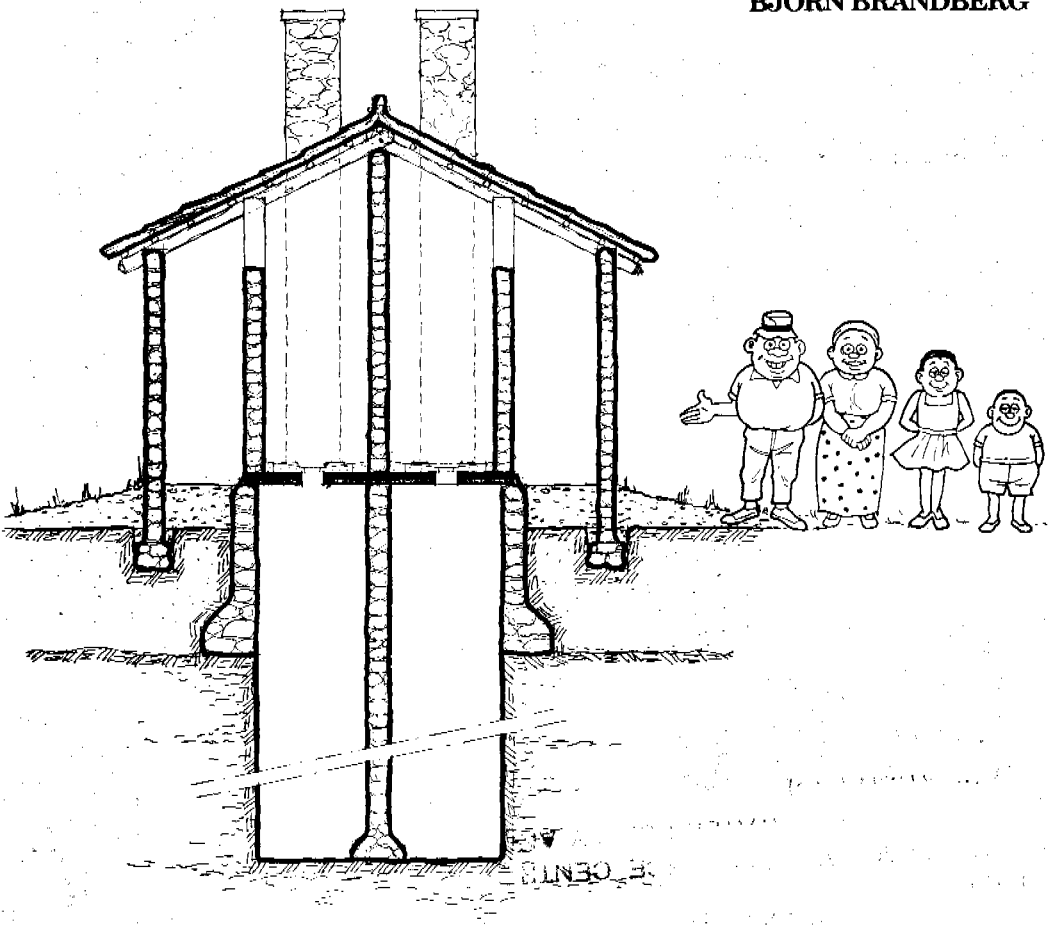
PLANNING, CONSTRUCTION AND OPERATION OF

PUBLIC AND INSTITUTIONAL LATRINES

A field manual based on proceedings from the HESAWA Workshop on Construction and Use of Public and Institutional Latrines held in Mwanza Tanzania 15-26 November 1989

prepared by
BJÖRN BRANDBERG



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RESPONSIBILITY
Given that local conditions will vary from place to place the construction of public and institutional latrines will always remain the responsibility of builder. The author, SIDA and the HESAWA Programme can not be made responsible for any accidents or other damages consequent of the use of this manual.

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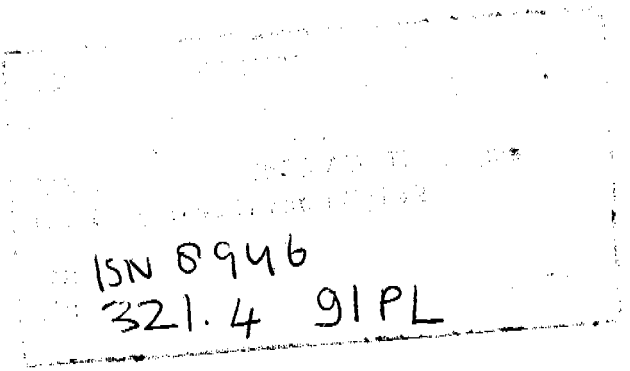

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FOREWORD

Improved sanitation, in its widest context is as vital for health as clean water. Its implementation is a task of the same magnitude and complexity. Ignoring this may lead to investments and other development efforts failing to result in improved health.

The population in rural and peri-urban areas are exposed to serious environmental hazards because of the lack of or improper use of toilets. This is specially true around market places (where principally food is sold) around bus terminals, dispensaries and schools. Given that medical services in general are insufficient, that nutrition and the general health status of the population is poor, the effect on public health is serious. The situation is dramatically illustrated by occasional outbreaks of cholera.

Much has been written about why we need a clean environment, and the awareness is growing. Our knowledge of how to protect our environment is limited, however. The initiative by the HESAWA Programme Management to initiate the workshop and the elaboration of this manual is therefore an important step in the process towards better environmental sanitation in public areas. It is our hope that this booklet shall become a useful tool in this important work.

Björn Brandberg

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Appendices

INTRODUCTION AND ACKNOWLEDGEMENTS

The manual

This manual has been prepared to facilitate the planning, construction and use of public and institutional latrines in Tanzania. As the problems and conditions are similar in many developing countries, it is hoped that the manual will be used also outside of Tanzania.

The manual is principally meant to be used as a field manual for extension workers. Health planners may find it useful in planning of public and institutional sanitation for schools, market places, bus terminals etc. It may also be useful in teaching and training of field staff and community leaders.

The contents of the manual are based on the results from the HESAWA funded workshop held at Bujora Training Centre in the Mwanza Region 15-26 Nov 1989. The information presented at the workshop by a large group of people (including public health doctors, health extension workers, engineers, researchers and planners) represents both wide and in-depth experience of low-cost sanitation and social conditions not only from Tanzania but also from neighbouring African countries. The responsibility for the contents of the manual remains, however, with the author.

For more detailed information on the conclusions from the workshop, reference is made to the complete proceedings available at the HESAWA programme headquarters in Mwanza.

Local knowledge and common sense

During the workshop and during the elaboration of this manual many questions have been raised where no clear answers have been given. Other questions have only been mentioned where a more in depth analysis would have taken too much space or made the publication difficult to read. Our knowledge about many details is also limited.

The expected lifetime of the public latrine is, for example, very difficult to predict as many factors influence it, i.e. the number and the frequency of users, the volume and the shape of the pit, soil conditions, anal cleaning material used, etc.

The question of light and ventilation in the latrine compartments is another question which has only been commented on. The fly control in the VIP-latrines (ventilated improved pit-latrines) requires a dark compartment while pleasantness, hygiene and cleanliness ask for as much light as possible.

Doors or no doors to the compartments is another question where factors like maintenance and privacy demand differing solutions and where it is the local knowledge of costs and acceptability that will have the final say.

