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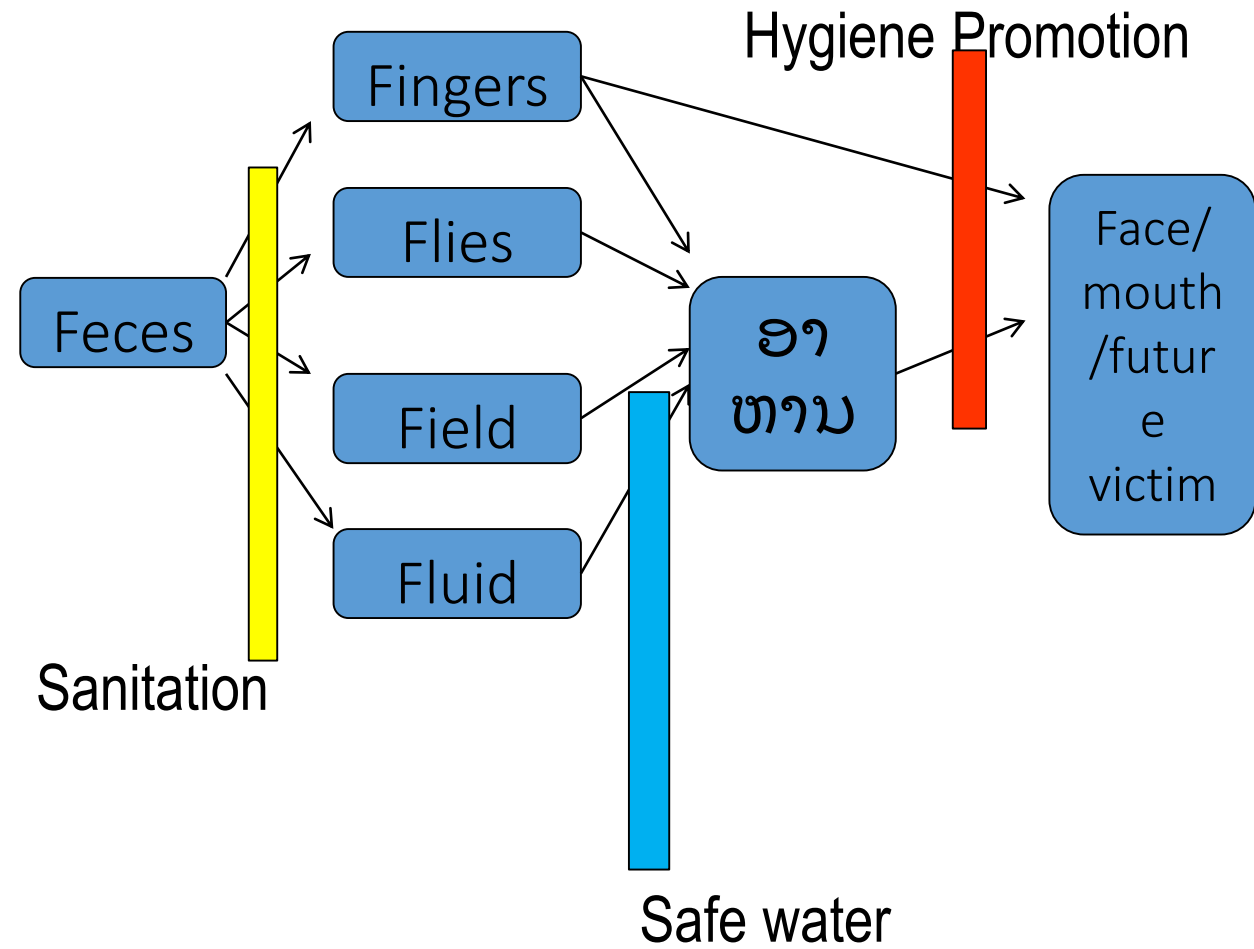


