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Construction of LATRINES

in rural villages in Sri Lanka

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in rural villages in Sri Lanka



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Cover Photo
Latrine in Hippola Village, Kandy District
(by Sarvodaya Rural Technical Services)

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FOREWORD

It is with great pleasure that I am writing this message on the occasion of the publication of this manual which is the result of a joint effort of **HELVETAS** and Sarvodaya Rural Technical Services (**SRTS**).

The improvement of health conditions of the rural community in Sri Lanka by providing pure drinking water and improving sanitation facilities is a vital task performed by the **SRTS**. A number of gravity water supply schemes, hand dug shallow wells and latrine projects have been constructed by **SRTS** in various districts through out the country during the past 15 years to achieve this objective.

In this exercise the **SRTS** personnel have worked not only as technical people but also as community development workers, using appropriate technology and suitable methodologies wherever it is necessary. It is commendable that the **SRTS** is now in a position not only to contribute to such an important manual through the vast experience they have gained during the last few years but also to provide the technical expertise to other NGOs who are involved in the rural water and sanitation sector in Sri Lanka.

In this connection our sincere thanks should go to our research partners from **HELVETAS**, Switzerland, who came with technological expertise, but gave the recognition to our own spiritual cultural resources that we were using in our movement. It should be stated that the contribution from **HELVETAS** financially as well as technically towards the **SRTS** activities should be highly appreciated.

Finally, I would like to give my thanks to everybody who made their valuable contribution towards the publication of this manual.

Dr..A. T. Ariyaratne,
Hon. President,
Lanka Jathika Sarvodaya Shramadana Sangamaya (Inc.)

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PREFACE

In 1978, a fruitful partnership commenced between the Sarvodaya Rural Technical Services (SRTS) and HELVETAS. In the beginning a small but motivated unit supported the Sarvodaya Shramadana Movement by providing training to young men and women in agriculture and artisan skills.

Initially SRTS was engaged mostly in the northern districts of Sri Lanka but with increasing numbers of skilled staff its activities were successfully extended to the other parts of the island. Over the years there was a shift from training and agricultural activities towards more technical (rural infrastructure) projects. SRTS specialised in assisting the rural communities in improving the infrastructure of their villages through the construction of Gravity Water Supply Schemes, Hand-Dug Wells, Bridges, Culverts, Latrines etc.

The large number of similar projects implemented by SRTS made it advisable to standardize the design and construction procedures. The manuals and standard drawings which were consequently prepared by the senior SRTS staff together with the HELVETAS engineers reflect the experiences gained throughout the years.

In August 1991, HELVETAS decided to update and to revise all these technical papers with the broader aim to make them available not only to SRTS but also to other organisations, institutions or individuals interested and engaged in this field of work. As a result of these efforts the following manuals are now available:

- **“Construction of Latrines in Rural Villages in Sri Lanka”**
(also available in Sinhala and Tamil)
- **“Construction of Hand-Dug Wells in Rural Villages in Sri Lanka”**
(also available in Tamil and Sinhala)
- **“Design, Construction and Standardisation of Gravity Water Supply Systems in Rural Villages in Sri Lanka”**
(available also in Sinhala)

It should be noted that these manuals are technical handbooks for those involved in the planning and construction of hand dug wells, gravity water supply systems and latrines. Other related aspects of such projects, like health education, participatory planning and involvement of the villagers in the construction phase or maintenance of completed projects are only touched or not discussed at all.

We are grateful to all who contributed to the completion of these manuals and would appreciate comments or suggestions for further improvements. For any inquiries you can contact our office under the following address:

HELVETAS, 15/2, Ekanayake Avenue, Nugegoda (Sri Lanka)
Tel. 01-85 24 54; Fax: 01-81 19 92

Nugegoda, March 1994

1 INTRODUCTION

Inadequate disposal of human excrement is a major health hazard which can be prevented through the use of good latrines. According to recent studies, only about 40% of the rural households in Sri Lanka are equipped with latrines in good or fair condition of the water seal or pit type. This manual should enable interested persons, institutions or organisations to design and construct appropriate latrines for the rural areas of Sri Lanka.

This manual briefly touches the health aspects of latrines but mainly concentrates on the following:

- Location of Latrine Pits
- Recommended Types of Latrines
- Operation and Maintenance of Latrines
- Construction Details
- Detailed Drawings
- References

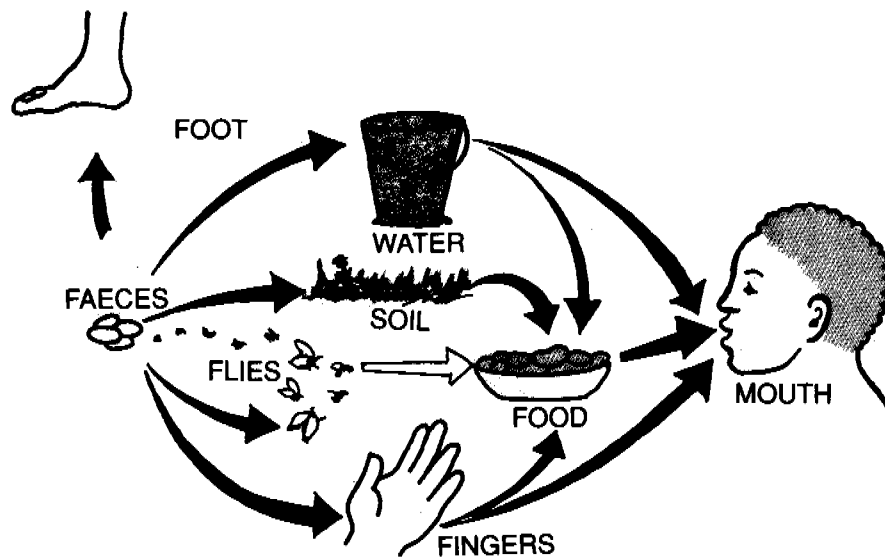
It is important to realise that the construction of latrines alone will not improve health conditions. There has to be an accompanying hygiene education program to make the people aware of the importance of personal hygiene.

The Appendix to this manual includes references and a bibliography for further reading.

2 HEALTH ASPECTS

2.1 EXCRETA-RELATED INFECTIOUS DISEASES

An infectious disease is one which can be transmitted from one person to another directly or indirectly. All infectious diseases are caused by living organisms, such as bacteria, viruses, or parasitic worms, and a disease is transmitted by the passing of these organisms from one person's body to another. Excreta-related diseases are caused by pathogens transmitted in human excreta, normally in the faeces.



Transmission of Excreta-related Diseases

2.2 PREVENTION OF EXCRETA-RELATED DISEASES

Improved excreta disposal (through latrines) is an important factor in preventing excreta-related diseases. Other factors are:

- Improved Water Supply
- Personal Cleanliness
- Efforts in Health Education, etc.

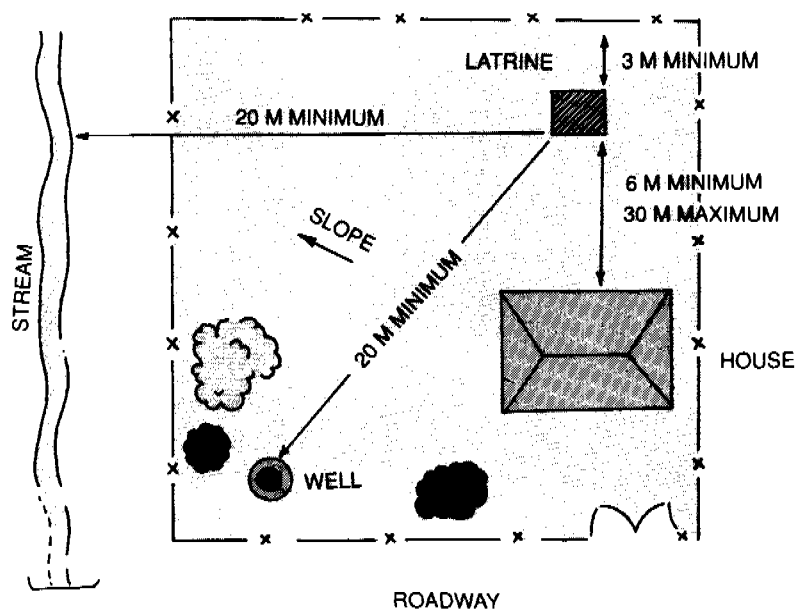
However, there is evidence that the use of a fouled/dirty latrine in rural areas provides a greater health hazard than the practice of casual defecation in the surrounding bush.

It is essential that people of all age groups use the improved latrines and keep them clean. Children's excreta is equally as infectious as adults'.

3 LOCATION OF LATRINE PITS

Latrines are used to safely dispose of human excrement. In the pits this excrement can decompose and the liquids will soak into the surrounding soil. To prevent pits from contaminating potential water sources (e.g ground water used in wells) the following basic requirements must be observed:

- Pits should be located outside a radius of 20 m from wells, streams, etc.
- Pits should not be located uphill, or upstream, of any drinking water source.
- Pits should be located, if possible, not less than 6 m but not more than 30 m from the nearest dwelling.
- The bottom of a pit should be at least one meter above the ground water level during the wettest season of the year.
- Pits should be dug in permeable soil.

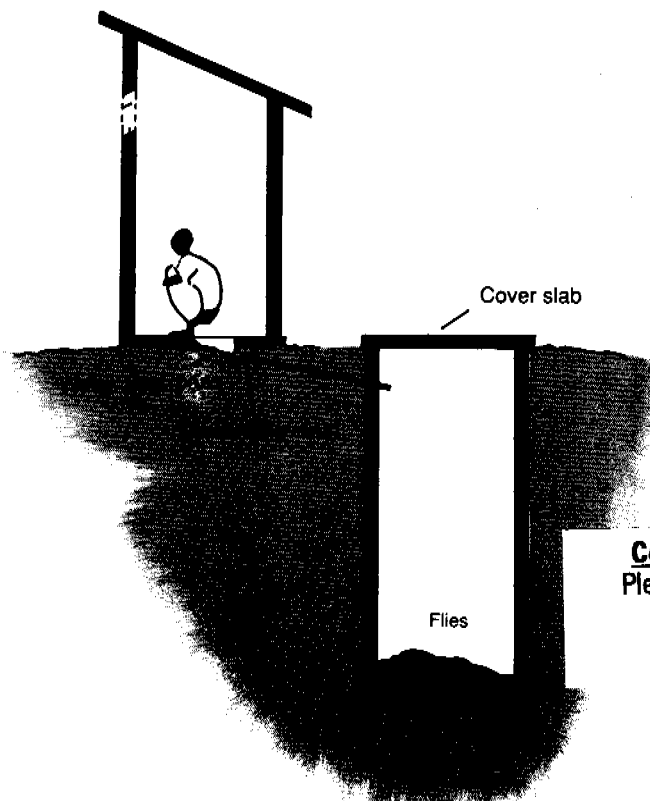


Latrine Location Plan

4 RECOMMENDED TYPES OF LATRINES

The two basic types of recommended latrines are:

Ventilated Improved Pit Latrine (VIP)

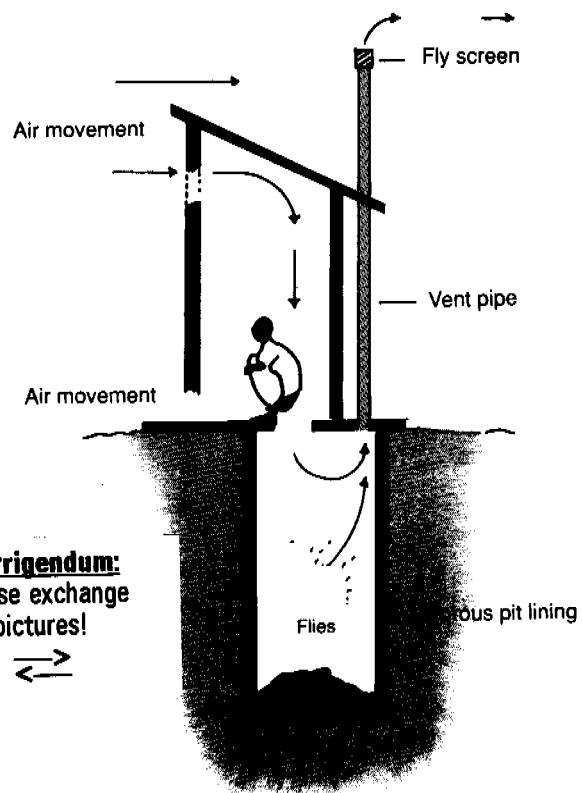


The VIP latrine is a good solution if there is little or no water available!

For more details please refer to:

- 4.1 General Information
- 5.1 Operation and Maintenance
- 6.1 Pits
- 6.3 Placing of Slabs
- 6.4 Foundation, Squatting Pan
- 6.5 Superstructure
- Appendix: Detailed Drawings

Water Seal (Pour Flush) Latrine



The water seal latrine is a good solution if there is enough water available, **min. 3 litres per flush!**

For more details please refer to:

- 4.2 General Information
- 5.2 Operation and Maintenance
- 6.1 Pits
- 6.3 Placing of Slabs
- 6.4 Foundation, Squatting Pan
- 6.5 Superstructure
- Appendix: Detailed Drawings

Corrigendum:
Please exchange
pictures!