For several reasons costs have not been analyzed. e.g. costs do vary from one place to an other also inside Tanzania, and prices vary widely depending on the material chosen. A comparison between costs and health benefits is also very difficult to make.

In conclusion there are many factors that we have difficulties in evaluating where we have to rely on local knowledge and common sense.

Acknowledgments

I am especially grateful to SIDA (Sweden) who funded the workshop and the preparation of the manual, to the HESAWA Programme Management who arranged the workshop, to Mr U. Winblad, Consultant ,who initiated the workshop and to Dr C. Msuya (AMREF) who coordinated it. Mr J. Muturi's presentation on operation and maintenance of public and institutional latrines was of great value in the writing of the last chapter.

I also wish to thank the facilitators and the participants for their valuable contribution during the workshop, without which this manual would never have been written (see appendix no 6: List of facilitators and participants).

Finally I wish to thank Mrs Sarah Bradly, Mr Jeff Broome, Dr Sandy Cairncross, Mr Andrew Macoun, Mr John Muturi, Dr Erik Nordberg, Mr I.O. Oenga, Mr Gunnar Schultzberg and Mr Rolf Winberg who have assisted with valuable comments and corrections on the draft. I am aware of the fact that space, time and knowledge have been insufficient to respond to all the interesting comments and questions that have been raised.

1 GENERAL

Successful latrine building programmes are slowly being implemented in various countries in Africa. A clean and safe environment is, however, only achieved when toilet facilities are available in all places where people need them.

Toilets at schools, market places, bus terminals etc. do present a difficult problem. They are often built and left to the public to use without a clear allocation of responsibilities for the cleaning and the repairing of them, with the result of extreme filthiness, smell and fly problems. Poorly managed, the toilets may produce a problem instead of solving one.

Construction, operation and maintenance of public and institutional toilets is an issue which has presented serious problems in all countries. Even in Europe public toilet facilities present serious management problems. It is obvious that the question requires a great deal of attention.

Stipulations for successful implementation of a public latrine project are:

1. **Community involvement**
   The first condition for achieving a clean and functional latrine to be used by the public is that the community or the benefitting institution is involved from the beginning and at all stages of planning, building and operation. If not, they will never treat the toilet as theirs, and the responsibility for cleaning and repair will fail and the toilet will soon become a public nuisance and a health hazard.

2. **Awareness**
   The benefitting community or institution must be aware of the need and of the importance of the toilet as well as of the importance and difficulty of keeping it clean. The best way to increase this awareness is through Hygiene Education. (See also chapter 4 under Public Health Education).

3. **Private toilets**
   If the toilet is to be built in the vicinity of a housing area, the houses must have their own toilets. If not, the new toilet will be used by the population in the area and conflicts will arise about the cleaning of the toilet which will consequently become very

filthy. The latrine will also fill up within a short time. Therefore: Start with a general latrine building campaign and follow up by building improved public latrines as well.

4. **Hygiene education**
In order to achieve a public health impact, latrine building should always be accompanied by hygiene education. Anal cleansing material and water and (ideally) soap for hand washing should be provided. Posters in Kiswahili should be placed in the latrines explaining the importance of hand washing, cleaning and reparation.

5. **Service**
There should be a permanent caretaker of the toilet responsible for general cleanliness and to providing anal cleansing material.

6. **Payment**
Charging a fee for the use of the toilet is encouraged in order to cover costs for operation, maintenance and replacement.

7. **Supervision**
Community leaders and Government health personnel should together monitor the toilet and supervise caretakers on a regular basis safeguarding that it is properly operated and maintained.

8. **Contract**
An agreement must be made with the benefitting community or institution concerning the construction, operation and maintenance of the toilet. To avoid misunderstandings the agreement should be written and signed (contract). Normally the operation and maintenance (cleaning and repair) should be carried out by the community or benefitting institution.

9. **Legality**
Before any practical steps are taken, central and local building regulations should be taken into account. As these regulations may be found in various official documents the local building authority should always be consulted even if planning permission is not required.

10. **Accidents**
Any building activity and building of latrines in particular implies risks for the builders as structures may collapse due to

poor workmanship, lack of control, supervision etc. The complete structure may also collapse due to heavy rains and poor soil conditions. It is therefore absolutely necessary that the staff is properly trained and that the risks are assessed from case to case, and that competent people are consulted whenever necessary.

2. PLANNING

Siting

For the siting of a public latrine the following points should be considered:

1. **Easy to find and not causing inconvenience**
   The latrine should be easy to find by the users and be located in a place where it has the necessary privacy and does not cause inconvenience to the principal activities of the place.

2. **Downwind**
   The latrine should, as far as possible, be located on the downwind side of the place (prevailing wind direction) to avoid smell and fly nuisance.

3. **Positioning**
   The toilet should, as far as possible, be positioned with the major openings (doors etc) toward the prevailing direction of the wind. If not there may be serious problems with down draught in the ventpipes, leaving the compartments smelly and filled with flies.

4. **Reservation of land**
   When the latrine is sited, space should also be taken into consideration for the location of additional latrines as there may be a need for more latrines in the future. Moreover, all latrine pits eventually fill up and will need to be emptied or replaced. In many cases public latrines can be emptied with a vacuum tanker. It is important that space is reserved also for these purposes.

5. **Water supply**
   Easy access to clean water is important for good hygiene and cleanliness in the latrine.

Lay out and dimensions

The layout and dimensions depend principally on the number of people that need to use it at the same time. Other factors to be taken into consideration are the dimensions of the pits (which may depend

on soil conditions), the number of entrances, and the location of the urinal.

Norms
The following norms are established by the Ministry of Health:

1. **Day schools**
   One compartment per 15 pupils between 1 and 100, and one additional compartment for every 25 pupils exceeding 100. For boys the required number can be divided by two provided that a urinal is supplied.

2. **Boarding schools**
   One compartment per 10 pupils between 1 and 100 and one compartment for every 25 students exceeding 100. For boys divide by two as for day schools.

3. **Institutions**
   For institutions, garages etc one compartment should be provided for each 25 users up to 100 people and one additional compartment for every 40 additional users.

Entrances

Entrances for men and women should as a rule be separate. Depending on cultural factors they may even need to be located in different directions and at a good distance from each other. Separate entrances to the separate compartment may be convenient but in general only two entrances are required: one for men and one for women. It may be practical to have a separate entrance for the urinal.

The required width for passing in and out is 60 cm. To allow people to pass a minimum of 90 cm is required, though 120 cm is more comfortable and a little more expensive.

Hand washing

A hand washing facility should be arranged at the entrances of the latrine, thus always reminding the users to wash their hands after visiting the toilet. Water and soap should be provided, but a towel is not normally required.

Water for hand washing should pour from a "leaking pot" or a calebasse, if piped water is not available.

The toilet compartment

The space required for defaecation is 70x1.20 cm. However, some people may feel this space too narrow even if the body does not need more space. Additional space may be required for undressing depending on climate and the clothing habits.

The latrine should be designed to accommodate the number of users expected. Government regulations should be respected. For bus terminals and marketplaces the appropriate size may be difficult to estimate and therefore in those cases buildings should be located in such a way that additional toilet structures may be built when needed.

Urinals

For schools there should be at least one urinal provided for each 30 male pupils.

If the urinal is of gutter type, 50-60 cm is required for each user with addition of another 50-60 cm for each corner if the gutter is built in an angle (as two people cannot use the same corner at the same time). The space required for other places may need to be estimated from place to place. 120 cm free space is recommended for the person urinating and for people passing.

