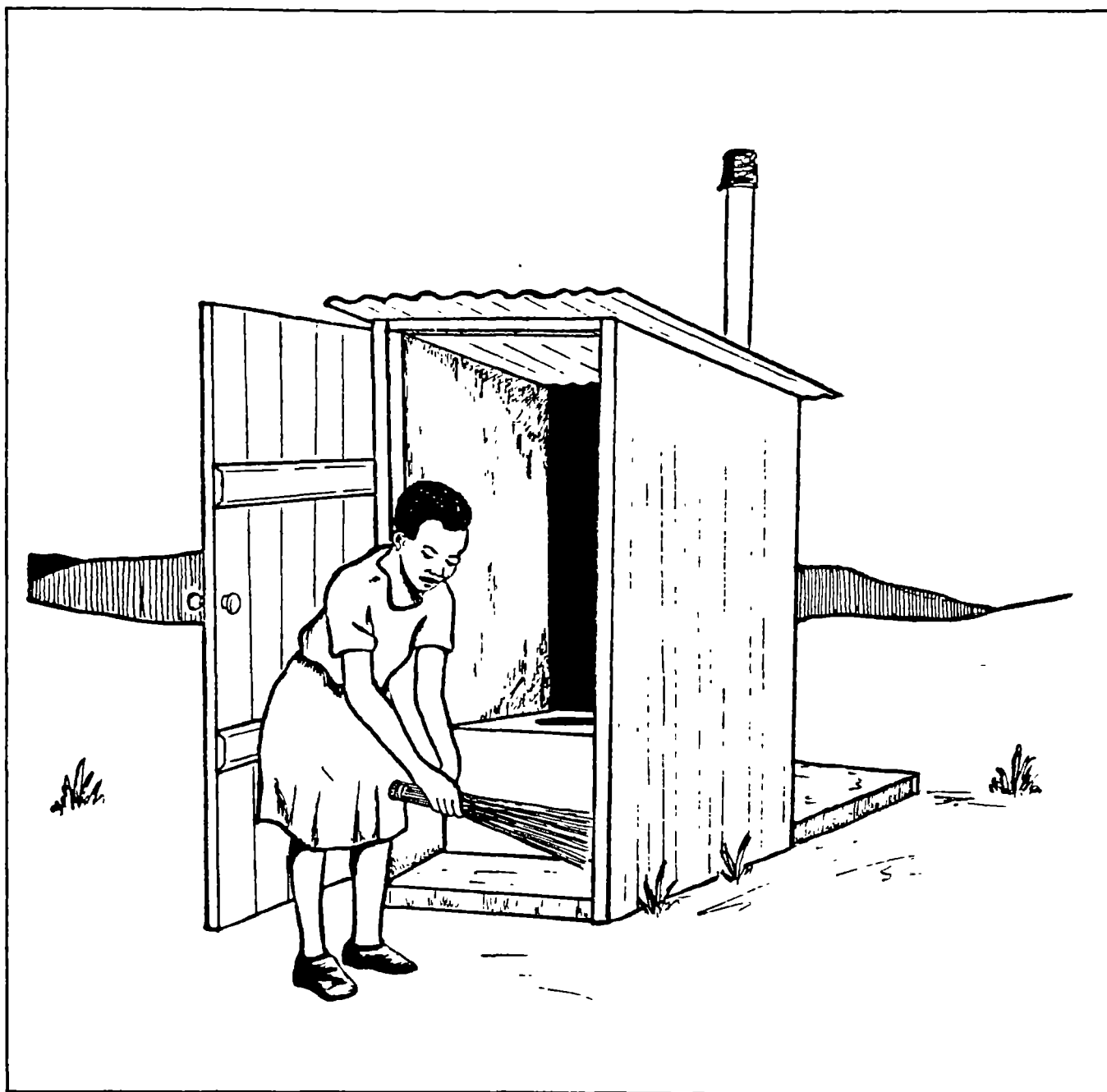
c. Keep the latrine seat and floor clean at all times.



d. Keep the latrine door shut at all times.



e. Keep the interior and exterior of the latrine clean at all times.



2.