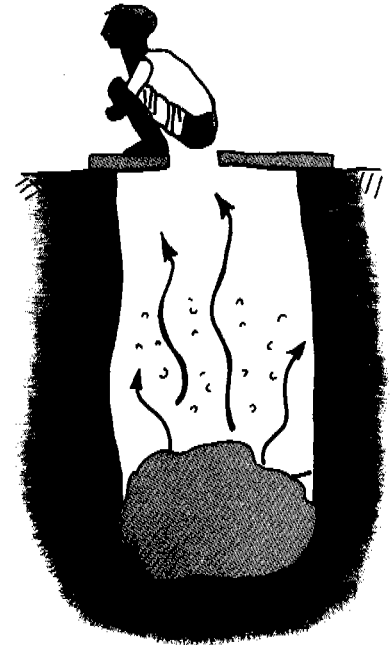
4.1 VENTILATED IMPROVED PIT LATRINE (VIP)

4.1.1 SIMPLE PIT LATRINE

The conventional, simple pit latrine (see picture) has two principal disadvantages:

- It smells.
- It produces hundreds of flies (or mosquitoes) a day.

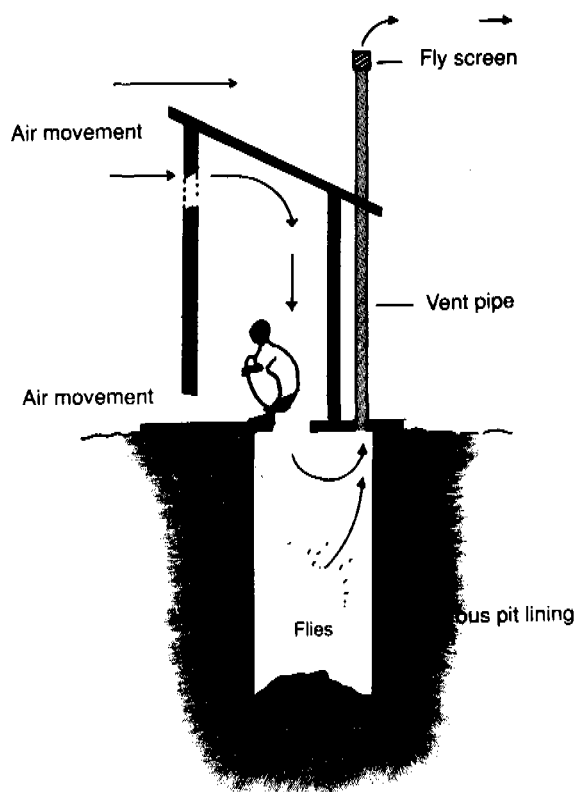
Therefore the simple pit latrine is not recommended!



4.1.2 VIP LATRINE

For standard drawing No. L - 1 please refer to the Appendix!

The disadvantages of the simple pit latrine are reduced in the ventilated improved pit latrine (VIP). See picture below:



The ventilation pipe is the key to controlling odours and flies by allowing a constant flow of air down through the squatting hole and up the vent pipe. This flow of air is induced partly by convection caused by the warmth of the sun on the external vent pipe, and partly by the wind blowing over the top of the vent pipe. Flies attracted by the odours of the pit will enter via the drop hole and lay their eggs. When new adult flies emerge they instinctively fly towards the light; however, if the latrine is suitably dark inside the only light they can see is at the top of the vent pipe. If the vent pipe is provided with a suitable fly screen at its top, the newly hatched flies will not be able to escape and they will eventually fall down and die in the pit.

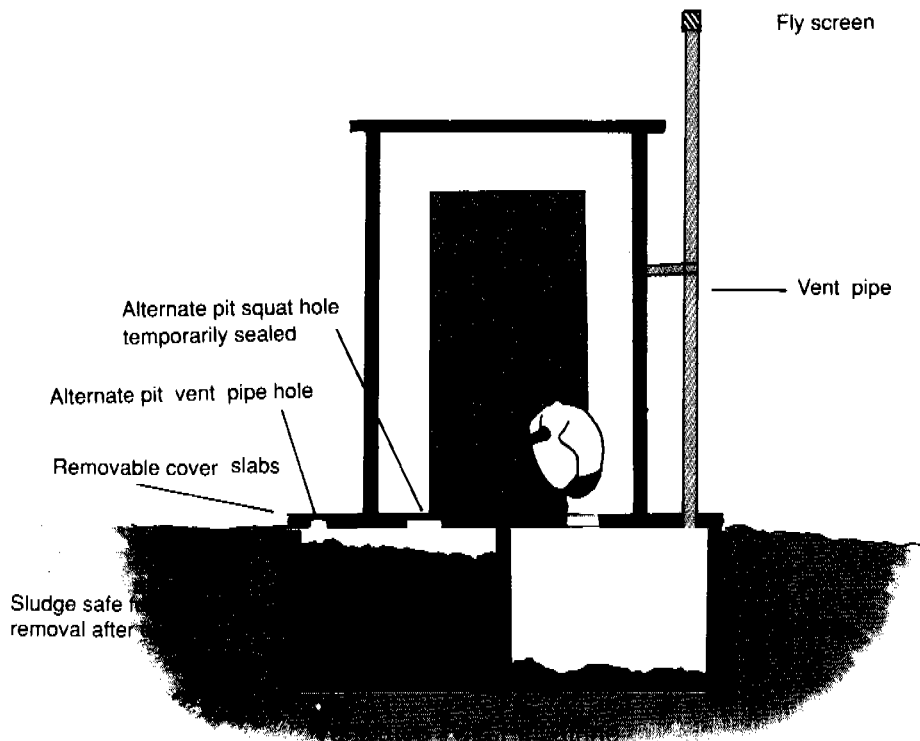
Once the pit is full with excreta (up to 50 cm of ground level), a new pit has to be dug and the latrine has to be moved to the new pit. The old pit has to be filled with earth and sealed. After about one year the contents of the pit can be used as compost, where such practise is culturally accepted.

Some important points for the proper functioning of a VIP latrine:

- The entrance of the latrine should face the main wind direction.
- The vent pipe should be located on the sunny side of the latrine, should be painted with dark colour (absorbs more sun light and increases thereby the air flow) and should be high enough and down-wind of the dwelling.
- Size of the vent pipe: $75 \text{ mm} \leq \text{diameter} \leq 200 \text{ mm}$.
- There should be sufficient ventilation openings to provide the latrine with fresh air.
- The latrine should be kept sufficiently dark but not too dark to use. A wooden cover for the drop hole may be provided (ensure air circulation through the covered drop hole).
- Do not compromise on the diameter and the height of the vent pipe (min. 50 cm higher than the roof).

4.1.3 UPGRADING OF A VIP LATRINE

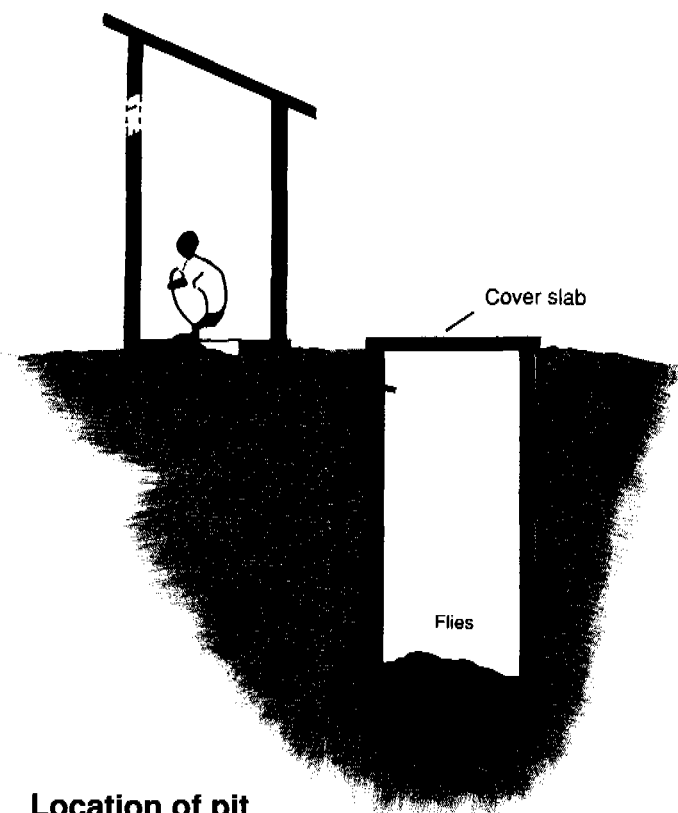
Through the construction of a twin pit a VIP latrine can become a permanent structure, since it does not need to be moved once the first pit is full. The users of the latrine simply switch to the squatting hole of the second pit (within the same latrine superstructure). After about one year the contents of the first pit can be removed and used as compost / manure (where acceptable).



4.2 WATER SEAL (POUR FLUSH) LATRINE

4.2.1 GENERAL INFORMATION

For standard drawing No. L - 2 please refer to the Appendix!



The water seal latrine is a further improvement of the VIP latrine. A water seal completely prevents the passage of flies and odours. A quantity of **3 to 5 litres of water** is needed to flush the latrine after each use. The offset pit allows the use of the latrine even after the pit is full. A new pit has to be dug and the connecting drain has to be led to the new pit. After a period of one year the contents of the first pit will be safe and can be removed and used as valuable compost/manure (where it is culturally accepted).

Location of pit

The pit should be located far enough from the latrine so that the foundation of the latrine is firm (does not cave into the pit) but close enough to allow the connecting drain to carry the excreta into the pit.

Min. distance between latrine and pit: 1.50 m

Max. distance between latrine and pit: 8.00 m

Water seal pans (squatting pans) are available everywhere in Sri Lanka. The pan should have a smooth and durable surface which is easy to keep absolutely clean. Cement pans and syphons have an unacceptably rough surface and are, despite their low costs, not recommended.

Advantages of a water seal latrine:

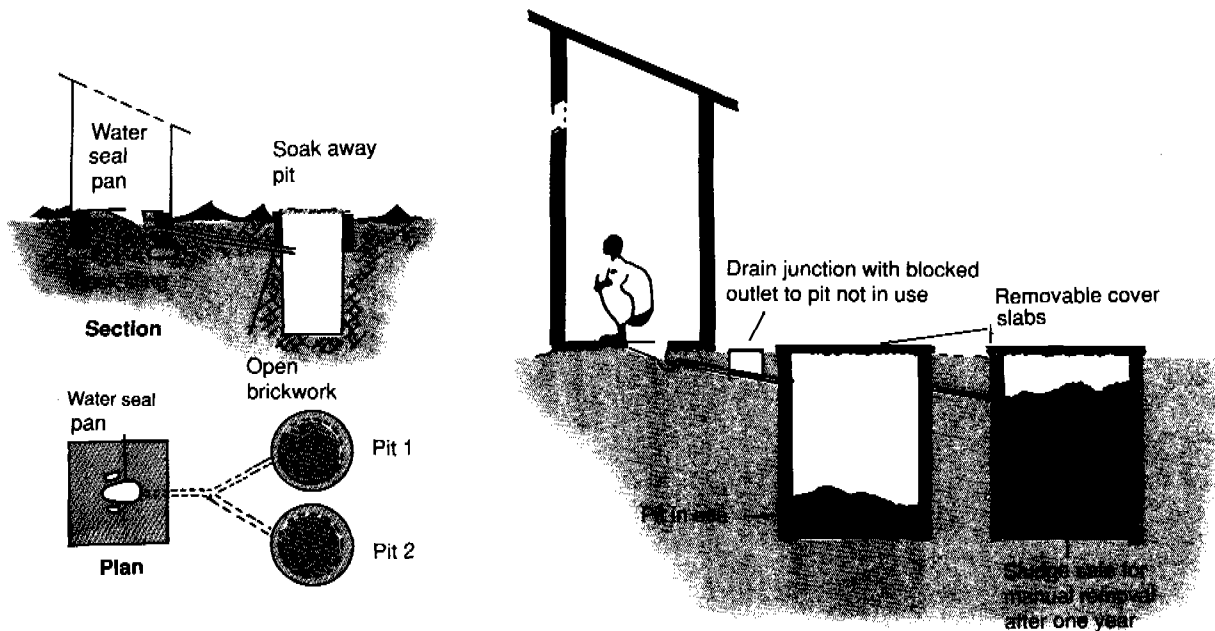
- No odour or fly nuisance.
- Can be located close to a house.
- Superstructure can be permanent (does not need to be shifted once the pit is full).
- Size of pit can be smaller than with a VIP latrine.

Disadvantages of a water seal latrine:

- Sufficient water has to be available within a reasonable distance (min. 3 liters per flush).
- Use of material for cleansing (e.g. towels, plastic, etc.) or careless handling may cause blockage of syphon and requires attention and maintenance.

4.2.2 UPGRADING OF A WATER SEAL LATRINE

Instead of digging a second pit only after the first pit is full, two pits could be constructed from the beginning according to the sketches below.



Upgraded Water Seal Latrines (Twin Pit)

Water seal latrines can also be upgraded through the construction of a small water tank/container adjoining the latrine.