Ventilation

In order to get fresh air into the toilet, ventilation is necessary. There are two types of ventilation of latrines:

1. Cross ventilation
2. Pit ventilation

Cross ventilation is the simplest and most effective way of getting fresh air into the toilet superstructure. To get cross ventilation in the toilet there should be openings (doors, windows) on opposing sides of the building allowing the wind to pass through it. If it is difficult to arrange openings on opposite sides they may be located on opposite sides of a corner. As a rule one should try to have the largest opening

(the door) facing the prevailing wind. There should also be an opening above the door to allow air to pass through even when the door is closed.

Pit ventilation is used to evacuate bad smells from the pit, hence reducing smell and fly nuisance in the toilet room. This system of ventilating a latrine is normally known as the VIP-system (Ventilated Improved Pit-latrine). For pit ventilation, a vent-pipe is required for each drop hole. If the same pit is used for many drop holes, the pit must be partitioned with air tight walls to prevent the draught with bad smells passing from one hole to the other. Remember the rule:

ONE PIT - ONE DROP HOLE - ONE VENT PIPE

3. CONSTRUCTION

The substructure

Pits

All latrine pits eventually fill up. The larger the pit the longer the life, but the number of users and the type of anal cleaning material are also factors of importance.

The recommended shape of the pit depends on the soil stability and the layout of the superstructure. Pits can be made round or square, lined and unlined.

Round pits are more stable than rectangular ones. Lined pits should as far as possible be made round.

Rectangular trench type pits are easier to cover than round pits but may be unstable and difficult to line. Rectangular pits can be used where the soil is very stable and where there is no risk of pit collapses.

Deep pits may last longer and have less smell and flies. They may, however, be dangerous to the people digging them. In case of doubt concerning the risk, do always consult an experienced person for advice. Well diggers may know a lot about the local soil, but remember that:

- a rectangular pit collapses more easily than a round one.
- a wide pit collapses more easily than a narrow one even if it is round.
- digging a deep pit may be much more dangerous.

Pit linings

Lined pits should preferably be made round. If for some reason you need to have a square or rectangular pit lining a technician should check the stability of the construction.

The lining should be made with permanent materials like stone and well burnt brick. Vertical joints should be left open to allow for infiltration of liquids (urine and wash water). Only the upper courses (30-50 cm from the ground) need to be fully mortared.

The pit lining should be continued 20-30 cm above the ground to prevent surface water from heavy rains entering the pit.

Linings made of local stone broken to pieces 20-30 cm may require some skill to lay but are strong and cheap and fast to build.

Brick linings should be laid with cement mortar in horizontal joints. Vertical joints should be left open except for the top courses (20-30 cm from the ground level) which should be filled to prevent surface water from entering. (A small hole or a gap under the slab may be a free passage way for smell and flies and it may be the beginning of a pit collapse as rainwater may enter here!)

Soil from the pit excavation should be used to slope the ground away from the pit.

Concrete slabs

To reduce the risk of accidents, slabs for public and institutional latrines should, as far as possible, be made of reinforced concrete. If cement and reinforcement are not available, slabs made of insect and rot resistant logs should be considered.

The concrete slab can be made with a smooth finish from the beginning. Often, the cement floor screed is put on when the slab is in place and when the walls are erected. Concrete slabs should preferably be supported on all sides. When this is not possible the slab should be test loaded before being mounted.

Note: For security reasons the test load should be twice as high as the expected load including the weight of walls crossing the slab. During the test load the slab should be supported in the same way as when finally installed but on temporary supports. Never test load a slab over a deep pit! The slab should be cast at least one week before being test loaded or installed.

Floors

The finish of the floor is of great importance for the cleanliness of the toilet. The floor finish should be hard and smooth and withstand

regular cleaning with water and a brush. Cement and sand mixture 1+4 (volumes of cement and river sand) with some extra cement sprinkled on top is recommended. The best result is obtained if there is not too much water in the cement mortar.

Where cement is not available, termite soil will give a relatively good surface. A soil covered floor will however need to be resmeared very often in a public latrine. Foulings should be swept down the drop hole immediately and sprinkled with ashes.

The surface around the drop hole should always incline towards the drop-hole (inclination 1:5). The rest of the floor should be inclined 1:20 toward the drop hole or toward a separate drainage or possibly toward the door. A 50 mm radius between the walls and the floor surface make cleaning easier. Flat horizontal floors are difficult to keep clean as urine and washing water easily form puddles.

The drop hole

The drop hole should be small enough to be safe for small children and big enough to use comfortably without fouling. (For dimensions please compare with the sanplat hole dimensions in Annex 4.)

Footrests

The drop hole should have elevated standardized footrests to avoid faecal fouling of the floor. It is important though that the footrests, as a guide,have the right position. (Use a template as by annexed drawing in Annex 4 to eliminate misshapes)

Sanplats

The installation of a sanplat (See Annex 4) on top of the drop hole makes it safe also for the smallest children, and easy to keep clean. Note that the floor around the sanplat should be properly inclined not to cause "dirty corners".

Large scale production of sanplats may facilitate the building and upgrading of private latrines. This is necessary so that the public latrine does not become overloaded, filthy and fills up too fast.

Lids

Public toilets should normally not have lids as the lid handles will become dirty. For this reason it is recommended that public and institutional latrines are equipped with ventpipes for smell and fly control rather than with lids for the drop holes. However, lids are strongly recommended for household latrines where the risk of contamination is smaller.

The Superstructure

Walls

The walls should provide reasonable privacy for the user. The walls are also important for the general appearance of the toilet. A nice finish is recommended as the general appearance will influence people's attitude to the building and its maintenance.

Various materials can be used as long as they can be found locally and are within the affordability of the community.

Mud walls are cheap and easy to build where such walls normally are used. They must, however, be properly protected from rain. Water from washing the floor may also affect the bottom part of the walls eventually leading to a collapse if the walls are not properly protected. Correct floor inclinations and a cement skirting (0.5 m) around the floor is essential.

Brick walls of burnt red clay bricks or concrete blocks are excellent. The bottom 4-6 courses should be laid in full mortar (cement-sand mixture: 1+6) while the rest of the bricks could be laid with mud-mortar. The bricks may be re-used when the latrine need to be replaced.

Local stone can be used but needs to be laid in cement mortar.

Grass or reed may be used in special cases. They need, however, to be replaced regularly.

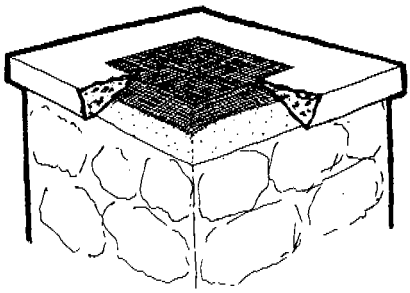
Ventpipes

Public and institutional latrines should, as far as possible, be provided with ventilated pits for the reduction of smell and fly nuisance in the toilet room.

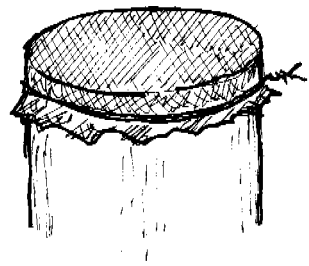
The required cross section of the ventpipe depends on the roughness of the material used. Smooth PVC-pipes can be 10-15 cm in diameter while rough brick or stone built pipes may need a free internal cross section as big as 20x20 cm.