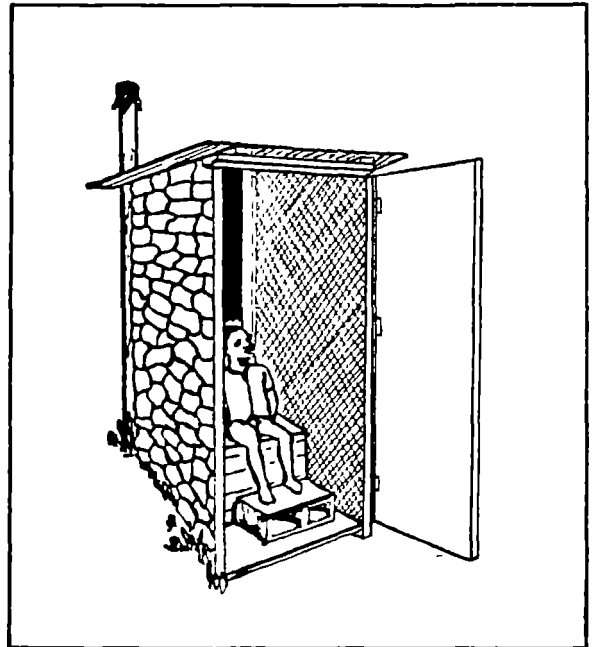
RECOMMENDED HEALTHY PRACTICES

In order to minimise the occurrence of diarrhoeal diseases within the family or household, the following should also be undertaken:

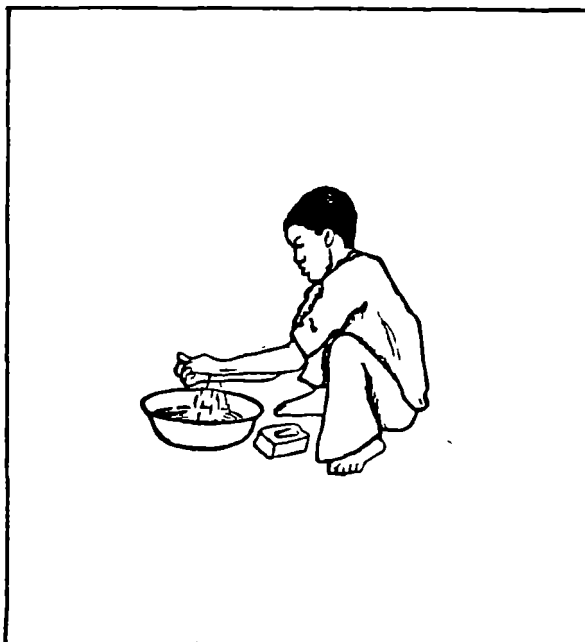
- a. Children's faeces should be disposed of immediately in a V.I.P. latrine.



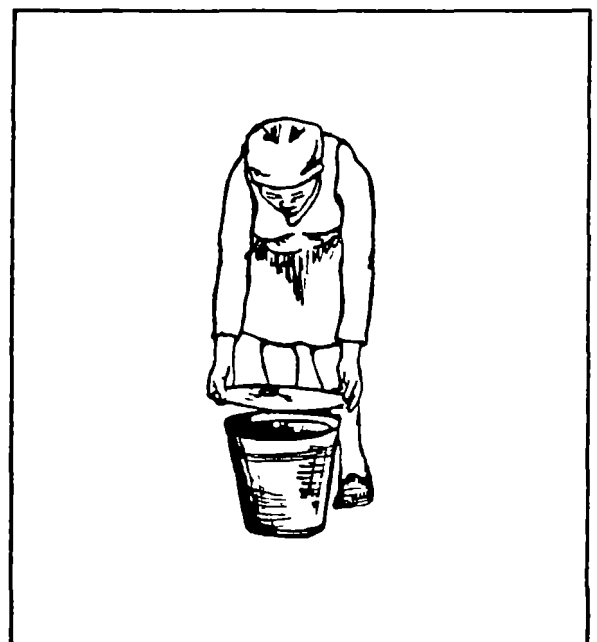
- b. Every member of the family including children should use the V.I.P. latrine.