5 OPERATION AND MAINTENANCE

5.1 O & M OF A VIP LATRINE

- Ensure that there is an efficient drainage around the latrine to prevent the latrine from being flooded.
- ***Wash hands with soap after using the latrine !***
- After each use, sprinkle a small amount of ash or soil through the hole to help eliminate odours and prevent fly breeding.
- Every day, wash the latrine floor and the edges of the squatting hole thoroughly by using a toilet brush. From time to time (once a week), use disinfectants.
- Use the cover for the squatting hole and shut the door after using the latrine.
- Keep the vent pipe clear and free of leaves.
- Maintain the fly screen on top of the vent pipe frequently
- Maintain the superstructure of the latrine.

5.2 O & M OF A WATER SEAL LATRINE

- Ensure that there is an efficient drainage around the latrine to prevent it from being flooded.
- ***Wash hands with soap after using the latrine !***
- After using the latrine, flush it with a bucket of water and refill the bucket immediately so that it is ready for the next user.
- Avoid using bulking materials for cleansing to prevent the syphon from getting blocked.
- Water must be readily available (keep a full bucket inside the latrine).
- Every day, wash the latrine floor and the edges of the squatting hole thoroughly by using a toilet brush. From time to time (once a week), use soap or ash.
- Maintain the superstructure of the latrine.

6 TECHNICAL AND CONSTRUCTION DETAILS

6.1 PITS

6.1.1 SIZE OF PITS

The size of a pit directly determines the period of time a pit can be used until it is filled up. The larger the pit, the longer it lasts. The volume of a pit depends on the cross section and the depth of the pit. The cross section is given by the max. size of the covering slab. Experience shows that a pit size of 90 by 90 cm is most reasonable because the covering slab for such a pit is neither too heavy nor too expensive. Therefore, we can say that the volume of the pit can be increased by deepening it - ***the deeper the pit, the longer it lasts!***

The period of time it takes until a pit is filled up can be roughly calculated with the following formulas:

VIP type:	$V \leq 0.06 \times P \times Y$	$V = \text{Volume of pit in m}^3$
		$P = \text{Persons using the pit}$
Water seal type:	$V \leq 0.04 \times P \times Y$	$Y = \text{Years of anticipated life of pit}$

As the cross section of a pit is fixed to 0.9 by 0.9 m we can develop a formula for the depth of a pit. Please note that the top 0.5 m can not be used as the pit has to be emptied or filled with earth before it is completely full.

Formulas to calculate the depth of pits:

VIP type:	$D \leq \frac{0.06 \times P \times Y}{0.9 \times 0.9} + 0.5$	$D = \text{depth of pit in m}$
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Water seal type:	$D \leq \frac{0.04 \times P \times Y}{0.9 \times 0.9} + 0.5$
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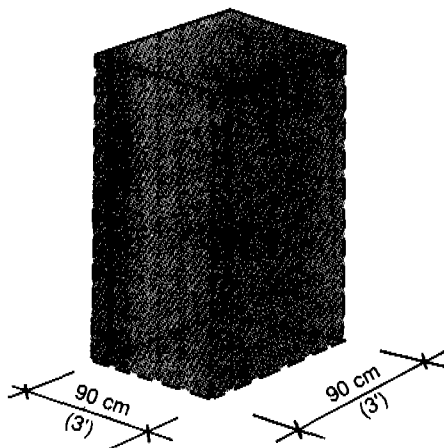
Example: A family of six wants its pit of a VIP latrine to last at least for ten Years. Therefore, the depth D of the pit should be:

$$D \leq \frac{0.06 \times 6 \times 10}{0.9 \times 0.9} + 0.5 = \underline{\underline{4.95 \text{ m}}}$$

6.1.2 PITS IN DIFFERENT SOIL CONDITIONS

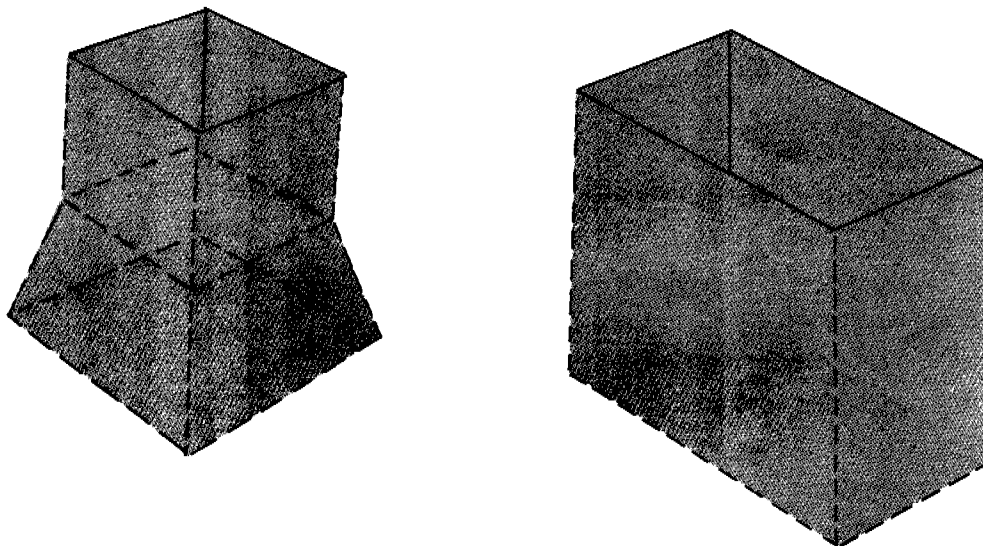
6.1.2.1 Pits in Normal (Stable) Soil

The know-how to excavate pits is readily available all over Sri Lanka (due to the wide spread digging of shallow wells).



6.1.2.2 Pits in Hard Soil

If the soil is too hard or rocky to dig deep enough, the pit may be made larger at the bottom or extended on one side as shown in the sketch below. Note that for water seal latrines the soil must be permeable, otherwise the pit will fill too quickly.



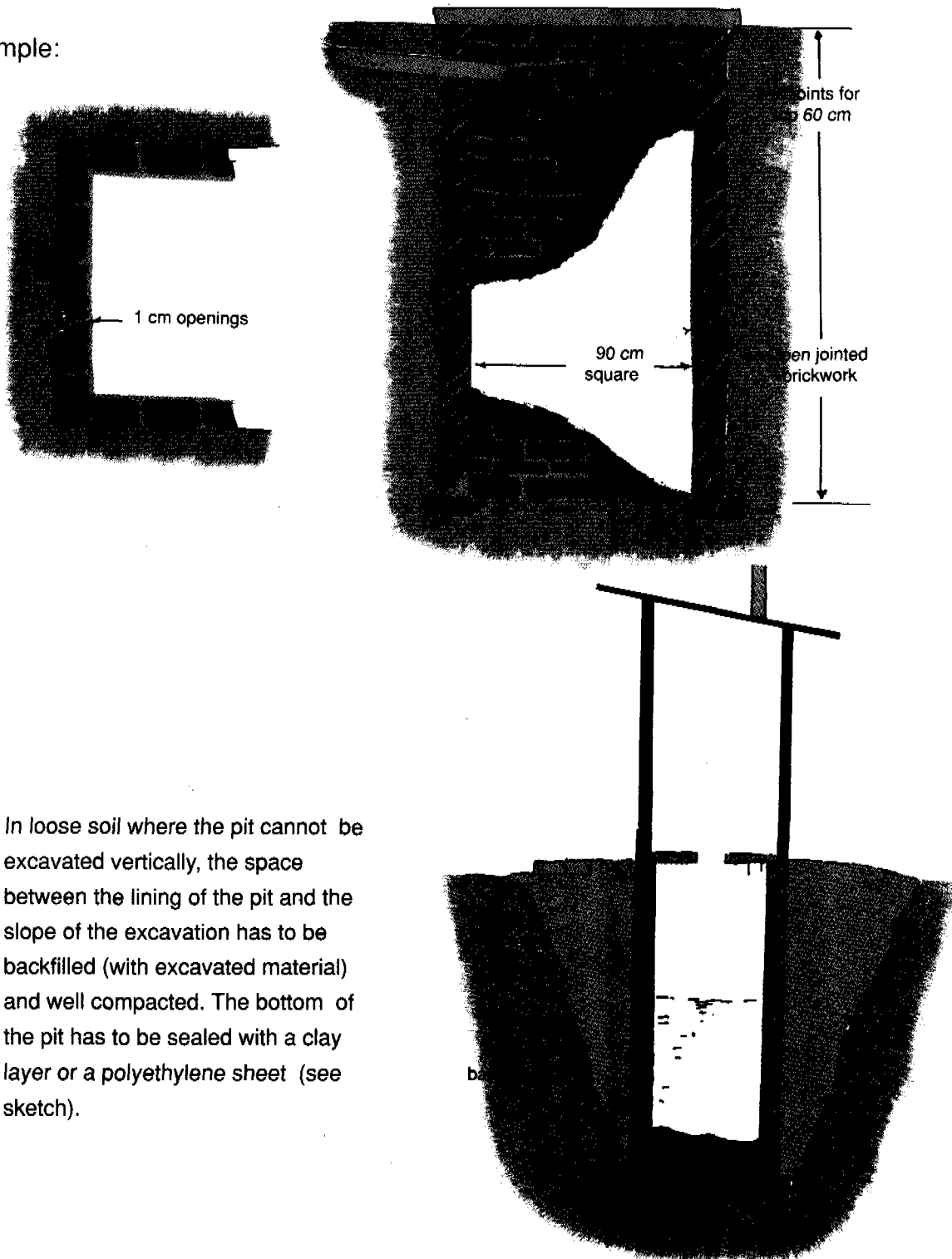
Enlarged Pits in Hard or Rocky Soil

6.1.2.3 Pits in Soft or Sandy Soil

If there is a danger that the pit might cave in due to soft soil the whole pit has to be lined. The lining can be done in various ways e.g.:

- Burned bricks set in mortar
- Concrete blocks
- Stone masonry
- Porous concrete rings, etc,

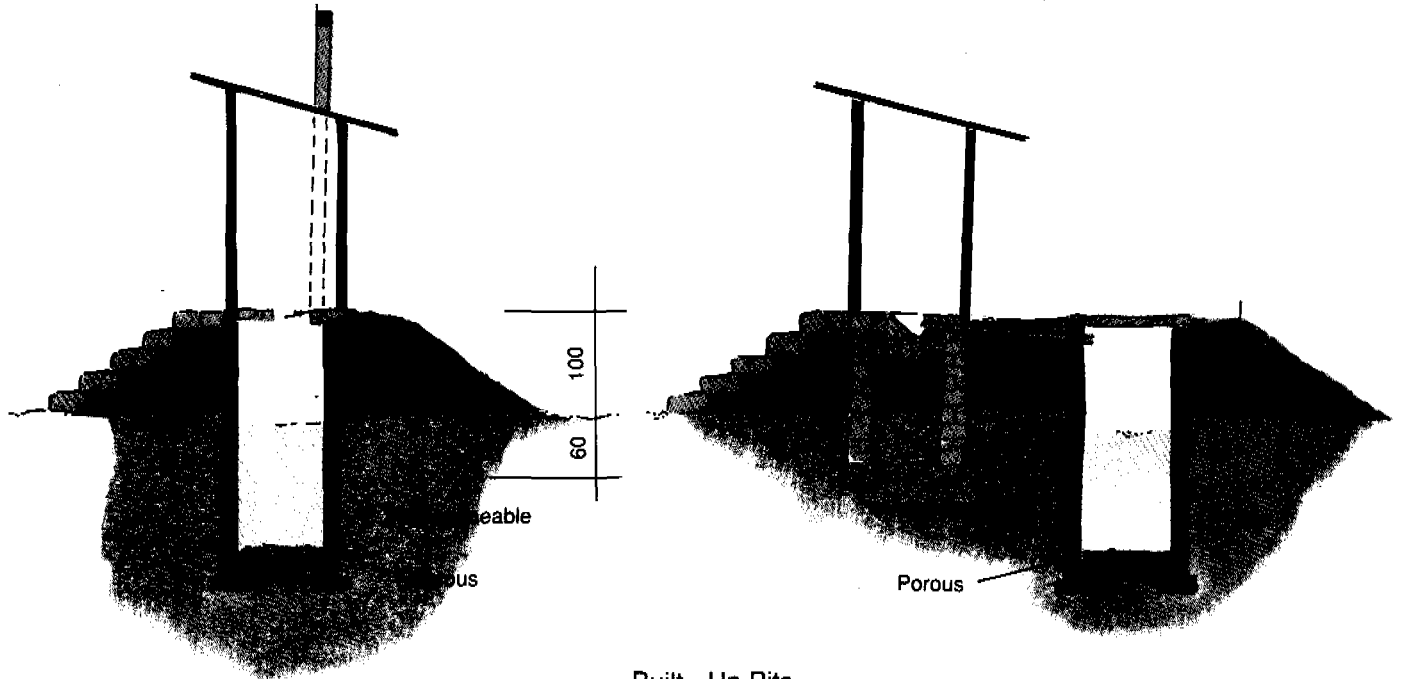
Example:



In loose soil where the pit cannot be excavated vertically, the space between the lining of the pit and the slope of the excavation has to be backfilled (with excavated material) and well compacted. The bottom of the pit has to be sealed with a clay layer or a polyethylene sheet (see sketch).