The ventpipe should as far as possible be placed on the uppermost part of the roof, hence reducing the risk of leakage and providing better draught in the pipe (reduced risk for turbulence). It should extend 60 cm above the highest point of the roof to catch the wind and away from trees and higher buildings. For better fly control the ventpipe should lead straight down into the pit with no bends as the light passing through the ventpipe should fall on the bottom of the pit.

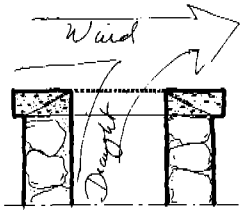
The ventpipe must always be screened with mosquito gauze, preferably made from stainless steel (or aluminium?) as the gases from the pit are very corrosive. Second option is PVC-coated glass-fibre (This may however be attacked by cockroaches). Other materials should not be used. If the mentioned materials are not available the ventpipe should be blocked until proper material is available, as an open ventpipe will lead flies to and from the pit with corresponding health hazards.



Building up the cement top of the ventpipe makes it easier to get the screen flush at the top.

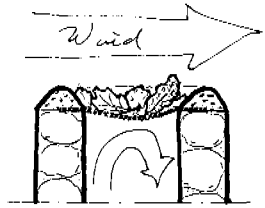


The screen can easily be fitted on top of the ventpipe with an iron wire.



Good

The fly screen should be placed flush with the top to assure a good draught in the ventpipe



Bad

An edge around the screen would allow leaves to accumulate and stop the draught

Roofs

The roofs of public and institutional latrines may be laid as for any other building. Special attention should be paid to the roof overhang for protection of the walls (if mud) and to the connection of the ventpipe. A latrine with a ventilated pit (VIP-Latrine) should have a shady interior to avoid flies going up the drop hole instead of being trapped in the ventpipe. Be careful though not to make it too dark as people may hesitate to use it for fear of stepping in something dirty.

Traditional thatch is the most common roofing material in rural areas.

Corrugated galvanized steel sheet ("zinc") lasts longer.

Concrete (reinforced with chicken wire) is often used in Zimbabwe, but requires special skills to make and to fit. The advantage of the concrete roof is that it can be made flat with an edge around it, hence allowing the outlet of the water to lead to any convenient direction. The outlet for the rain water requires special attention, however, so as not to soak the walls.

3. OPERATION AND MAINTENANCE

The principles for operation and maintenance should be considered right from the planning stage.

Six principal questions need to be taken into consideration:

1. Management
2. Training
3. Public health education
4. Maintenance
5. Economy
6. Monitoring and supervision

Management

There must be an institution responsible for the operation and maintenance of the toilet and within the institution there must be one person who has the over all responsibility. This institution can either employ a caretaker or contract out the management responsibility.

If the management is contracted out, an agreement should be made stating conditions for service including:

Level of service
It should be stated when the toilet is to be kept open (days and hours), and which services should be offered to the public (Anal cleaning material, water, soap etc.), and at what hours it should be cleaned.

Complaints.
It should be stated how complaints should be handled (complaints by the public as well as faults observed during supervision).

Disagreement and termination of contract.
It should be stated what would happen if the two parties disagree concerning the interpretation of the agreement, and how it could be terminated. Normally the contract has a fixed period which could be prolonged. In serious cases there may be a need to terminate the agreement before the end of the contract. This must be stated in the contract.

Charges and replacement.
The agreement should include economic and financial questions such as whether the manager should be paid for taking over the responsibility or if he should pay for it, and who should be responsible for building the replacement latrine when the latrine is full. This is a question of great importance for the fees and for the maintenance. If it is the government's responsibility to replace the latrine when it is full the latrine may fill up faster. If the manager would have to replace it he will see to that no other waste is deposited. He should therefore be allowed to charge enough to be able to replace the latrine when it is full.

Contract

In rural Africa, agreements are seldom written. Considering the problems of running a public toilet it may however be worthwhile to try to get the agreement in writing. Opinion may stand against opinion, and when the conflict arises it may be wise to have a paper to refer to. In case the manager of the toilet has difficulties in reading, a third "neutral" person could assist writing the agreement and explaining the conditions.

Training of caretaker

Irrelevant of the management system, a caretaker must be appointed and trained. The caretaker must be a reliable person, especially if he is to collect user fees. The caretaker must have a form of instruction and he or she must be trained to carry out this instruction properly:

1. When to be there.

2. When and how to clean.

3. From where he will receive equipment (brushes and buckets) and supplies (water, anal cleaning material, soap etc).

4. Charges.
   How much should the charge be, and how should the money be kept so as not to be stolen. Receipts?.

5. Reporting.
   To whom should he report problems (people misusing the toilet, not paying, vandalism, need of repair etc).

Public health education

The proper use of the latrine will depend very much on the general knowledge of the public of how to use a toilet.

If the general public has not been trained in how to use latrines they may feel uncomfortable about using it. Poor people may even hesitate to spend money if there is a charge. Some may be without money for the moment. Others may also be afraid to use a smelly toilet if they feel that they might get sick from bad smell. (Note: A bad smell may be unpleasant but it does not transmit diseases!)

General health education is a must if the public latrine is to be used properly. Posters may be useful, but will not be enough. A strong campaign on the importance of hygiene is a must. The subject, however is too big to be included in this manual.

Maintenance

Maintenance is not only a question of cleaning. All houses will require minor or major repairs at varying intervals. Minor repairs should be carried out by the caretaker, while major repairs should be carried out through the responsible institution.

Economy and fees

To build a public toilet is expensive, to run it costs money, to repair it is not free, and to replace it the day it fills up costs as much as building a new one.

Already at the planning stage it should be made clear how these costs should be covered.

In commercial business the client fees would normally cover the expenses. For institutional latrines there is normally no charges. For public latrines there may be a symbolic fee to avoid abuse. The fee can be increased to cover part of or even all the above mentioned costs.

Increasing the cost over a certain level may, however result in the users looking for other places to defaecate, hence jeopardizing the original purpose of the toilet.

A subsidy may therefore be required. If the toilet is at a market place the subsidy may be taken from the market fees, or be charged to the traders association, who may prefer to run the place rather than pay the government. (A contract should in such a case be drawn up with the traders association.)

In order to encourage children to use the latrine it could be discussed to let them use the latrine free of charge.

Monitoring and supervision.

It should be stated when and by whom the monitoring and supervision is done. Monitoring is a regular checkup. Supervision is control and training.

Who should do the monitoring and who should do the supervision and at what intervals? It could be the same person.

It should be stated how the services should be monitored and supervised:

What should have been done?
- cleaning
- provide water
- provide cleaning material
- minor repairs
- major repairs

...and how?
- is the toilet kept clean enough?
- is the water provided clean enough?
- Is the caretaker well behaved?

...and who should have done what??
- the caretaker?
- the institution?
- anybody else?

...and when?
- opening times?
- cleaning when?
- repairing when?
- reporting when?

Has the caretaker got the right equipment
Has he been paid

What should the building look like?

is the painting satisfactory
is the roof watertight?
do the doors close properly,
no plaster falling off, etc.

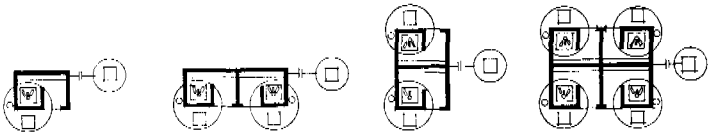
Good luck with your public and institutional latrines!