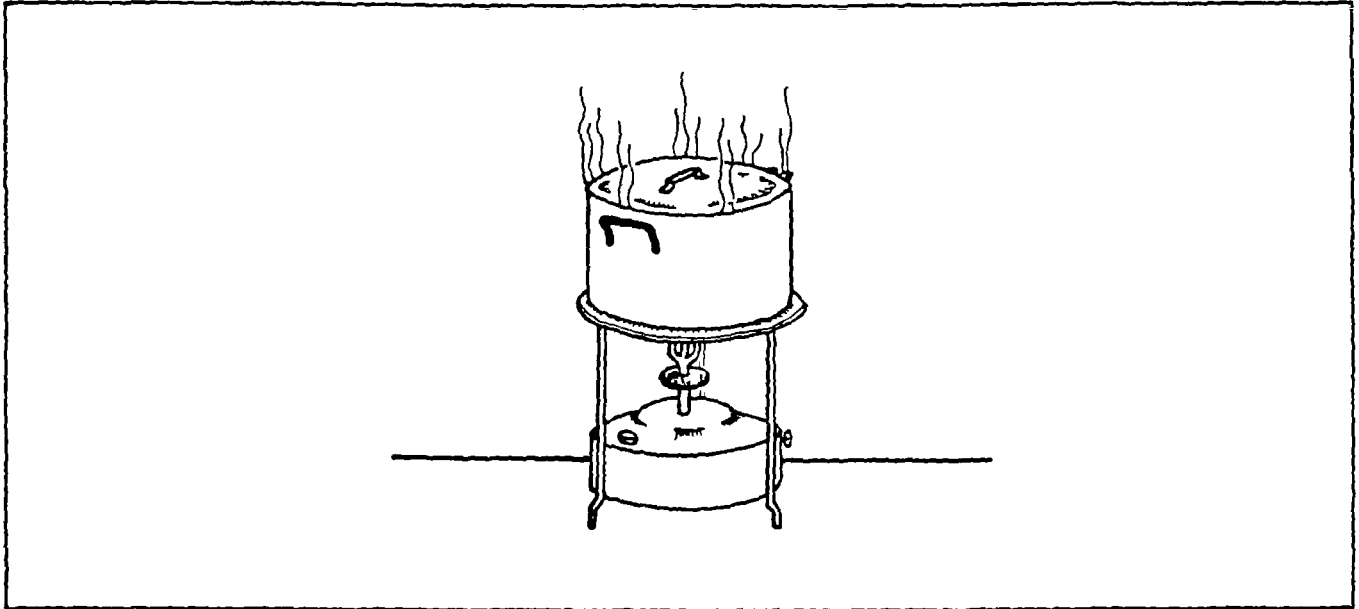
- c. Every member of the family should wash his/her hands after each visit to the latrine.



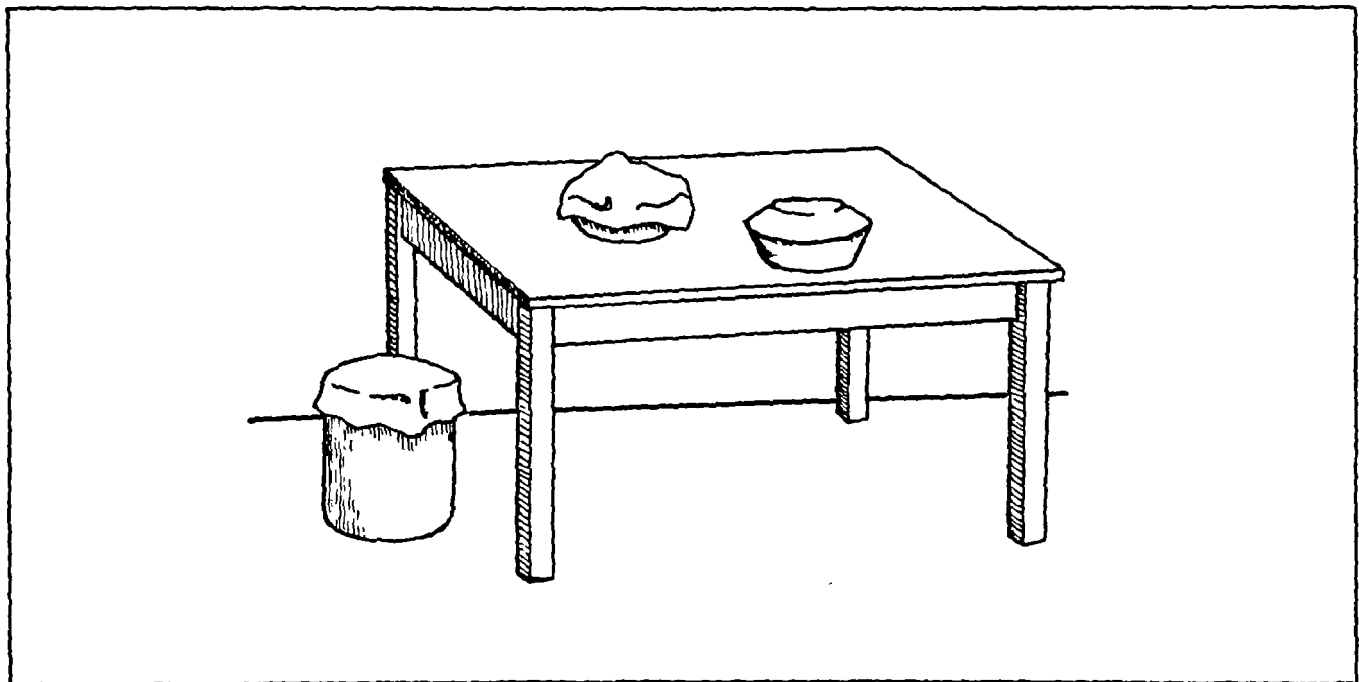
- d. Water for domestic use should be collected and stored in clean covered containers.