6.1.2.4 Pits in Soil with a High Water Table

When the ground water level is high, the construction of pits becomes very difficult. They tend to collapse in the wet season, and there is a danger of *Culex pipiens* mosquitoes breeding in pits with high water levels. In such cases a ***built-up pit*** is appropriate, as shown in the sketch below.



Built - Up Pits

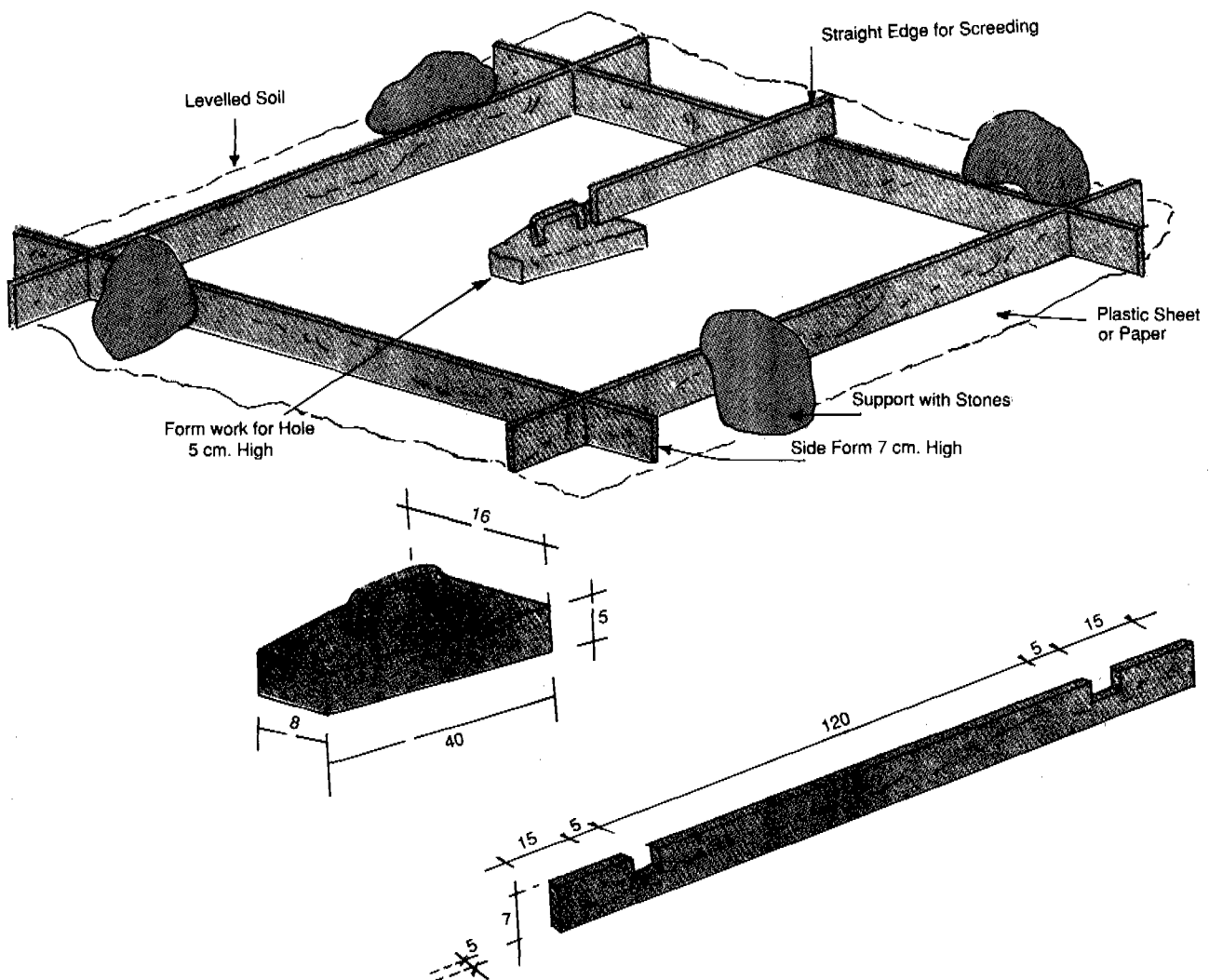
6.2 CONSTRUCTION OF SLABS

There are two types of slabs required:

- Squatting slab for VIP latrine (refer to plan no. L 1a in the Appendix).
- Covering slab for pits (refer to plan no. L 2a in the Appendix).

Step by step instructions

1. Prepare a level surface of an area of about 2 x 2 m. Cover the surface with a polyethylene (plastic) sheet.
2. Make the formwork ready and place it according to the sketch below. Check the right angles by measuring the diagonals. Do not forget to leave free spaces for holes, e.g. squatting hole, vent pipe, etc..
3. Make the reinforcement bars ready and fix them according to the respective drawing (see Appendix).



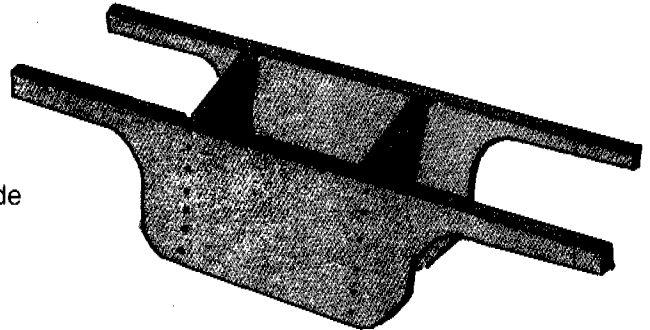
4. Mix stiff plastic concrete in ratio 1:2:3 (cement:sand:gravel)

Detailed quantities:

cement:	0.035 m ³	=	35 l. = one 50 kg bag
dry sand:	0.070 m ³	=	70 l.
gravel:	0.105 m ³	=	105 l. (max. grain size: 12 mm)

Note: When using wet sand (which is bulkier than dry sand) the volume should be increased by about 25 %. The total volume of above materials is 0.21 m³ = 210 l. which is equivalent to about 0.14 m³ of mixed finished concrete. It is quite convenient to use a gauge box (see sketch below) for measuring the volume of the materials. A reasonable size would be 0.027 m³ = 27 l. Always use clean water, sand and gravel.

Size:	Volume	=	27 l.
	Length	=	0.30 m
	Width	=	0.30 m
	Height	=	0.30 m



Note: The above measurements are inside dimensions!

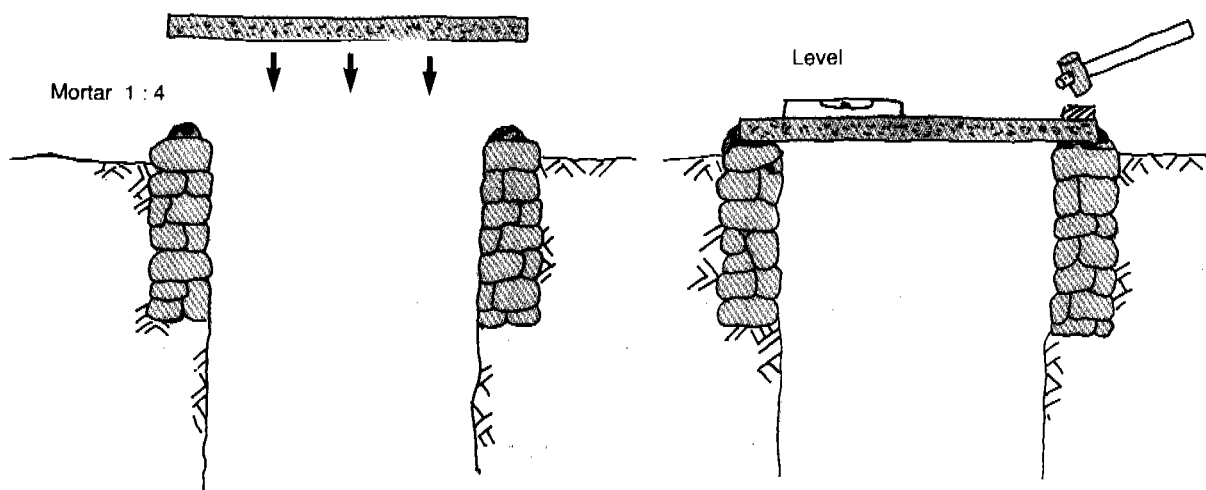
5. Pour about 2 cm of concrete over the whole area of the slab and tamp it.
6. Place reinforcement in correct place (according to drawing L 2a in the Appendix).
7. Fill the whole form with concrete and compact it well. Use fine cement mortar (1:3) for the edges (e.g. around squatting hole) and bevel the edge.
8. Screed the top of the slab according to the design (ensure slope towards squatting hole) and float the top using cement mortar 1:3.
9. Cast the two foot rests (for the VIP latrine) using stiff cement mortar 1:3.
10. Smooth the top of the slab (except the foot rests) with a trowel. Add some cement to the wet topping.
11. As soon as the surface hardens, cover the slab with wet material (e.g. mats, gunny bags, etc.) and **keep it wet for at least one week**. The formwork can be removed after one day, but the slab can only be moved after one week.

6.3 PLACING OF SLABS

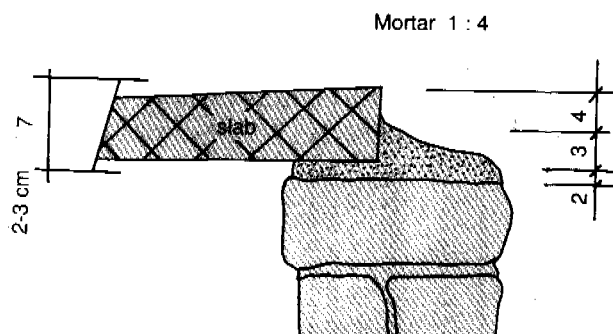
The slabs have to be placed on a foundation. The foundation also acts as a lining of the top of the pit (refer to pictures below).

Step by step instructions:

1. Excavate the space for the foundation of the slab (lining of pit).
Thickness min. 30 cm Depth min. 50 cm
2. Build the foundation walls (lining) with hard stones and clay (or cement in exceptional cases). Be careful to fill all gaps between the stones and the ground with clay. The walls should be built at least 10 cm higher than the existing terrain. The last course should be constructed with big stones and be placed to level.
3. Clean the top of the walls (lining) with water.
4. Place a heap of stiff cement mortar 1:4 all around the top of the wall (lining).
5. Place the slab carefully on top of the walls (lining) into the mortar. Level the slab by knocking it into place as shown in the picture below.



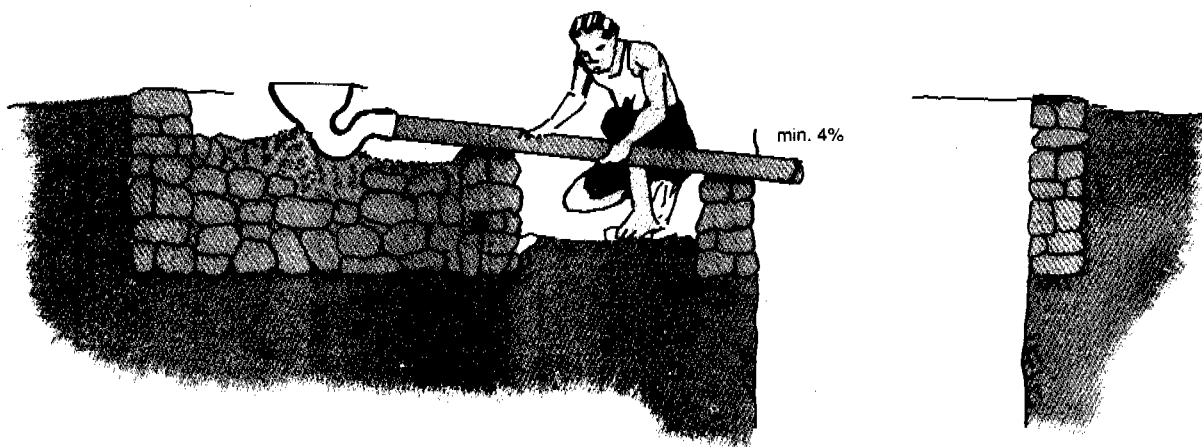
6. Smooth the mortar along the face of the slab according to the sketch below.



6.4 CONSTRUCTION OF FOUNDATIONS AND PLACING OF SQUATTING PANS FOR WATER SEAL LATRINES

Step by step instructions:

1. Excavate a pit for the foundation of the latrine. Size (incl. working space) about 2.00 x 2.00 m. Dig the trench for the drain pipe (slope min. 4 %).
2. Construct the foundation walls with stones and cement mortar 1:6. Do not forget to clean and wet the stones. The top 25 cm should be built in one face only and the wall should be built 15 - 20 cm higher than the surrounding terrain.
3. ***Do not forget to leave open a gap for the drain pipe!*** Add 3 - 5 cm topping (cement mortar 1:4) on top of the wall.
4. Build the superstructure of the latrine (refer to chapter 6.5 *Superstructure of Latrines*).
5. Place and fix the squatting pan (be sure to level it), syphon and drain pipe (min. slope 4 %).