FEDERATION

Introduction to Excreta Disposal, Drainage and Hand Washing Facilities



ການກໍາຈັດສິ່ງຖ່າຍເທ, ສູຂະ
ພາບ ແລະ ການເຜົາລະວົງ
Excreta Disposal, Health and
Survival





ໄລຍະສູກເສີນ Phases of an emergency

- ສູກເສີນກະທັນຫັນ Immediate Emergency
- ການເຮັດໃຫ້ໝັ້ນຄົງ Stabilization
- ການຟື້ນຟູ Recovery

ເພື່ອຈຸດປະສົງໃນການກຳລັດອາຈົມ ໄລຍະເຫຼົ່ານີ້ສາມາດຖືກຫຼຸດລົງເປັນ 2 For the purposes of excreta disposal, these phases can be reduced in to two”

ໄລຍະທີ 1 First Phase: ສູກເສີນກະທັນຫັນ immediate emergency (ສອງ-ສາມອາທິດ ເຖິງ 3 ເດືອນ several weeks up to three months)

ໄລຍະທີ 2 Second Phase: ໄລຍະບົວແບງ ແລະ ຟື້ນຟູ Stabilisation and recovery (months to years)



Key Design Criteria

5 key factors

1. Accessibility
2. Safety
3. ກຸ້ນອບໃຈ ແລະ ຄວາມຕ້ອງການຂອງຊຸມຊົນ
Comfort and community desires
4. ຕົວສ່ວນຕົວ Privacy
5. Health

Coverage:

- 20 people per latrine.
- Sex segregation is 3 for female :1 for male.
- Trench latrine is maximum 100 people per
- 3.5m length X 1m deep X 300mm wide trench.

Location:

Minimum 6 metres from dwellings (for pit latrine) and maximum 50 metres.

Pit Depth : Minimum 1.5 metres above the water table.

Accumulation rates ອັດຕາສະສົມ

Solid: 0.5 litres/person/day in emergency (<0.15m³/person/year in stable situation)

Liquid: 0.8 litres/person/day (1.3 litre/day if water used for anal cleansing). If people wash in latrines the accumulation rate could be 8-10l/p/d



FAMILY OR COMMUNAL TOILETS?

First Phase

Open Defecation
Shallow Trench
Latrine
Deep Trench Latrine
Shallow family
latrine
Bucket latrines
Packet Latrine
Chemical Toilet

Second Phase

- Simple Pit Latrine
- Ventilated Improved Pit (VIP) latrine
- Borehole latrines
- Pour flush latrine
- Septic tank
- Aqua privies
- Wastewater treatment system
- Latrines for institution



Options for emergency

Pee poo bag

Individual, single-use biodegradable bags for point-of-use sanitation that are buried or properly disposed

- Bags typically inside reusable buckets
- Brand names: Peepoole, Wagbag



Bucket Latrine

Elevated temporary structure over large container or tank that can be lined with large, replaceable plastic bag



Chemical Toilet

Portable prefabricated sanitation units with water-tight excreta-holding tank, containing a chemical solution to aid digestion and reduce odor



Trench latrine

Narrow trenches with temporary privacy structure; waste covered daily with soil.