- e. Water collected from unprotected sources should be boiled first before used for drinking. You may wish to get together with other community members to protect the community's source of water.



- f. Food should always be covered to protect it from dust and flies. Everyone should wash their hands before handling food.



PART 3 (ANNEXES)

DETAILS OF THE FOLLOWING:

- 1 Constructing mortar on burlap shelters**
- 2 Constructing zinc shelters**
- 3 Constructing other pit covers**
- 4 Constructing Timber framework for zinc or mortar on burlap shelters.**

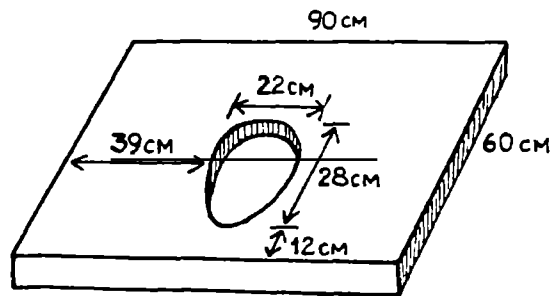
ANNEX 1

CONSTRUCTING MORTAR ON BURLAP SHELTERS

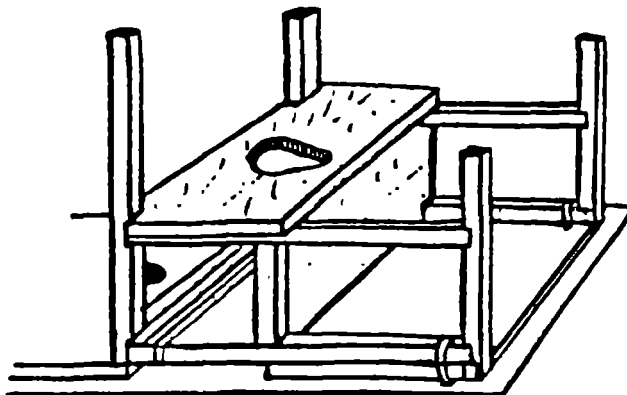
- 1 Construct timber framework and fix roof.
- 2 Construct wooden seat using shelving boards to the following dimensions:

length	—	90 cm
width	—	60 cm
height	—	40 cm
thickness	—	2.5 cm

- * cut out oval drophole as shown



3. Install the wooden bench seat
 - * nail the seat boards to the lower studdings of the framework at a height of 40 cm from the latrine floor:
 - * support the seat from the underside using joists.
 - * cover the front portion using other timber boards . Make sure there are no cracks or holes .



- * cover the two sides and the back of the timber framework with chicken wire mesh.
- * soak burlap in cement and salt solution for about 30 minutes, stirring continuously.

solution
1 bag cement
6 kg salt
72 litres of hot water (8 buckets)

5. Wrap burlap all around the wire mesh. Fix loose parts of the burlap by tying them to the wire frame .
6. Allow to dry for at least 2 hours.
7. Using a brush, cover burlap with mortar and allow to dry .

mortar mixture
2 parts cement
3 parts sand

8. Spray on succeeding layers of coating using a rough casting machine until thickness is about 1 cm throughout.
9. Install door.
- 10 Tie fly-screen on vent-pipe and install in vent-pipe hole.