LATRINE TYPES

Public and institutional latrines can be built in many ways, principally depending on the number of users and type of soil. The wind may be a reason to avoid a latrine with entrances on opposite sides, as you may get a back draught in the ventpipe (causing smell and fly problems). For traditional custom reason this may, however, be necessary as people may hesitate to use a latrine where the entrances are too close.

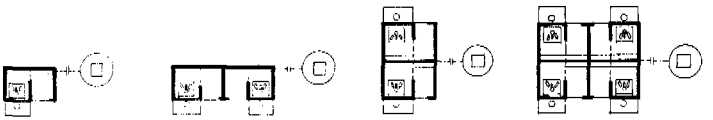
Depending on the required level of privacy, the latrines may or may not be equipped with doors. Doors do give problems as they often get damaged and require regular repairs.

LATRINES WITH ROUND PITS



Any latrine should preferably be made with a round pit as the round pits are more stable than the rectangular ones. The round pit can also easily be lined, which may be necessary if the soil is unstable.

LATRINES WITH RECTANGULAR PITS

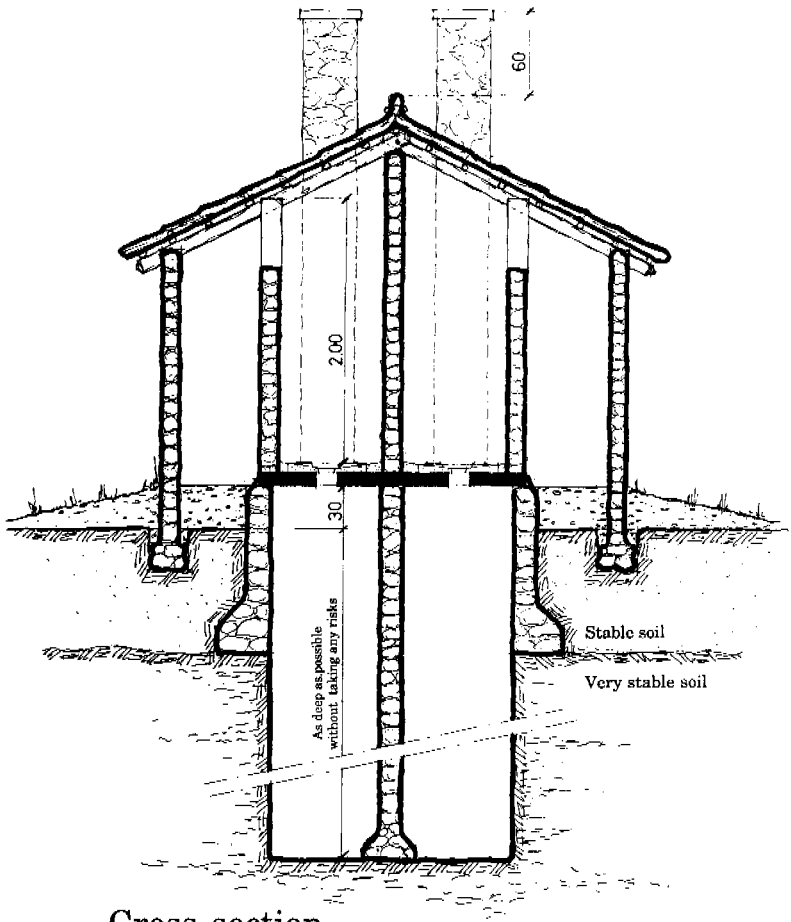


Rectangular pits are often easier to cover, and are generally easier to adapt to the square form of building. Rectangular pits should only be used where there is no risk for soil collapses.

Example 1

LATRINE FOR HARD AND STABLE SOIL

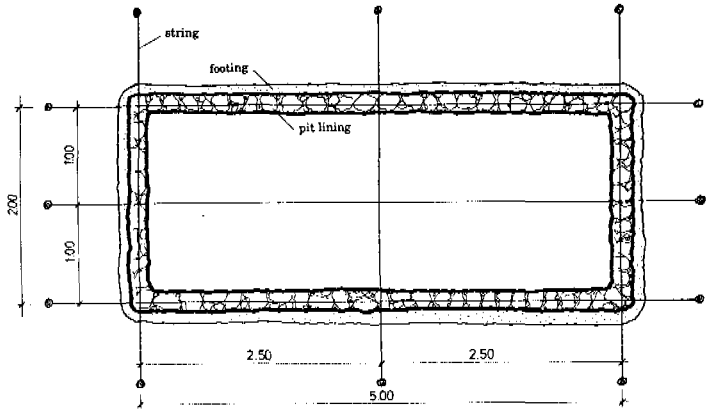
Where there is <u>no risk</u> for soil collapse a rectangular pit can be used. The pit lining in this case serves as a foundation for the walls.



Cross section

The substructure of this latrine was built during the workshop. The superstructure was completed later.

Setting out and digging



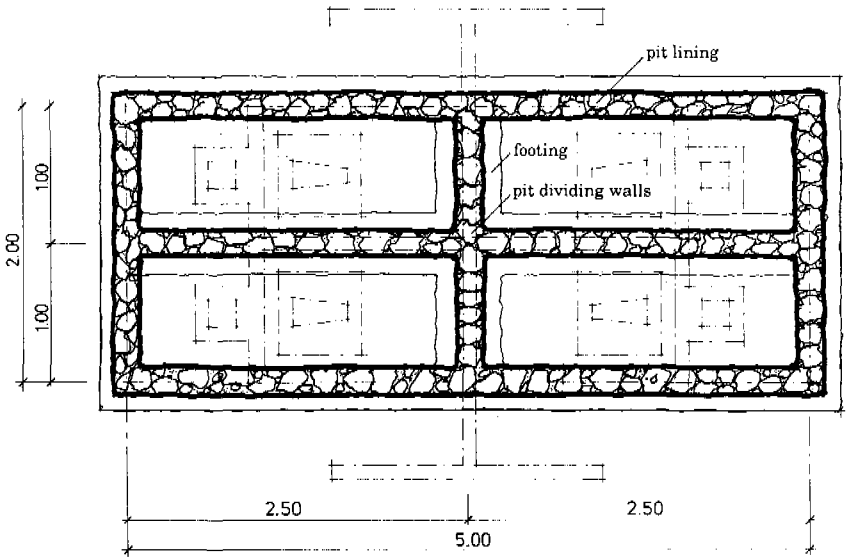
Start by setting out the main dimensions roughly on the ground, just to make sure that the latrine comes in the right place. Then, mark out the main dimensions and secure them with lines fixed on poles in the ground, well outside the building.

Now you can start digging down to the hard soil that you know can support the weight of the structure. If you are uncertain, consult somebody who knows the soil better and can make a secure judgement. If you are unsure then the pit lining should go down to the bottom of the pit.

Make a flat area for the footing of the foundation which should lie on firm and undisturbed soil.

To be sure that you have the right dimensions you can hang a small stone on a string from the lines you set up in the beginning.