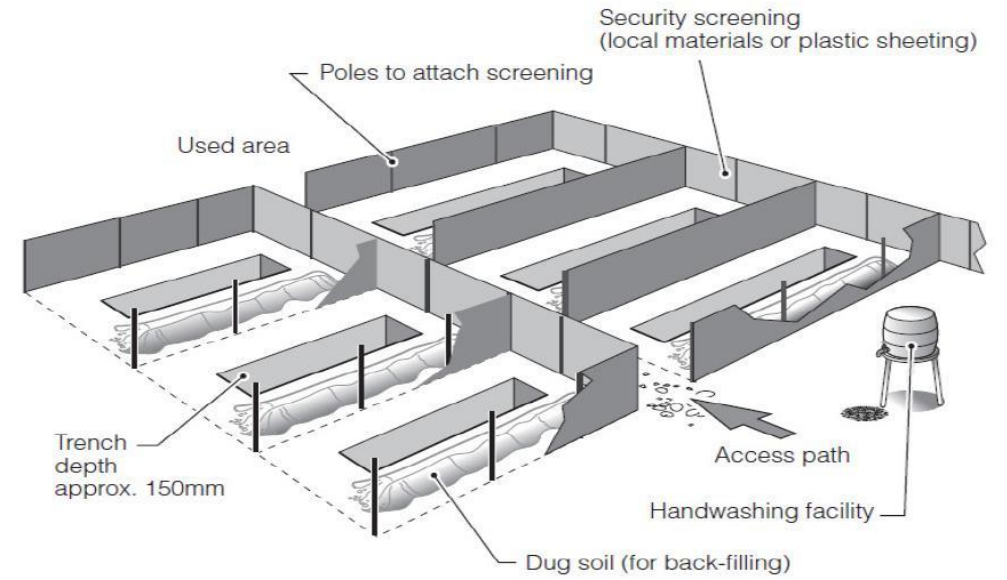
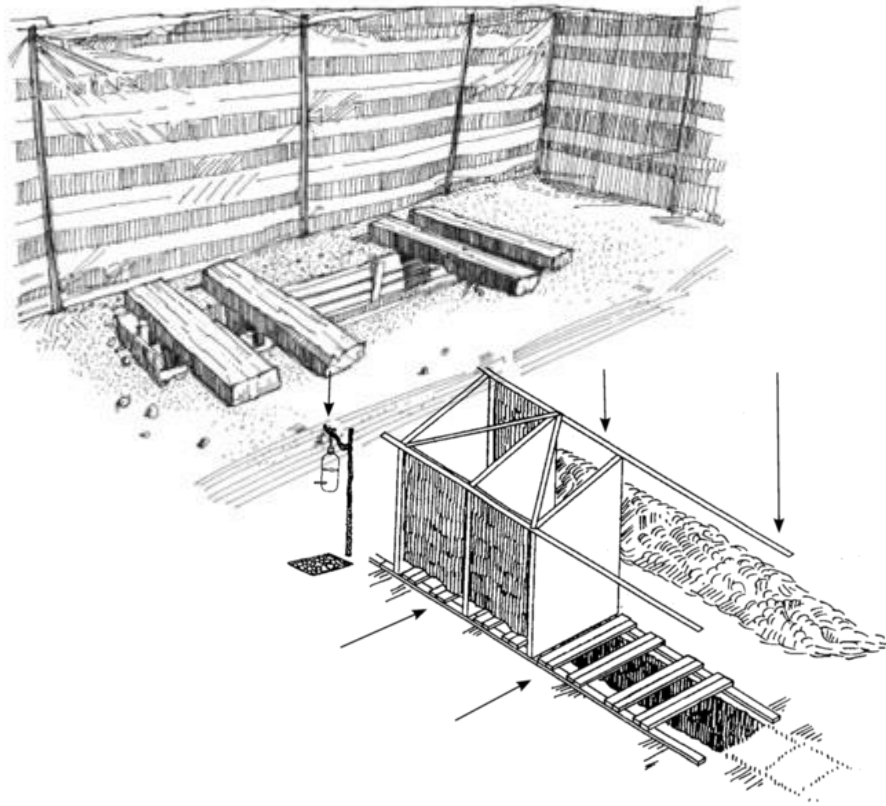




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Trench latrine





Recommendations for Sanitation in Improved Settlements and Cholera Prone Areas

- [The Sphere standard](#) of 50 people per latrine for emergency situations should be used for the immediate term, with the aim of decreasing to the Sphere minimum standard for excreta disposal of 20 people per latrine.