ANNEX 2

ZINC SHELTERS

1. Construct timber framework (same as for burlap on mortar)
2. Construct wooden seat using shelving boards to the following dimensions:

length	—	90	cm
width	—	60	cm
height	—	40	cm
thickness	—	2.5	cm

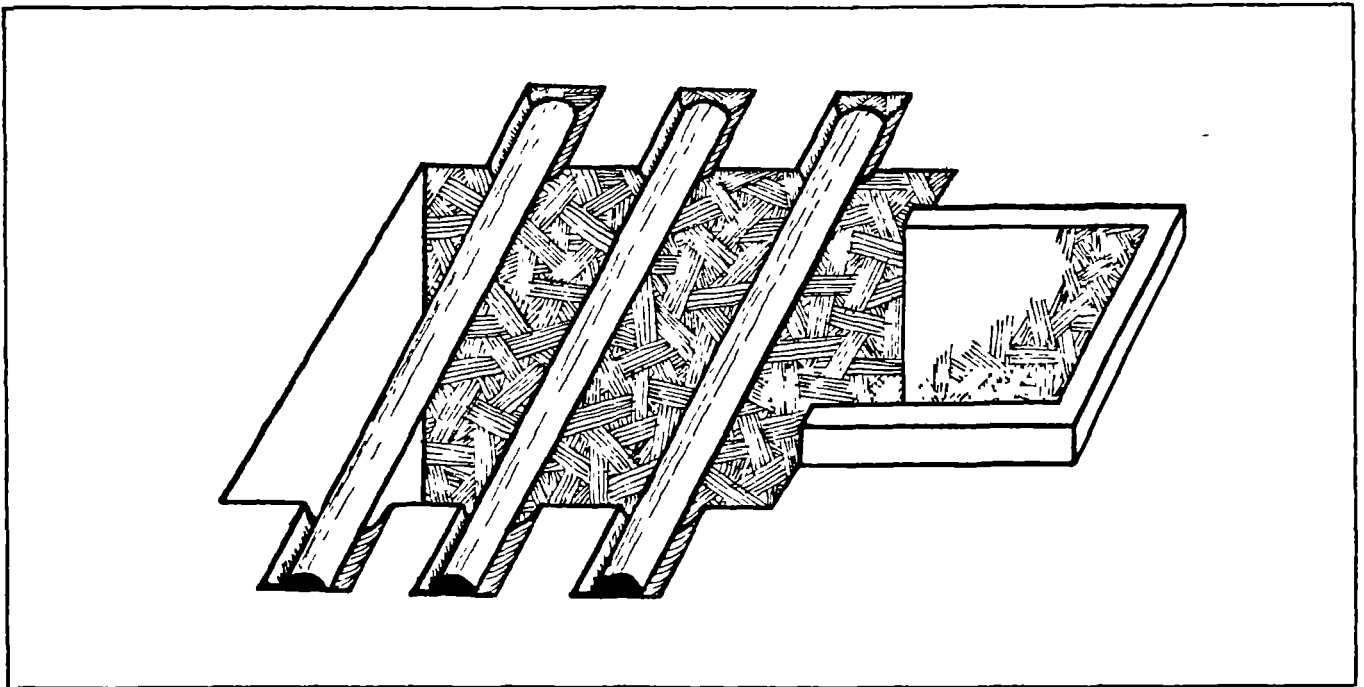
 - * cut out oval drophole as shown on page 34.
3. Install the wooden bench seat
 - * nail the seat boards to the lower studdings of the framework at a height of 40 cm from the latrine floor:
 - * support the seat from the underside using joists.
 - * cover the front portion using other timber boards . Make sure there are no cracks or holes.
4. Cover frame using zinc sheets.
5. Fix roof and install door.
6. Tie fly-screen on vent-pipe and install, ensuring that vent-pipe remains straight, in hole.