6. Pour lean concrete 1:3:5 all around the squatting pan, syphon and drain pipe up to the topping of the foundation walls. Ensure that the floor of the latrine slopes towards the squatting pan (slope = 5 %).
7. Smooth the lean concrete with cement mortar 1:3 and cement paste.
8. Cast the two foot rests with stiff cement mortar 1:3. Do not smooth the top of the foot rests!

6.5 SUPERSTRUCTURE OF LATRINES

6.5.1 GENERAL REMARKS

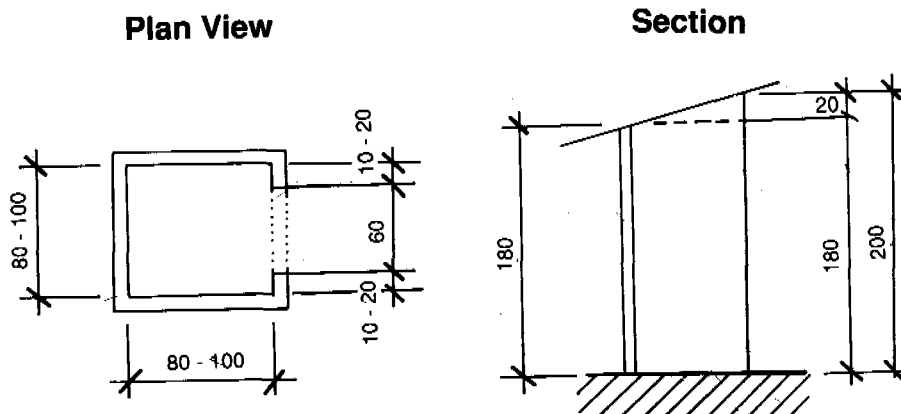
The users of a latrine should enjoy some privacy and protection. The walls of a latrine will give the privacy whereas the roof protects the users.

There are many different alternatives to construct the walls of a latrine. Before deciding on a particular variant one should consider the following:

- What is the style of the house to which the latrine belongs?
- How much money is available to construct the latrine?
- What raw materials are easily available (locally)?
- Preferences of the users;
- Maintenance/repair of superstructure.

6.5.2 SIZE OF SUPERSTRUCTURE

A latrine should be big enough to allow comfortable use yet as small as possible. Experiences in many different countries show that the following dimensions are most appropriate (inside dimensions in cm):



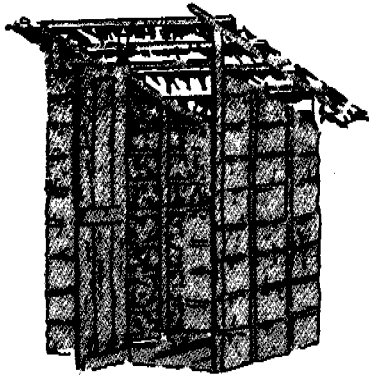
Detailed drawings of a VIP and a water seal latrine are given in the Appendix (see drawings no. L - 1, L - 1a, L - 2, L - 2a).

6.5.3 ROOFING OF LATRINES

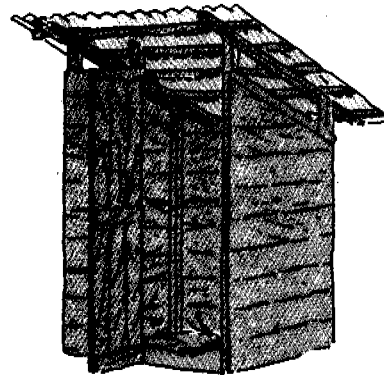
Several examples of possible solutions to cover a latrine are shown in the sketches (next chapter).

Traditional techniques and skills should be taken into account before deciding on a specific roof. The users of the latrine should decide what kind of roof they want, so that they will be able to do some basic repair and maintenance works on the roof.

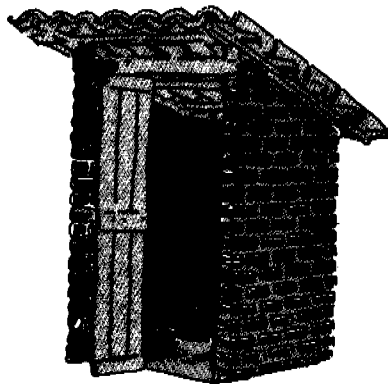
6.5.4 SAMPLES OF SUPERSTRUCTURE



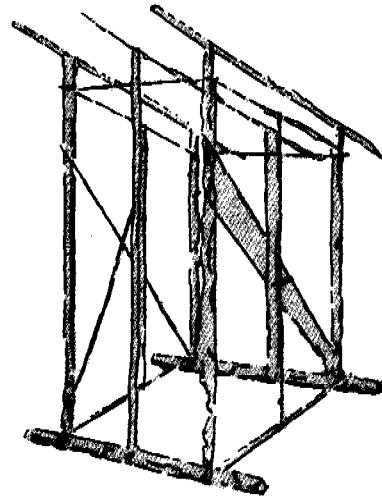
A) Mud and wattle walls and palm thatch roof



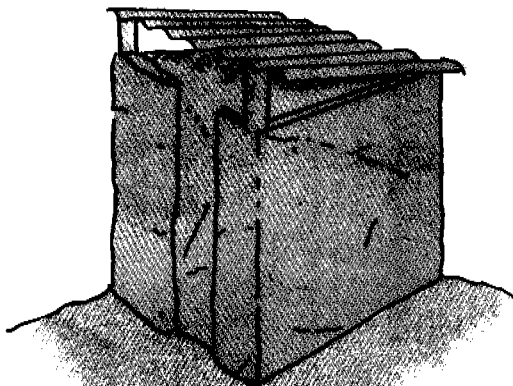
B) Timber walls and corrugated iron or asbestos cement roof



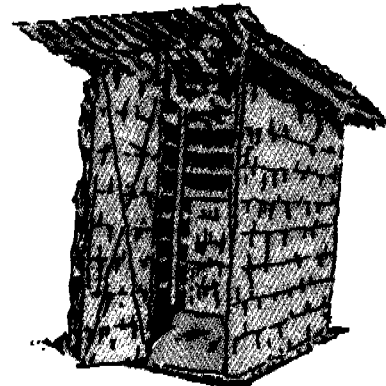
C) Brick and tile



D) Rough cut tree limbs and logs



E) Mud brick walls and plaster



F) Cadjan

The technologies for types A, B, D and F are readily available in Sri Lanka and there is no need to give more explanations about them in this manual. More details about types C and E are given in the detailed drawings in the Appendix. ***The users of the latrine should decide on the type of the superstructure.***

APPENDIX

REFERENCES AND BIBLIOGRAPHY

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- “ “ “ 23 / A Guide to Sanitation Selection
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DETAILED DRAWINGS

<i>Number</i>	<i>Title</i>
L - 1	VENTILATED IMPROVED PIT LATRINE, VIP
L - 1a	SQUATTING SLAB FOR VIP LATRINE
L - 2	WATER SEAL (FOUR FLUSH) LATRINE
L - 2a	COVERING SLAB FOR PITS

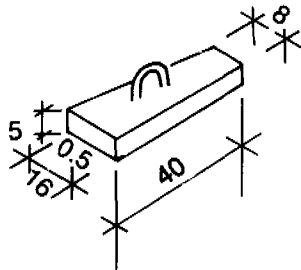
සංචානය දියුණු කළ වැසිකිළියේ ලාලේ
SQUATTING SLAB FOR VIP LATRINE
VIP மலகூடத்திற்கான மலங்கழிக்கும் தட்டு

පිලිබද අංකය Plan No. திட்டப்பட இல.	L - 1a	දිනය Date: திகதி	March 1992		දිනය Date: திகதி		විසි By: யாரா
පරිමාණය Scale: அளவுத் திட்டம்	1:20	අදින ලද්දේ Drawn by: வரைந்தவர்	Kumuduni	සංශෝධන Amendments திருத்தம்			
සිතියම පත්‍රය Map Sheet: திட்டப்படத் தாள்		නිර්මාණය Designed by: திட்டமிட்டவர்	R. St. & H. Pf				

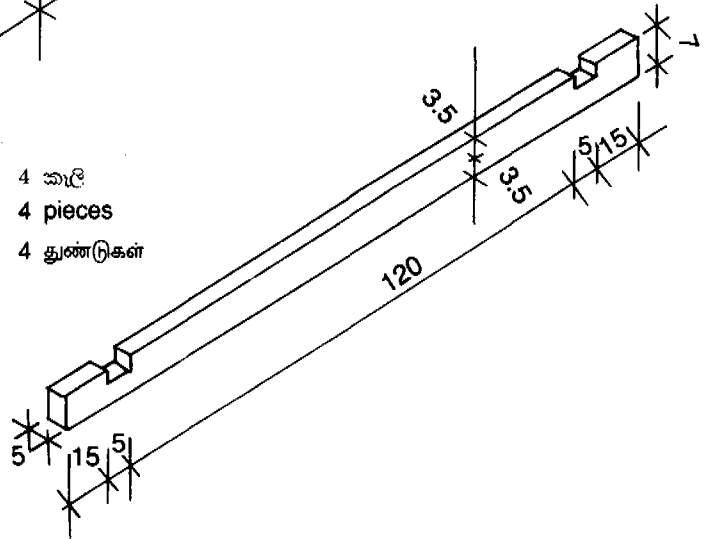
අවශ්‍ය ද්‍රව්‍ය / List of Materials / பொருட்பட்டியல்

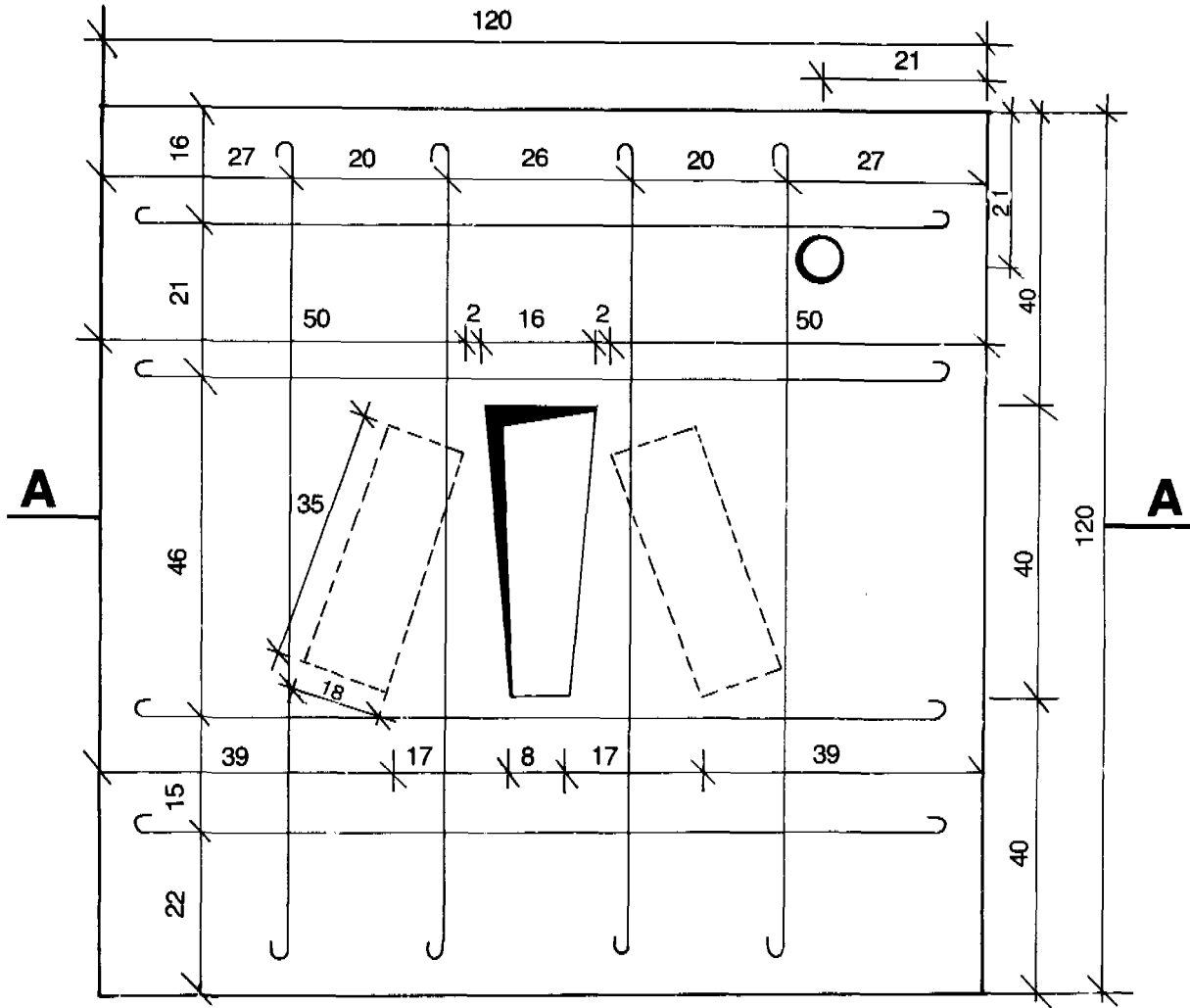
සිමෙන්ති:	කොට්ට 0.75
cement	0.75 bags
සීමෙන්තු	0.75 බොතிகள்
වැලි:	නාච්චි 8-10 (60 L)
sand	8-10 pans (60 L)
මණ්ණල්	8-10 තාච්චි (60 L)
මැට්ටු ලෝහ:	නාච්චි 10-12 (70 L), විශාල ප්‍රමාණය = මි.මි. 12.5
metal	10-12 pans (70 L), max. size = 12.5 mm
පරල කැරකුණු	10-12 තාච්චි (70 L), ඉහතම ආකාරයේ 12.5 මි.මි.
කමිති කැරකුණු:	විෂ්කම්භය මි.මි. 6 කමිති මිටර් 10 w = 2.3 කි.ග්‍රෑ.
re-rods	10 m ϕ 6mm, w = 2.3 kg
මි.මි. 6 කි.මි. 10	10 මි. ϕ 6 මි.මි., w = 2.3 කි.කි
ලැටි:	අවිච්චි
timber	for form work
අඟිච්චි මරම	බෙට්ටු අඟිච්චි