- Chemical toilets should be used in the immediate term where available.
- If chemical toilets are not feasible, trench latrines or temporary pit latrines should be constructed immediately
- Elevated latrines should be considered for areas where digging of latrines is not possible or acceptable or areas with high water table or prone to flooding.
- Residents of internally displaced persons (IDP) settlements should be engaged in choosing among appropriate alternatives.
- Existing practices should be further investigated to identify other feasible alternatives (e.g., are people in improvised settlements using toilets in minimally damaged buildings in the vicinity?)
- **Further investigation of the local feasibility and local acceptability of packet and bucket latrines should be undertaken.**
- Health communication materials should contain information about latrine use and care (in local languages), and provisions made to communicate with non-literate populations.
- Longer term sanitation solutions should be investigated further to help prevent occurrence of cholera and other infectious diseases.
- **Regardless of the type of sanitation facility installed, handwashing stations should be installed at every sanitation facility**



Latrine Construction Process

Determining Location

Pit excavation/disposal system

Laying of slab and foundation

Superstructure construction

Hand washing Facilities Construction

Operation and Maintenance arrangement

Monitoring arrangement

Calculation of Pit Size

$$V = (N \times S \times D) + 0.5A$$

1000

Minimum size for pit is suggested
1.5 m depth with 1 – 1.2m in
diameter

N = No of Users
S = Sludge
Accumulation rates
(liter/person/year)
D = Design life (years)
A = Pit base area (M2)

Suggested Sludge accumulation rates

Waste deposited and condition	"S" accumulation rate (l/p/y)	
	Stable Situation	Emergency Situation
Wet condition, degradable anal material is used.	40	60
Wet condition, non-degradable anal material is used.	60	90
Dry condition, degradable anal material is used.	60	90
Dry condition, non-degradable anal material is used.	90	135



Determining Location

Pit excavation/disposal system

Laying of slab and foundation

Pit excavation

• The suggested shape of pit is cylinder

$$V = \pi r^2 h$$

$$\pi = 3.14$$

r = radius

h = high (means the depth of the pit)