ANNEX 3

CONSTRUCTING OTHER PIT COVERS

Householders are generally advised not to dig the pit until it has been properly laid out to suit the available slabs, but in the event that the householder has already dug a pit which is too big to fit the standard sized slabs, proceed as follows:

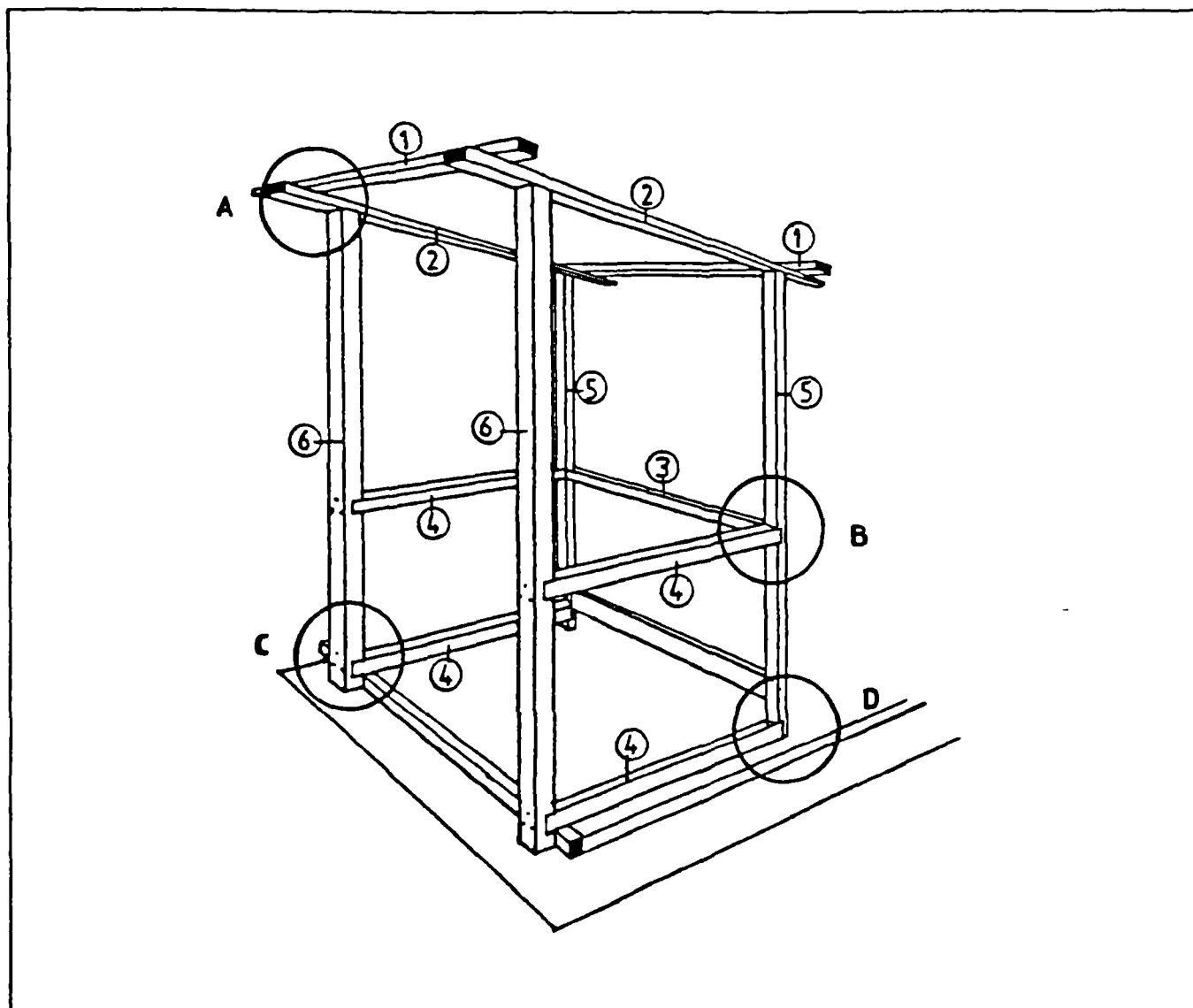
- 1 Dig a channel on one side of the pit.
- 2 Construct ring beam around channel to fit standard seat slab.
- 3 Place lintel across end of channel to support the back wall.
- 4 Cover main pit with treated poles. Poles should overlap edges of pit by at least 25cm on each side and should be about 40 cm apart.



- 5 Cover the main poles with the corrugated sheets. Make sure you have cut a hole for the vent-pipe.
- 6 Tie on flyscreen and position vent-pipe in hole. Seal the edges with mortar.
- 7 Cover sheets with soil. Spread soil carefully to form mound with sloping sides to ensure good drainage.

ANNEX 4

TIMBER FRAMEWORK FOR ZINC OR MORTAR ON BURLAP SHELTERS.