1 කැලි
 1 piece
 1 துண்டு



4 කැලි
 4 pieces
 4 துண்டுகள்



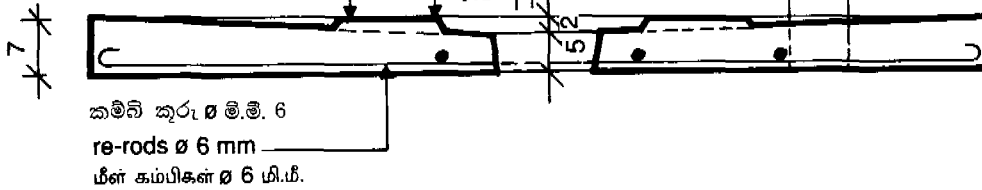


பட்டினித் PLAN VIEW அமைப்புப் படத்தோற்றம்

இது மிதிக்கப்படும் மேல்பக்கம் மிதித்திருந்தால்
top to be floated

மேல்பக்கம் மிதித்திருந்தால்
to be smoothed with cement paste
சீமெந்து கலவை பூசி மென்மையாக்க வேண்டும்

வெண்டிப்பை PVC 100
vent pipe, pvc 100 mm
காற்றோட்டக் குழாய் pvc 100 மி.மீ.



பட்டினித் A-A SECTION A-A பிரிவு A-A

VENT

கார்ட்

அண்மை
No. 1.1
புட இல.

அண்மை
e: 1.2
புத் திட்டம்

அண்மை
Sheet:
புடத் தாள்கள்

வடிகழி வடிகழி
Lining of

சிலேசென்ட்
mud brick

கண்ட கற்கள்
sand

வடிகழி
timber

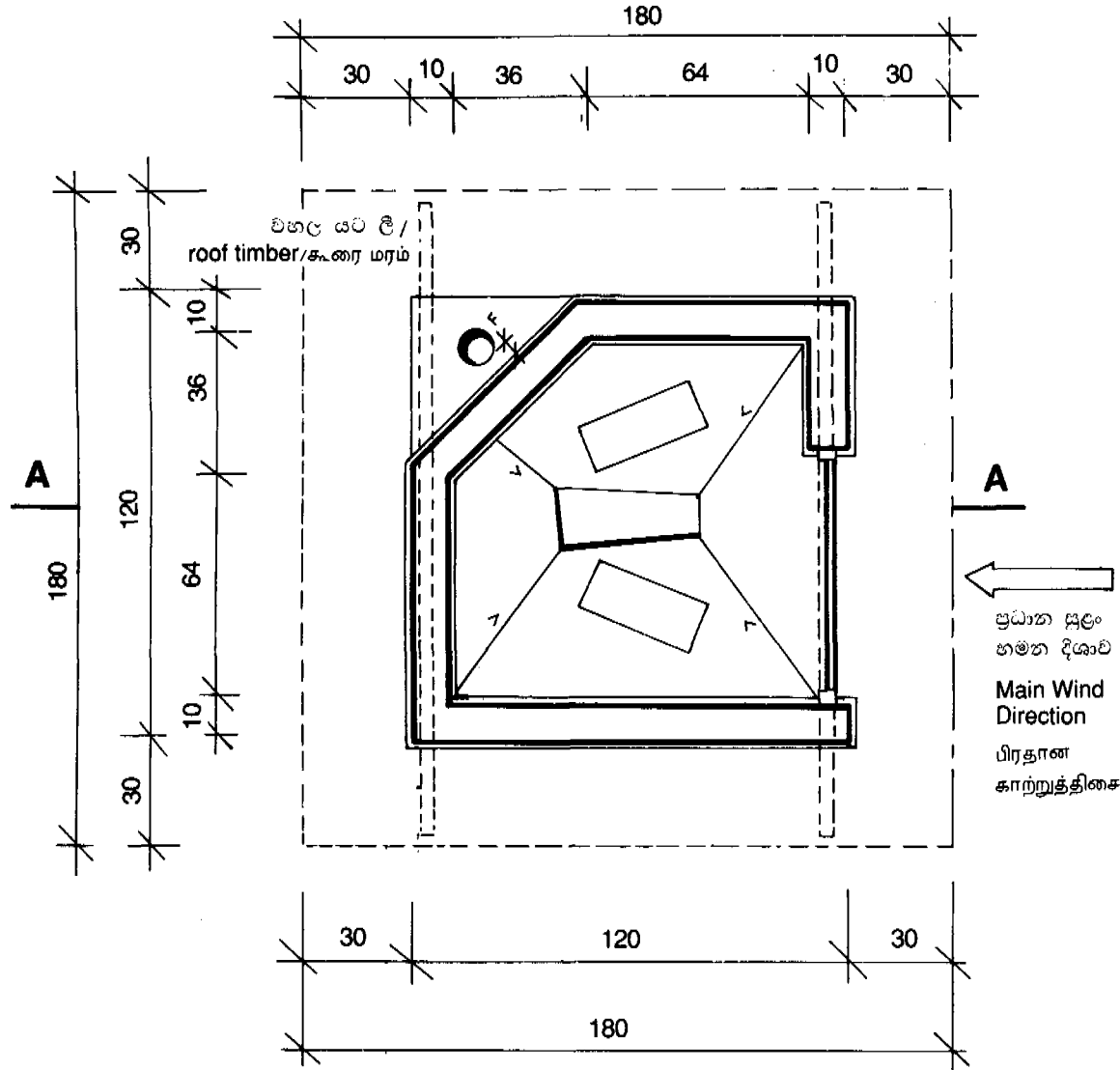
அரிந்த மரம்
roofing

கூரைத் தகடுகள்
nails

ஆணி
wire

கம்பி
pvc pipe
pvc குழாய்

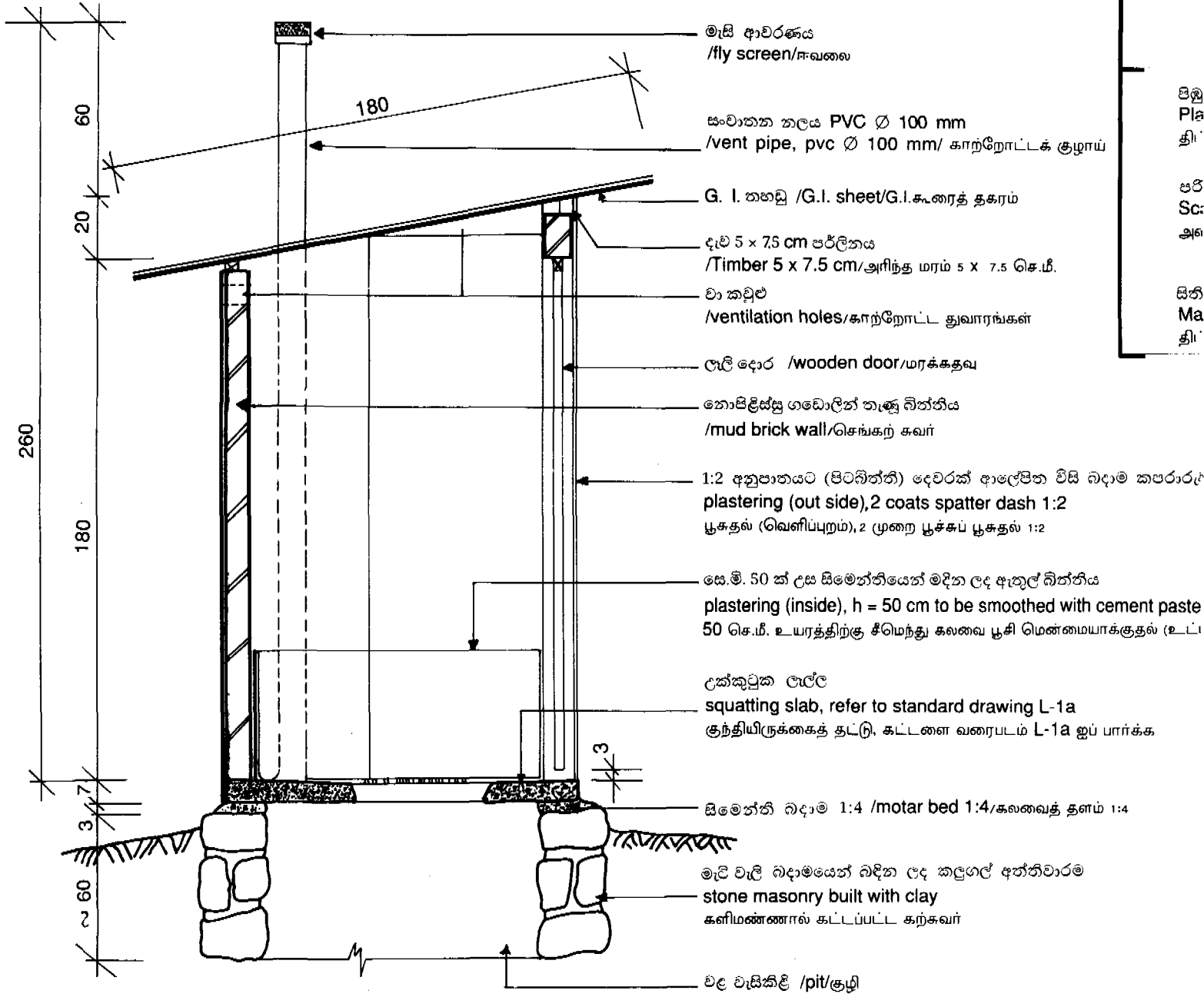
பி.பி.பி. குழாய்
fly screen
FF வலை



படவரை PLAN VIEW அமைப்புப் படத்தோற்றம்

அவசியப் பண்டங்கள் / List of Materials / பொருட்பட்டியல்

- வடிகழி வடிகழி (வடிகழி வடிகழி வடிகழி வடிகழி)
- Lining of pit: (incl. placing of slab)
குழியின் ஓரம் பூசுதல் (தட்டு பதித்தல் உட்பட)
- சிலேசென்ட் cement சீமெந்து 0.5 கைபை 0.5 bags 0.5 பொதிகள்
- கண்ட கற்கள் rubble கண்ட கற்கள் 450 கை 450 pcs 450 துண்டுக்கள் (0.9 m³)
- வடிகழி sand மணல் 8-10 கை 8-10 pans 8-10 தாச்சிகள் (65 L)



சுருக்கம் A-A SECTION A-A பிரிவு A-A

கூலிகளின் தேவை

Labour Requirement/தேவையான தொழிலாளர்கள்

ஆயத்தக் கூலி, கூலி ~ 3.5 - 4 நாட்கள்
 skilled labour ~ 3.5 - 4 mandays
 தேர்ச்சி பெற்ற தொழிலாளர் ~ 3.5 - 4 மணித நாட்கள்

ஆயத்தக் கூலி, கூலி ~ 12 நாட்கள்
 unskilled labour for pit ~ 12 mandays superstructure ~ 4.5 mandays
 தேர்ச்சியற்ற தொழிலாளர் குழி அமைக்க ~ 12 மணித நாட்கள் கவர்ச்சுட்டு ~ 4.5 மணித நாட்கள்