Sample $V = 0.09 \text{ m}^3$, $r = 0.4 \text{ m}$

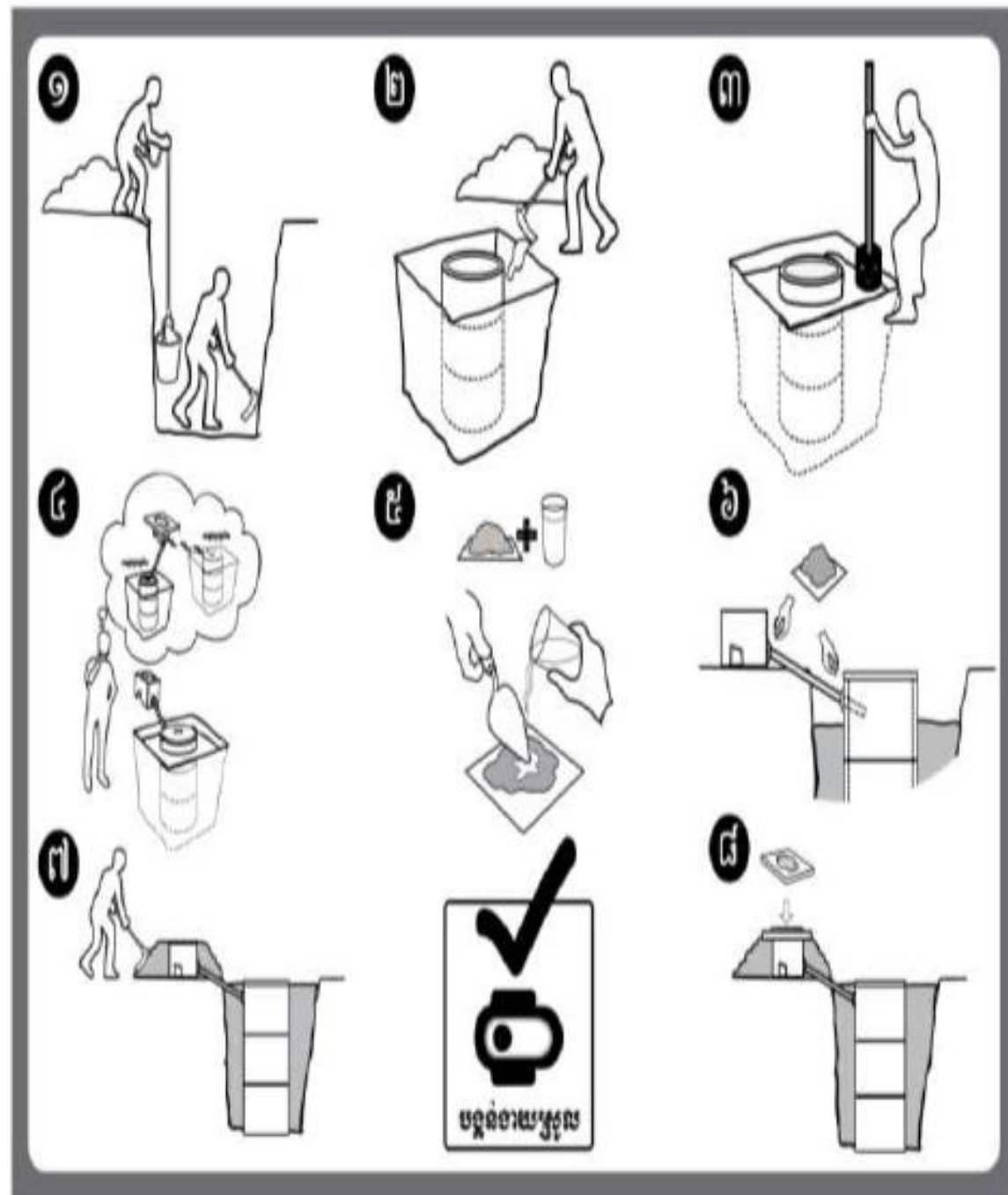
$$0.09 = (3.14 \cdot (0.4)^2) \cdot h$$

$$0.09 = (3.14 \cdot (0.16)) \cdot h$$

$$0.09 = 0.5024 \cdot h$$

$$h = 0.09 : 0.5024$$

$$= 0.17 \text{ m}$$





Concrete Slab

1 part of cement: 2 part of sand : 3 or 4 parts of aggregate

Thickn ess (mm)	Steel diam eter	Spacing of steel Bars (mm) for minimum slab span				
		1m	1.25 m	1.5m	1.75 m	2m
65	6	150	150	125	75	50
	8	250	250	200	150	125
80	6	150	150	150	125	75
	8	250	250	250	200	150

Pit Lining

Soils that require lining

Soft sand and Gravel

Unconsolidated Soil

Filled land

Compressed mud stone and shales

Soils doesn't require lining

with significant clay content

Most consolidated sedimentary rocks

With high proportion of iron oxide (laterites)

Lining Materials

Wood

Bricks/stone

Concrete blocks

Mud blocks

Bamboo

- Tyre
- Oil Drum
- Ferro cement
- Iron sheet
- Concrete ring
- Etc.



Superstructure Materials



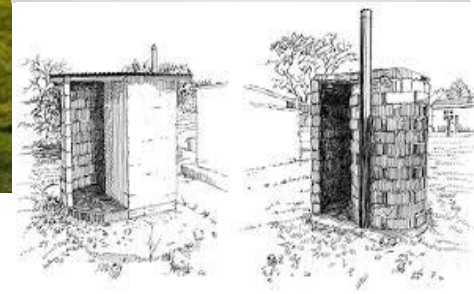
Wood

Bamboo

Steel/PVC pipe

Pre-fabricated Materials (rapid latrine)

Other local available materials





Sphere Standards for excreta disposal

Safe disposal of human excreta creates the first barrier to excreta-related disease, helping to reduce disease transmission through direct and indirect routes. Safe excreta disposal is, therefore, a major priority and in most disaster situations should be addressed with as much speed and effort as the provision of a safe water supply. The provision of appropriate facilities for defecation is one of a number of emergency responses essential for people's dignity, safety, health and well-being.