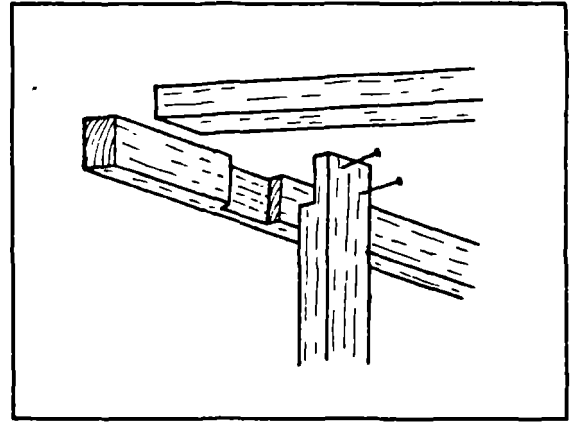


Dimensions of labelled timber parts

Label No.	Dimensions (cm)	No. of pieces
1	5 x 7.5 x 120	2
2	5 x 7.5 x 140	2
3	5 x 7.5 x 80	2
4	5 x 7.5 x 125	4
5	5 x 7.5 x 180	2
6	5 x 7.5 x 200	2

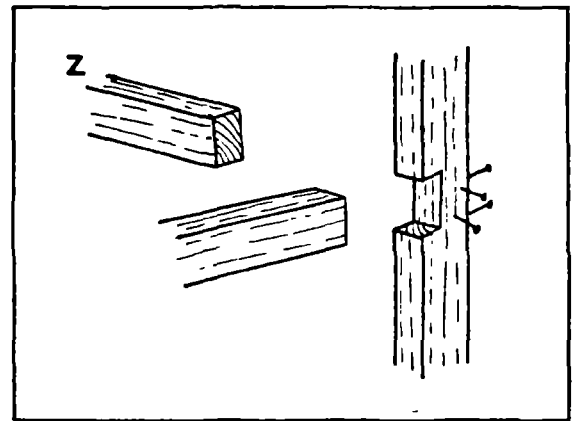
JOINT A

- a. Cut notches 7.5 cm wide by 2.5 cm as indicated. Remember to slant the notches as per inclination of the roof.
- b. Nail the planks together as shown.



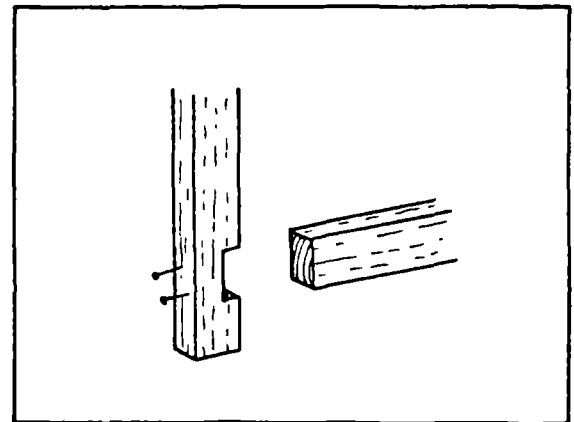
JOINT B

- a. Cut 2 cm deep groove on the 5 cm side of the post.
- b. Nail the planks as shown. The plank on the other side of the posts (Z) will be nailed directly without cutting any notch on that side.



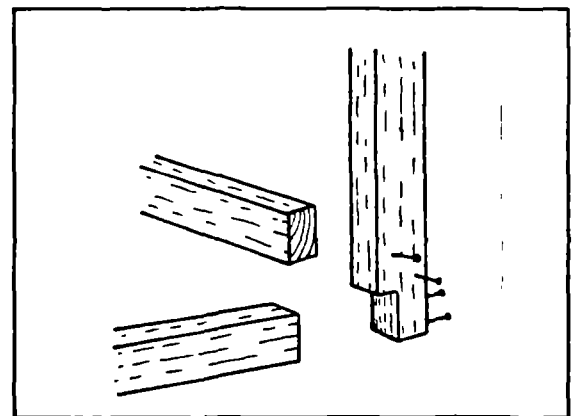
JOINT C

- a. Cut a 2 cm deep groove on the 5 cm side of the posts.
- b. Insert stud and nail together



JOINT D

- a. Cut a notch on the post. It should be 2 cm deep from the bottom of the post on the 5 cm side.
- b. Insert stud into notch and nail it.
- c. Nail the other stud directly on the face of the post.



NRSP1988