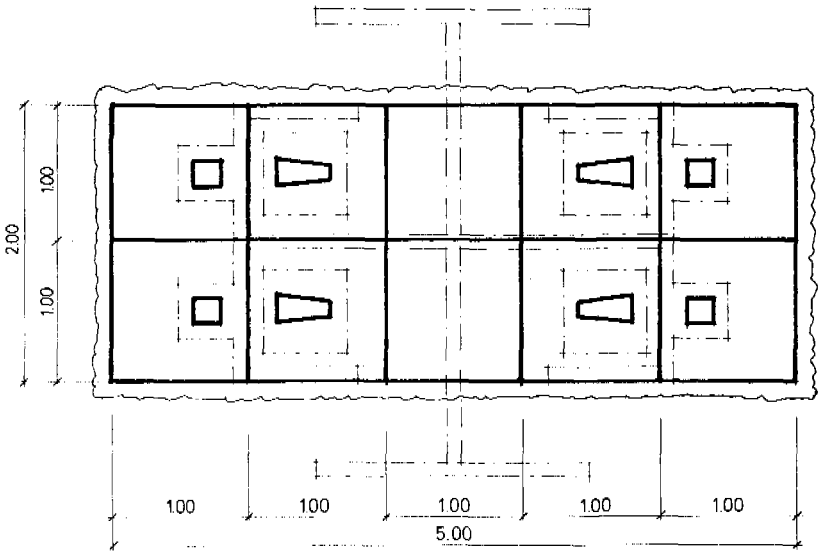
Laying the foundation and the pit -lining



Lay the foundation with clean stones set in cement mortar (mixture one cement to four volumes of clean river sand). Continue with the whole foundation before you continue digging.

When the digging is done you complete the foundation walls up to the final height . Make sure that the foundation is at least 30 cm higher than the surrounding ground. Level off the top with cement mortar using a spirit level.

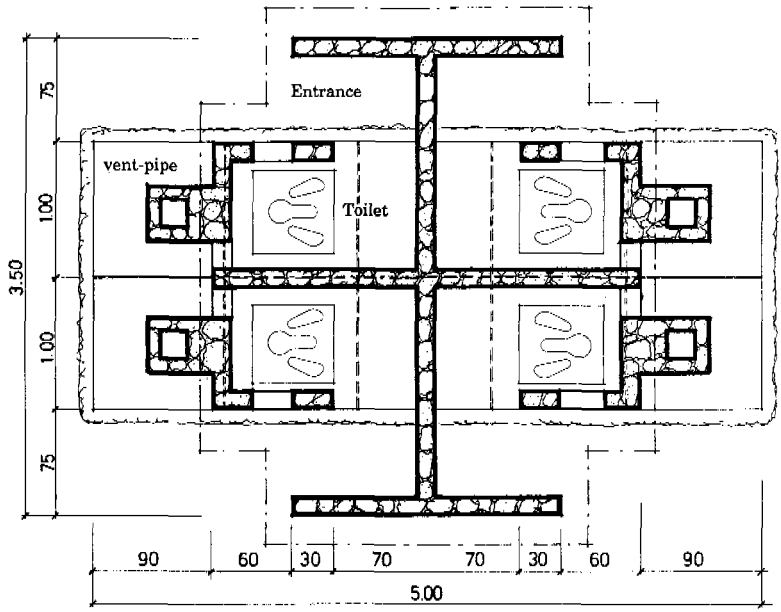
Mounting of the slabs



When the slabs have been properly cured (one week with water and protected from the sun) you can put them on the foundation.

While installing the slabs you should fill the joints between the slabs and the foundation with cement mortar to make sure that the slabs have a solid support and to avoid that smell and flies may pass from one pit to another.

The superstructure



Now make a foundation also for the entrance walls and set out the rest of the walls on the top of the slabs and continue up to the level of the roof and finish the ventpipes by mounting the fly screens as described earlier in this manual.

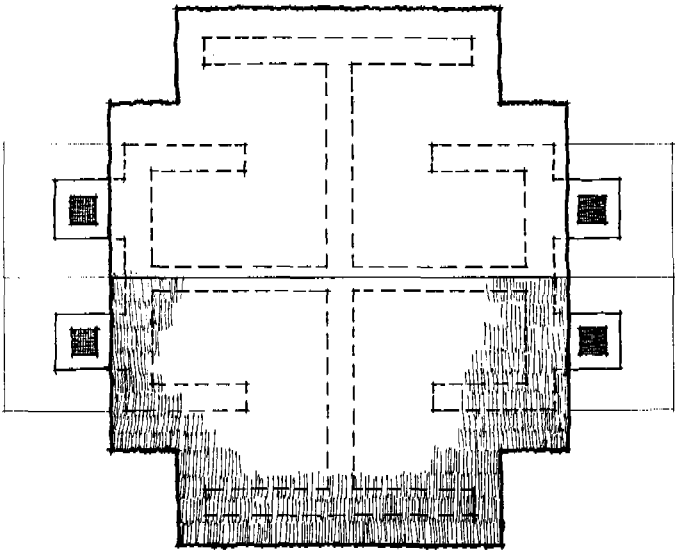
Note that the ventpipes should reach 60 cm above the highest point of the roof. Put rafters and level off the top of the wall.

Plaster the walls if required and put the sanplats in place.

Finalize the floor by putting a top screed on top of the slabs. Fill up well around the sanplats to avoid dirt accumulation in the corners. Slope the rest of the floor towards the entrance to avoid that urine and wash water may form unpleasant puddles.

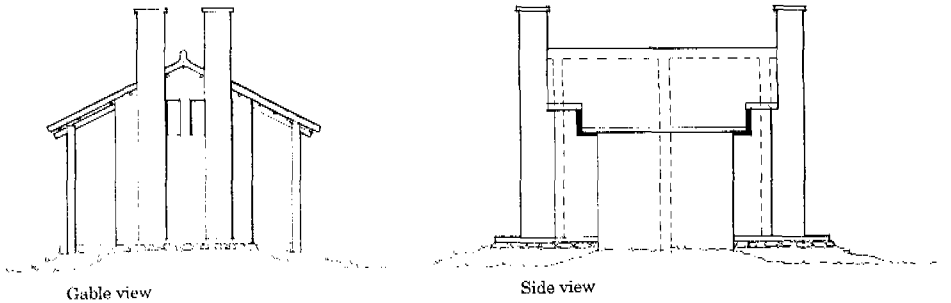
To protect the walls a plaster skirting may be arranged all around the floor 50 cm up the wall. Give the connection to the floor a radius to make cleaning easier.

The roof



The latrine can be roofed with any material.
Note that the roof inclination needed will depend on what material you use and how heavy the rainfall is. Consult an experienced local builder if you have doubts.

The completed latrine



Gable view

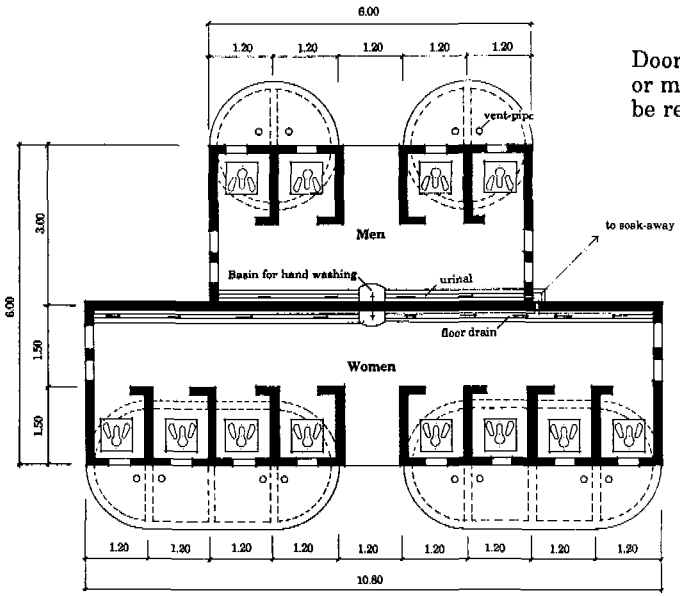
Side view

This is what the completed latrine should look like.