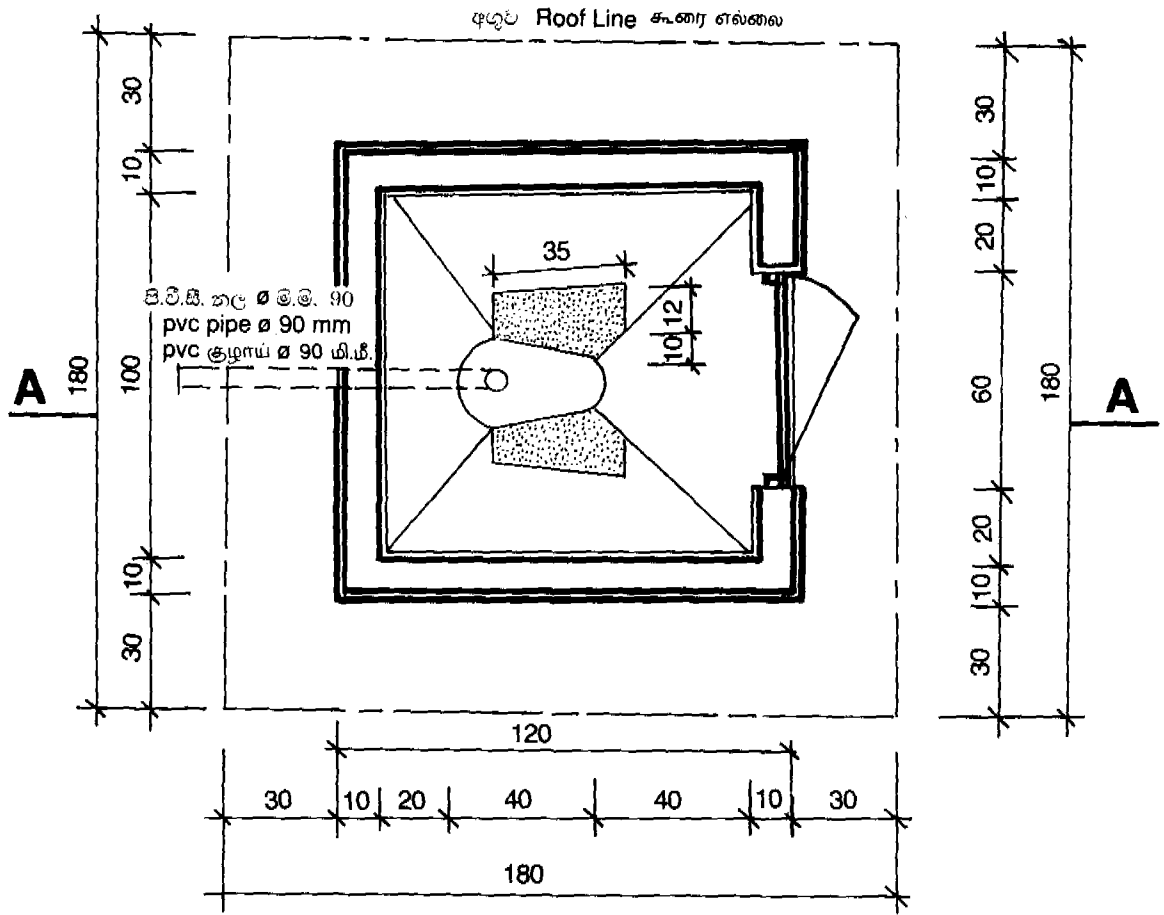
සංචානනය දියුණු කරන ලද වළ වැසිකිළිය
VENTILATED IMPROVED PIT LATRINE (VIP)
காற்றோட்டம் அதிகரிக்கப்பட்ட குழி மலகூடம்

1. අංකය 1 No. උපුටා ගැනීම.	L - 1	දිනය Date: திகதி	April 1992		දිනය Date: திகதி	විසින් By: யாரால்
2. මානය 2. Size: වත් තීරු	1:20	අඳින ලද්දේ Drawn by: வரைந்தவர்	Kumuduni	සංශෝධන Amendments திருத்தம்		
3. ම පත්‍රය 3. Sheet: උපුටා ගැනීම		නිර්මාණය Designed by: திட்டமிட்டவர்	R. St. & H. Pf			

අවශ්‍ය ද්‍රව්‍ය / List of Materials / பொருட்பட்டியல்

වැසිකිළි වළෙහි බැමි බැඳීම (උක්කුපික තහඩුව තැන්පත් කිරීම ද ඇතුළුව)
Lining of pit: (incl. placing of slab) / குழியின் ஓரம் பூசுதல் (தட்டு பதித்தல் உட்பட)

සිමෙන්ති cement	ඒමෙණ්තු	1.5 කොට්ට 1.5 bags	1.5 බොතියන්
මොටිලිස්සු ගඩොල් mud bricks	ගඩොල්	260 260 pcs	260 තුණ්ඩුකන් (22.5 x 10.5 x 7.5 cm)
කුණ්ඩා කුරුකන්			
වැලි sand	මණ්ණල්	30-35 කාච්චි 30-35 pans	30-35 තාච්චිකන් (240 L)
දැව timber	දැව	සට ලී 2 (5 x 7.5 සෙ.මී.), දිග = 180 සෙ.මී., දොර සහ දොර රාමුව (70 x 180 සෙ.මී.)	2 pcs purlins (5 x 7.5 cm), L = 180 cm, 1 pc door with frame (70 x 180 cm)
අඟිණ්ණ මරණ්ණ	අඟිණ්ණ	2 වනේ මරණ්ණ 5 x 7.5 සෙ.මී., L = 180 සෙ.මී.	2 වනේ මරණ්ණ 5 x 7.5 සෙ.මී., L = 180 සෙ.මී.
		නිලේයුඬන් සුඬඬු කුඬු (70 x 180 සෙ.මී.)	නිලේයුඬන් සුඬඬු කුඬු (70 x 180 සෙ.මී.)
සෙවිලි තහඩු roofing sheets	තහඩු	3 (සෙ.මී. 180 x 60, ගේජ් 32)	3 pcs (180 x 60 cm, 32 gage)
සුරේණ්ණ තුරුකරණ්ණ		3 තුණ්ඩුකන් (180 x 60 සෙ.මී., 32 ගේජ්)	3 තුණ්ඩුකන් (180 x 60 සෙ.මී., 32 ගේජ්)
අඬු nails	අඬු	තහඩු අඬු 12 - පොච්චි සහ දොර රාමු සඳහා කිරීම සඳහා සෙ.මී. 7.5	12 pcs roofing nails with washers 7.5 cm nails for door frame anchorage
චුණ්ණි		12 වාචුචුර් උණ්ණ සුරේණ්ණ චුණ්ණි. කුඬු නිලේයුඬන් පිණේණ්ණකුඬු 7.5 සෙ.මී. චුණ්ණිකන්	12 වාචුචුර් උණ්ණ සුරේණ්ණ චුණ්ණි. කුඬු නිලේයුඬන් පිණේණ්ණකුඬු 7.5 සෙ.මී. චුණ්ණිකන්
කම්පි wire	කම්පි	ම.මී. 2 කම්පි මිට් 4 ක් (චුණ්ණ සඳහා)	4 m of 2 mm wire (for anchorage)
සුරුණ්ණ කම්පි		පිණේණ්ණතුරුකරණ්ණ සුරුණ්ණ කම්පි, 2 මි.මී. චුණ්ණිකන් 4 මි.	පිණේණ්ණතුරුකරණ්ණ සුරුණ්ණ කම්පි, 2 මි.මී. චුණ්ණිකන් 4 මි.
පී. චී. චී. තල pvc pipe	පී. චී. චී. තල	L = 260 cm, ජ = 100 mm	L = 260 cm, ජ = 100 mm
පී. චී. චී. තල pvc குழாய்			
මැසි ආවරණ fly screen	මැසි ආවරණ	පී. චී. චී. මැසි ආවරණ pvc mosquito mesh, pvc තුණ්ණු වනේ ~ 0.1 m ²	පී. චී. චී. මැසි ආවරණ pvc mosquito mesh, pvc තුණ්ණු වනේ ~ 0.1 m ²
වෛ			



படவரை PLAN VIEW அமைப்புப் படத்தோற்றம்

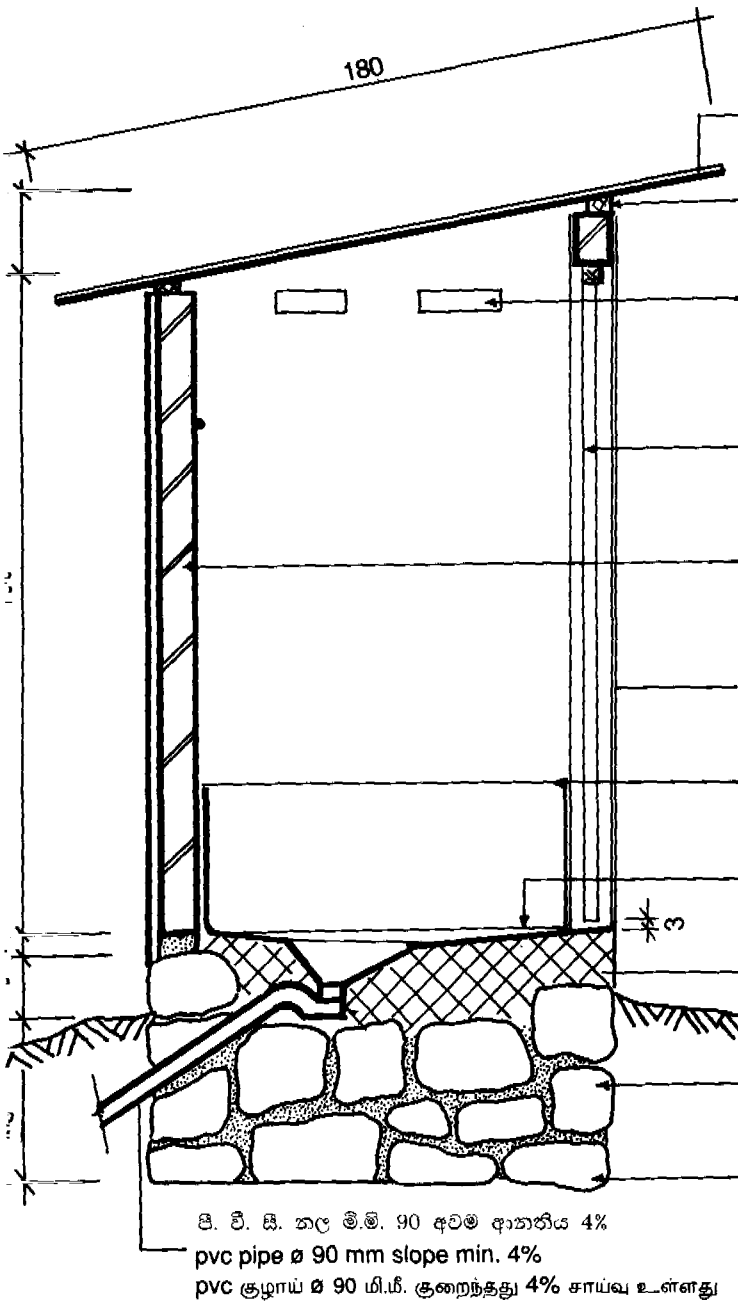
அலுவலர் பட்டியல் List of Materials / பொருட்பட்டியல்

வடிகழி வடிகால் (வடிகழி வால் பதிக்கிற படை)

Lining of pit: (incl. placing of slab)

குழியின் ஓரம் கட்டுதல் (கட்டு பதித்தல் உட்பட)

பிசைந்தி	0.5 கைபிடு
cement	0.5 bags
சீமெந்து	0.5 பொதிகள்
கட்டு கல்	நாலை 450 (0.9 m ³)
rubble	450 pcs (0.9 m ³)
கண்ட கற்கள்	450 துண்டுகள் (0.9 ம ³)
வடிகால்	நாலை 8-10 (65 L)
sand	8-10 pans (65L)
மணல்	8-10 தாச்சிகள் (65L)



- G.I. கைப்பிடி
G.I. sheet
கூரைத் தகரம்
- கம்பளி சே. சீ. 5 x 7.5
Timber 5 x 7.5 cm/அரிந்த பலகை 5 x 7.5 செ.மீ.
- வா கிழி
ventilation holes
காற்றோட்ட துவாரங்கள்
- கட்டி தோர்
wooden door
மரக்கதவு
- கோபிலிசீட்டி கடுமெலின் கறு கிந்திய
mud brick wall
செங்கற் கவர்
- கிடு கிந்தி 1:2 அனுசாயகடு துலிர்ன் காலேகிண விசு ல்டு
plastering (out side) 2 coats spatter dash 1:2
பூசுதல் (வெளிப்புறம்) 2 முறை வீசுசுப் பூசுசு பூசுதல் 1:2
- கசுரூரடு சே. சீ. 50 க் டுசு கிசுென்றிசுென் டுடின டுடி அறுல் கிந்திய
plastering (inside), h = 50 cm to be smoothed with cement paste
50 செ.மீ. உயரத்திற்கு சீமெந்து கலவை பூசி மென்மையாக்குதல் (உட்புறம்)
- 1:3 அனுசாயகடுசுென் சே. சீ. 3 கணகடுபி கிசுென்றி ல்டும டுடிடா டுடிடி டுடிடி.
3 cm Topping coat 1:3, smoothed with cement paste
3 செ.மீ. மேற்பூசுசு 1:3 சீமெந்துக் கலவையால் பூசி மென்மையாக்குதல்
- கோன்கிடுபி ல்டின் 1:3:5 கண் லாந்து கோன்கிடுபி கடுபிடு
concrete 1:3:5, cast in-situ
கொங்கிநீட் 1:3:5, நிலையத்தில் வார்த்தல்
- 1.6 கிசுென்றி ல்டும டுடிடா கடுபி ல்டின டுடி அந்திவாரடு
Foundation in stone masonry built with cement mortar 1:6
கற்களால் சீமெந்து கலவை 1:6 கொண்டு கட்டிய அத்திவாரம்
- கிட்டு கிட்டு
filled with stones
கற்களைக் கொண்டு நிரப்புதல்
- கி. பி. கி. கடு சீ.சீ. 90 அடும அகாநிய 4%
pvc pipe \varnothing 90 mm slope min. 4%
pvc குழாய் \varnothing 90 மி.மீ. குறைந்தது 4% சாய்வு உள்ளது