Example 2

LATRINE FOR MANY USERS

This latrine has been designed to cope with many users at the same time. The size can be adapted to serve different numbers of users as calculated using the norms in chapter one, Planning/ Norms.



To make cleaning easy the whole floor should be laid with a slight inclination. The floor in the compartments should be laid with the floor inclination towards the drop hole, while the floor in the corridors should slope towards the floor drainage along the central wall, and the floor in the entrance could preferably slope outwards.In the men´s section the floor drainage also serves as a urinal. The cross section is consequently the same for the two departments.

The principle for building the latrines is the same as for the latrine in example one "Latrine for Hard soil". Reference is also made to the main text, Construction.

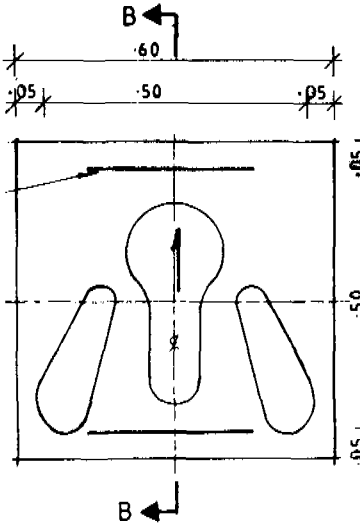
SANPLATS

Sanplat is an abbreviation for sanitation platform which is a small prefabricated concrete slab 60x60 cm in dimension designed to improve hygiene and safety in any latrine.

The sanplat is recommended for the public and institutional latrines, though the lid should not be used as the lid handle may become dirty.

The sanplat can be made locally using three simple moulds (as by the annexed drawings).

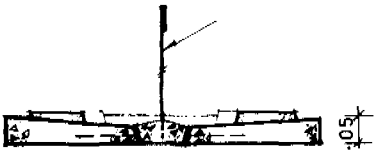
Plan



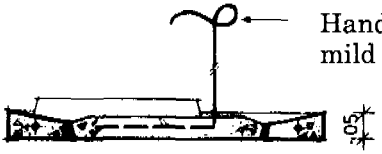
Reinforcement of round mild steel 6 mm 2 pcs 300mm each

The lid is made of the same concrete as the platform. To guarantee a perfect fitting it should be cast in the hole of the sanplat, that it belongs to.

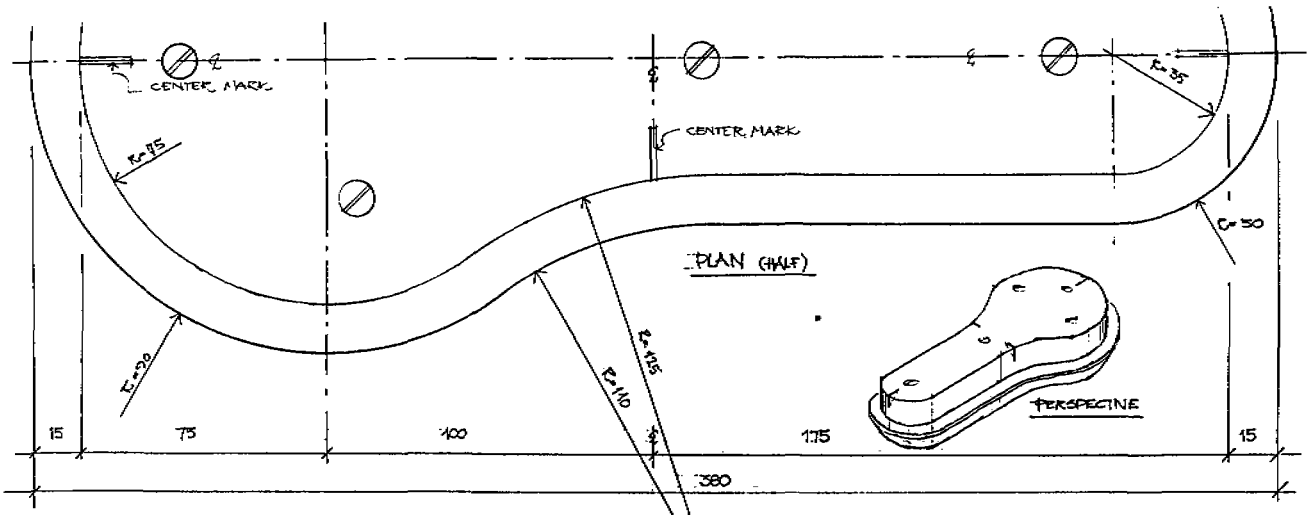
Section AA



Section BB



Handle of 6 mm round mild steel 750 mm long



DROP-HOLE MOULD

0 10 20 30 40 50 60 70 80 90 100mm REDUCED
NOT TO SCALE

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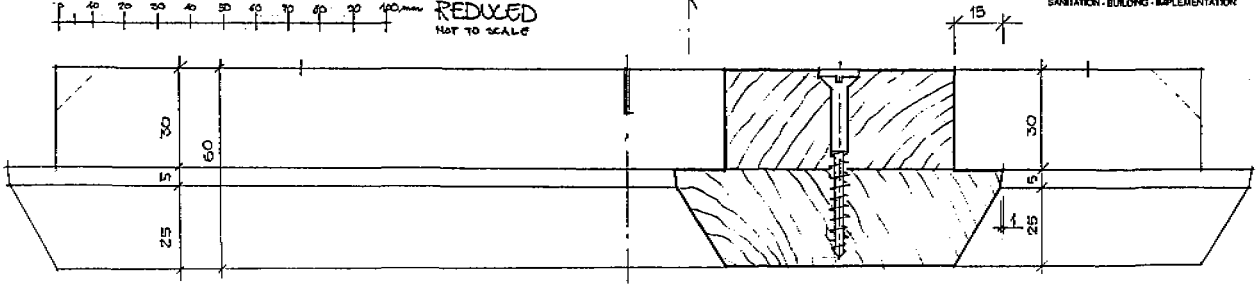
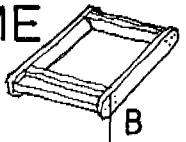