கிட்டு
Plan
கிட்டு
Sca
அள
கிட்டு
Map
கிட்டு

கடுப்கடுபி A-A SECTION A-A பிரிவு A-A

குடு அடுசுயகடுபி Labour Requirement தேவையான தடுபிடுலாள்கள்

புதுபுது கடுபிகடு, குடுபி Skilled Labour தேர்ச்சி பெற்ற தடுபிடுலாளர்	ல்டுகிடு ல்டு /pit /குடி ல்டுகிடு காமடுரசு /latrine மலகூடம்	டின 1 1 manday 1 மனித நாள் டின 3.5-4 3.5-4 mandays/ மனித நாட்கள்
புதுபுது கடுபிகடு, குடுபி Unskilled Labour தேர்ச்சியற்ற தடுபிடுலாளர்	ல்டுகிடு ல்டு /pit /குடி ல்டுகிடு காமடுரசு /latrine /மலகூடம்	டின 12-14 12-14 mandays 12/14, மனிதநாட்கள் டின 4 5, 4-5 mandays 4-5 மனித நாட்கள்

ජල මුද්‍රිත වැසිකිලිය

WATER SEAL (POUR FLUSH) LATRINE

நீரடைப்பு (நீசுற்றல்) மலகூடம்

අංකය No. අංකය No.	L - 2	දිනය Date: திகதி	April 1992	දිනය Date: திகதி	සිසින By: யாரால்
අංකය No. අංකය No.	1:20	ඳින ලද්දේ Drawn by: வரைந்தவர்	Kumuduni	සංශෝධන Amendments தீருத்தம்	
පිටු Sheet: අංකය No.		සිරිලාසය Designed by: திட்டமிட்டவர்	R. St. & H. Pi		

අවශ්‍ය ද්‍රව්‍ය List of Materials / பொருட்பட்டியல்

අත්තිවාරම සහ වැසිකිලි කෘමරය Foundation and Superstructure அத்திவாரமும் சுவர் கட்டும்

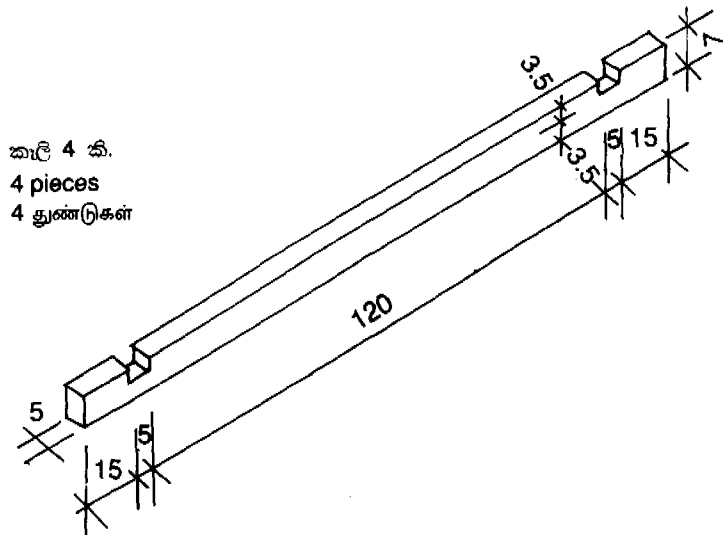
සිමෙන්ති cement	සීමෙන්ති	කොට්ට 2.75, 2.75 bags 2.75 பொதிகள்
කලුගල් rubble	கண்ட கற்கள்	කලු 400, 400 pcs, 400 துண்டுகள் (0.8 m ³)
වැලි sand	மணல்	බිමට /floor/තලම තාවි 45 /45 pans/ 45 தாச்சிகள் (330L) බිත්ති සඳහා /walls/சுவர் තාවි 12 /12 pans/ 12 தாச்சிகள் (130L) බදාමවලට /plaster/பூச்சு. තාවි 20 /20 pans/ 20 தாச்சிகள் (150 L)
කළුගල් metal	பரல்கற்கள்	තාවි (10-12) (80 L), උපරිම මි.මි. 12.5 10-12 pans (80 L), max. size 12.5 mm 10-12, தாச்சிகள் (80 L) ஆகக் கூடிய அளவு 12.5 மி.மි.
තොසිලිසිසු ගඩොල් mud bricks	செங்கற்கள்	කලු 360 සෙ.මි. 22.5 x 10.5 x 25 360 pcs size 22.5 x 10.5 x 25 cm 360 துண்டுகள் அளவு 22.5 x 10.5 x 25 செ.மீ
වහලට තහඩු roofing sheets	கூரைத் தகரம்	තහඩු 3 (ගේජ් 32, 180 x 60 සෙ.මි.) 3 pcs (180 x 60 cm 32 gage) 3 துண்டுகள் (180 x 60 செ.மீ., 32 கேஜ்)
අඳුණ: nails	ஆணி	12 වොෂර් සමග තහඩු සවිකරන අඳුණ, දොර රාමුව සවිකිරීම සඳහා සෙ.මි. 7.5 අඳුණ 12 pcs roofing nails with washers 7.5 cm nails for door frame anchorage வாஷர் உள்ள கூரை ஆணிகள் 12, கதவு நிலையைப் பிணைக்கும் 7.5 செ.மீ. அளவுடைய ஆணிகள்
කම්බි: wire	சுருள் கம்பி	විස්කම්බය මි.මි. 2 කම්බි මීටර් 4 ක් (රඳවනයක් ලෙස) 4 m of 2 mm wire (for anchorage) பிணைத்தற்கான சுருள் கம்பி, 2 மி.மீ. விட்டமுள்ள கம்பி 4 மீ.
පීවීසි පල pvc pipe	pvc குழாய்	නලල මි.මි. 90, L = 1.60 ම. drain pipe L = 1.60 m, ϕ = 90 mm வடிகால் குழாய் L = 1.60 மீ., ϕ = 90 மி.மீ.
යටලී timber	அரிந்த மரம்	කලු 2 යටලී සෙ.මි. 5 x 75, දිග සෙ.මි. 180, තනි කලු දොර රාමුවට (සෙ.මි. 70 x 180) 2 pcs purlins 5 x 75 cm, L = 180 cm, 1 pc door with frame (70 x 180 cm) 2 வளை மரங்கள் 5 x 75 செ.மீ., L = 180 செ.மீ நிலையுடன் கூடிய கதவு (70 x 180 செ.மீ.)
උක්කුවක පෝච්චිය squatting pans	மலங்கழிக்கும் தட்டு	(ජලමුද්‍රාව සහිත) 1 pc 1 pc (with syphon) (நீர்க்குழாயுடன்) 1 pc

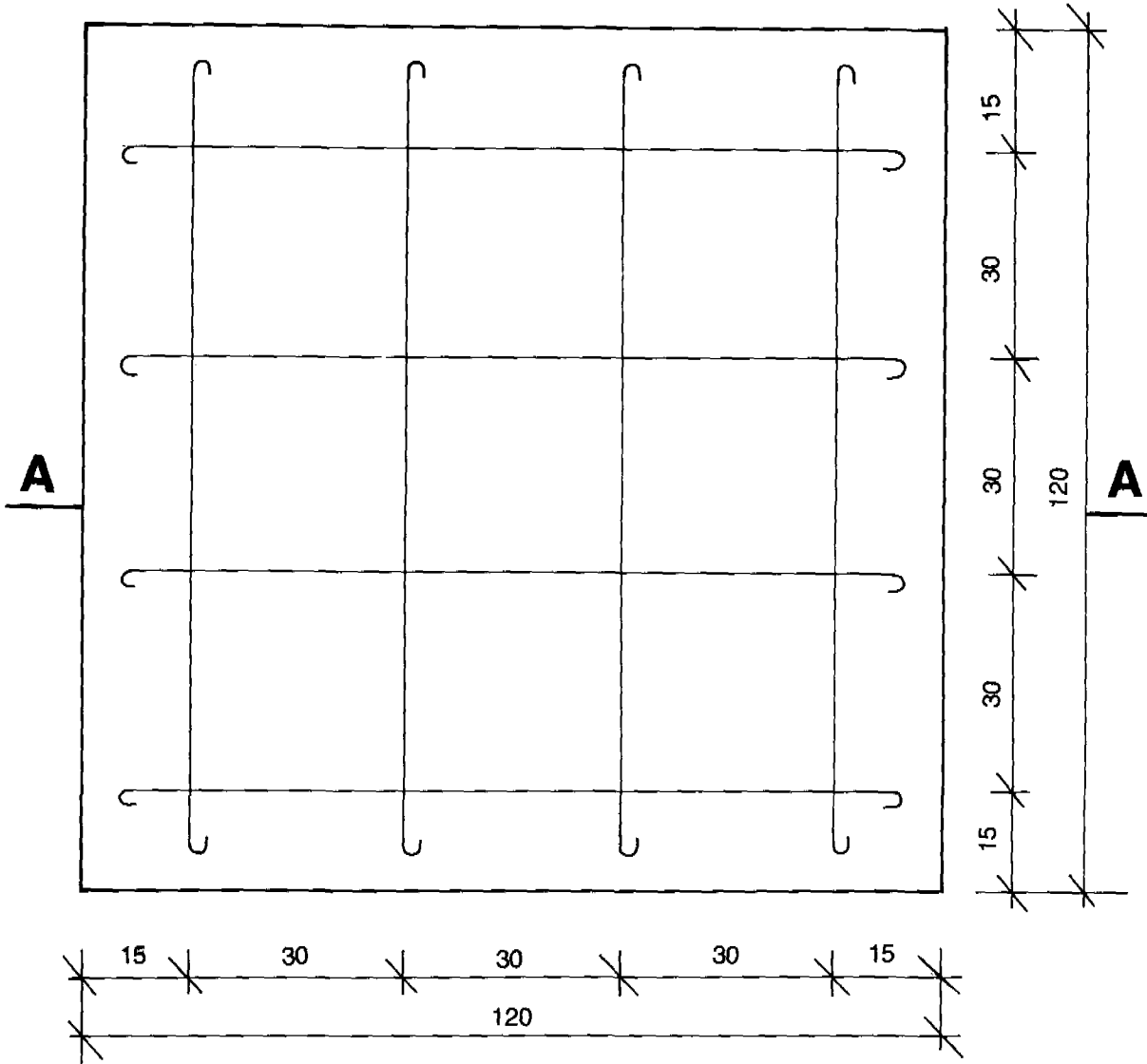
கவர வர வர வர வர
COVERING SLAB FOR SOAK AWAY PIT
வடிநீர்க் குழிக்கான முடும்பட்டி

பிளான் எண் Plan No. திட்டப்பட இல.	L-2a	தேதி Date: திகதி	March 1992		தேதி Date: திகதி		விசயம் By: யாரை
அளவை Scale: அளவத் திட்டம்	1:20	வரைந்தவர் Drawn by: வரைந்தவர்	Kumuduni	மாற்றம் Amendments திருத்தம்			
மிதவரை Map Sheet: திட்டப்படத் தளம்		வடிவமைப்பு Designed by: திட்டமிட்டவர்	R. St & H. Pf				

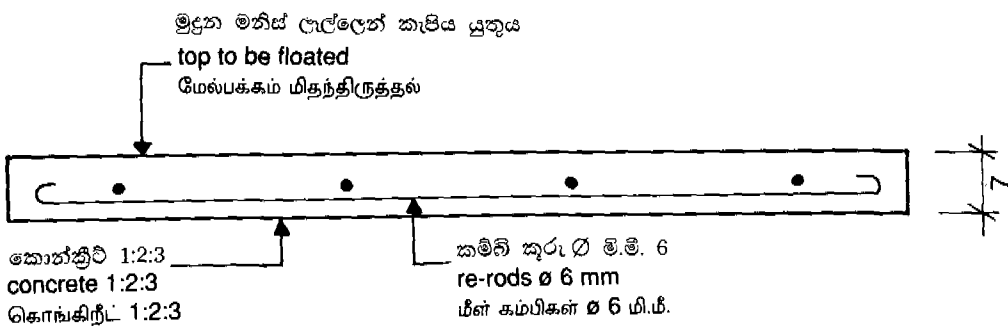
வடிவமைப்பு / List of Materials / பொருட்பட்டியல்

சிமென்ட் cement சிமென்டு	கைப்பை 0.75 0.75 bags 0.75 பொதிகள்
மணல் sand மணல்	கைப்பை 8-10 (0.6 m ³) 8-10 pans (0.6 m ³) 8-10 தாச்சிகள் (0.6 ம ³)
உலகம் metal உலகம்	கைப்பை 11-13 (0.8 m ³) 11-13 pans (0.8 m ³) 11-13 தாச்சிகள் (0.8 ம ³)
கைப்பை re-rods மீள் கம்பி	10 m ∅ 6mm w = 2.3 kg (விசயம் 6 கைப்பை 10 கை) 10 m ∅ 6mm, w = 2.3 kg 10 மீ. ∅ 6 மி.மீ., w = 2.3 கி.கி
மரம் timber அரிந்த பலகை	வடிவமைப்பு form work பெட்டி அமைப்பு





பட்டினித் **PLAN VIEW** அமைப்புப் படத்தோற்றம்



பட்டினித் **A-A SECTION A-A** பிரிவு A-A