SIDE-VIEW and CROSS-SECTION

2

SANPLAT FRAME

DIMENSIONS IN MILLIMETERS
MATERIAL: HARD WOOD



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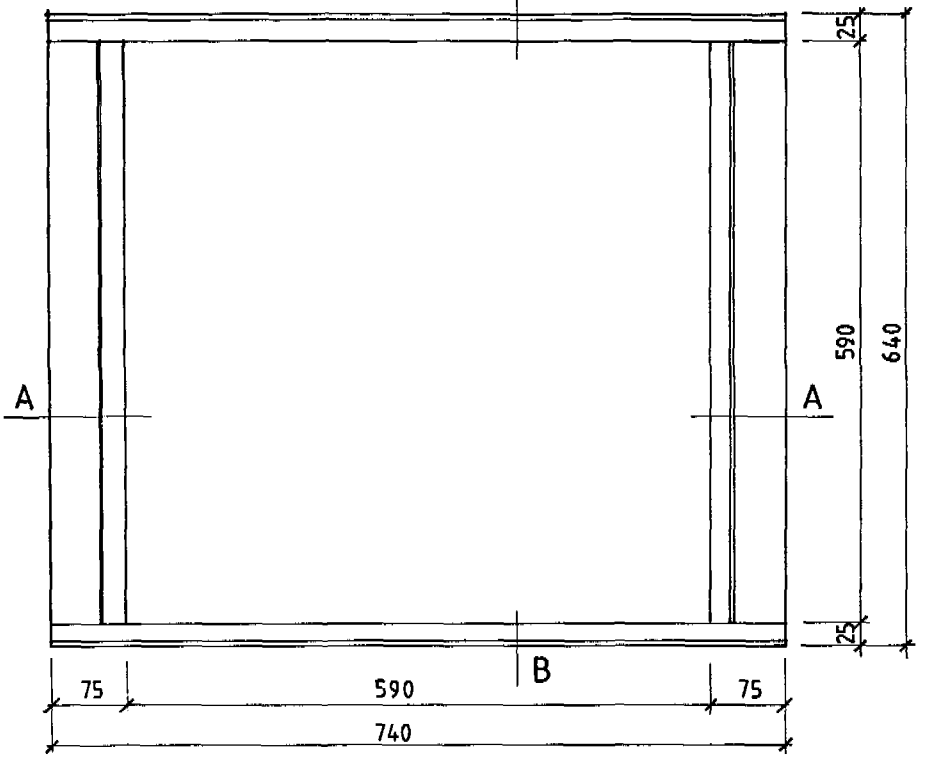
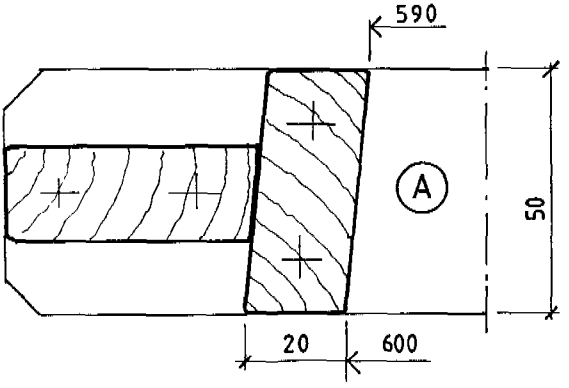
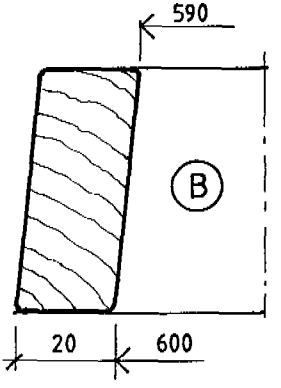
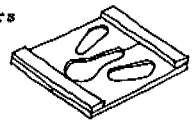






FOOT-REST MOULD

Dimensions in millimeters
Material: Hard wood



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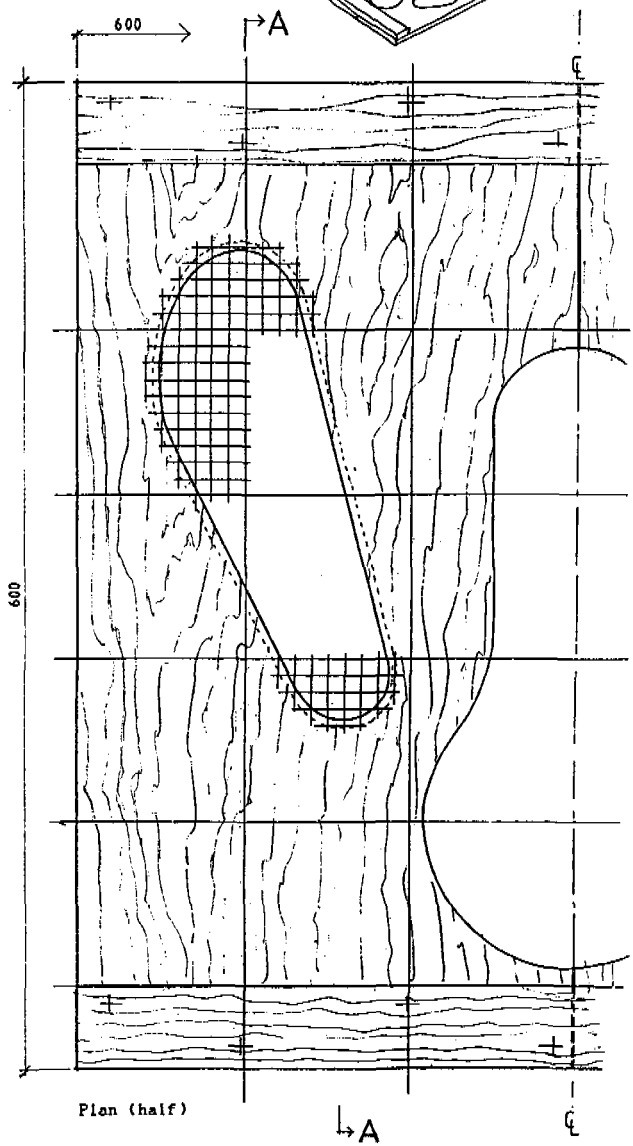
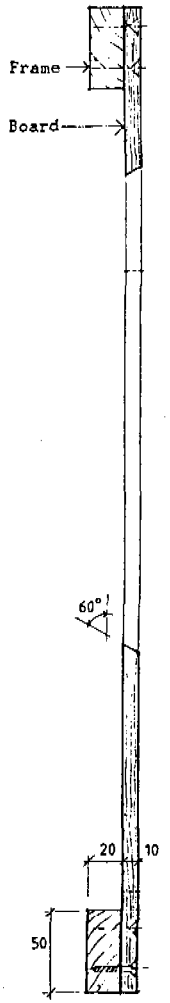


Plan (half)



Section A-A

Appendix no 5

INSTRUCTION FOR CARETAKER

Instruction for the caretaker of the public/institutional toilet at

.....
which should be kept open on

.....days
between
.....hours.

DAILY CLEANING
The latrine should be cleaned thoroughly each day before closing for the night.

EXTRA CLEANING
The clients are responsible for leaving the toilet in good condition. The caretaker should provide the necessary cleaning material. If extra cleaning is required i.e due to the failure of the clients in keeping it clean,this should be done as soon as possible by the caretaker in order to keep the toilet clean at all times.

ANAL CLEANING MATERIAL WATER,AND SOAP
The caretaker should at all times when the latrine is open provide anal cleaning material, clean water and soap for washing of hands.

COLLECTION OF TOILET FEES
The caretaker should collect a toilet fee of ..... from each user and an additional .....for anal cleaning material on request from customer.

CUSTODY OF REVENUES
The caretaker is obliged to safeguard collected revenues to avoid losses because of theft etc.

OTHER DUTIES
The caretaker is allowed to maintain other duties as long as this does not interfere with the proper service of the toilet.

MINOR AND MAJOR REPAIRS
Minor repairs should be done by the caretaker. Needs for major repairs should be reported well in advance to the authority in charge.

THIS INSTRUCTION
This instruction should be put up well visible at the entrance of the latrine to inform the caretaker and the public.

List of facilitators and participants

Facilitators

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Winifrida Kasimbala	Community Dev. Assistant, Biharamulu
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Methusellah Lameck	Health Assistant, Chato
Tumbe Makubate	Community Dev Assistant, Bunda
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