Excreta disposal standard 1: Environment free from human faeces

- The environment in which the affected population lives is free from human faeces
- All excreta containment measures, i.e. trench latrines, pit latrines and soak-away pits, are at least 30 metres away from any groundwater source. The bottom of any latrine or soak-away pit is at least 1.5 metres above the water table
- In flood or high water table situations, appropriate measures are taken to tackle the problem of faecal contamination of groundwater sources
- Drainage or spillage from defecation systems does not contaminate surface water or shallow groundwater sources
- Toilets are used in the most hygienic way possible and children's faeces are disposed of immediately and hygienically



Sphere Standards for excreta disposal

Excreta disposal standard 2: Appropriate and adequate toilet facilities

•Toilets are appropriately designed

- way as to minimise security threats to users
 - degree of privacy
 - easy to use and keep clean and do not present a health hazard
 - allow for the disposal of women's menstrual hygiene materials and provide women with the necessary privacy for washing and drying menstrual hygiene materials minimise fly and mosquito breeding
- maximum of 20 people use each toilet
 - Separate, internally lockable toilets for women and men are available in public places, such as markets, distribution centres, health centres, schools, etc.
 - Toilets are no more than 50 metres from dwellings
 - Use of toilets is arranged by household(s) and/or segregated by sex
 - All the affected population is satisfied with the process of consultation and with the toilet facilities provided and uses them appropriately
 - People wash their hands after using toilets and before eating and food preparation



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Hand washing facilities Criteria

Location: the hand washing facility should be located near the food preparation facilities, canteen and defecation place.

Materials: it should have soap, ash, mud, or other hand washing agents and hygienic materials for drying hands after washing.

Access: Should be easy to use and accessible by all population groups including children, elderly and disabled. Also has good access to clean water.

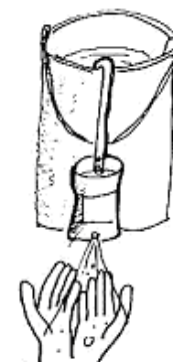
Use: if the water used by the facilities is not safe drinking water, the users should be made aware that the water is not safe for consumption and only used to wash hands.



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Facilities samples for Hand Washing



dipper with a hole



cistern with valve



hollowed fruit



recycled container



a 'conventional' tap



with a bowl

The little invention provides running water for hand washing for practically no cost at all. Except for the bottle no special materials, tools, or skills are required.

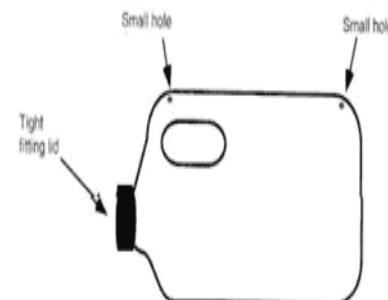
NOTE
The lid needs to be tight fitting. If not the bottle will lose its water when in horizontal position.

Support of wood or bricks

Horizontal position
No water coming out as holes are at the top.

NOTE
If only round bottles are available, the platform/shelf will need to have a corresponding rounded shape.

Vertical position
A fine jet of water comes out of the bottom hole. The top hole is an air intake, which is required for an even flow unless you open the lid slightly



With a sharp object like a nail, make a small hole close to the bottom (the water outlet) and another further up (the air inlet). The size of the bottom hole must correspond to the amount of water you would like to receive.

Drawing by Jaap Zomerplaag



Drainage

Prevent erosion

Prevent pollution of water source

Prevents vector breeding and other diseases caused by standing water

- *Approx. 2% of slope is needed, means 2 meters drop every 100 meters of drainage*

Disposal Technical options

Disposal into water courses

Directly dispose to the river or stream

Infiltration techniques

Using soakaway pit to infiltrate the water into the soil

Evaporation techniques

Using shallow pool to let the water evaporate (impermeable soil)

Evapotranspiration techniques

As irrigation water for plants



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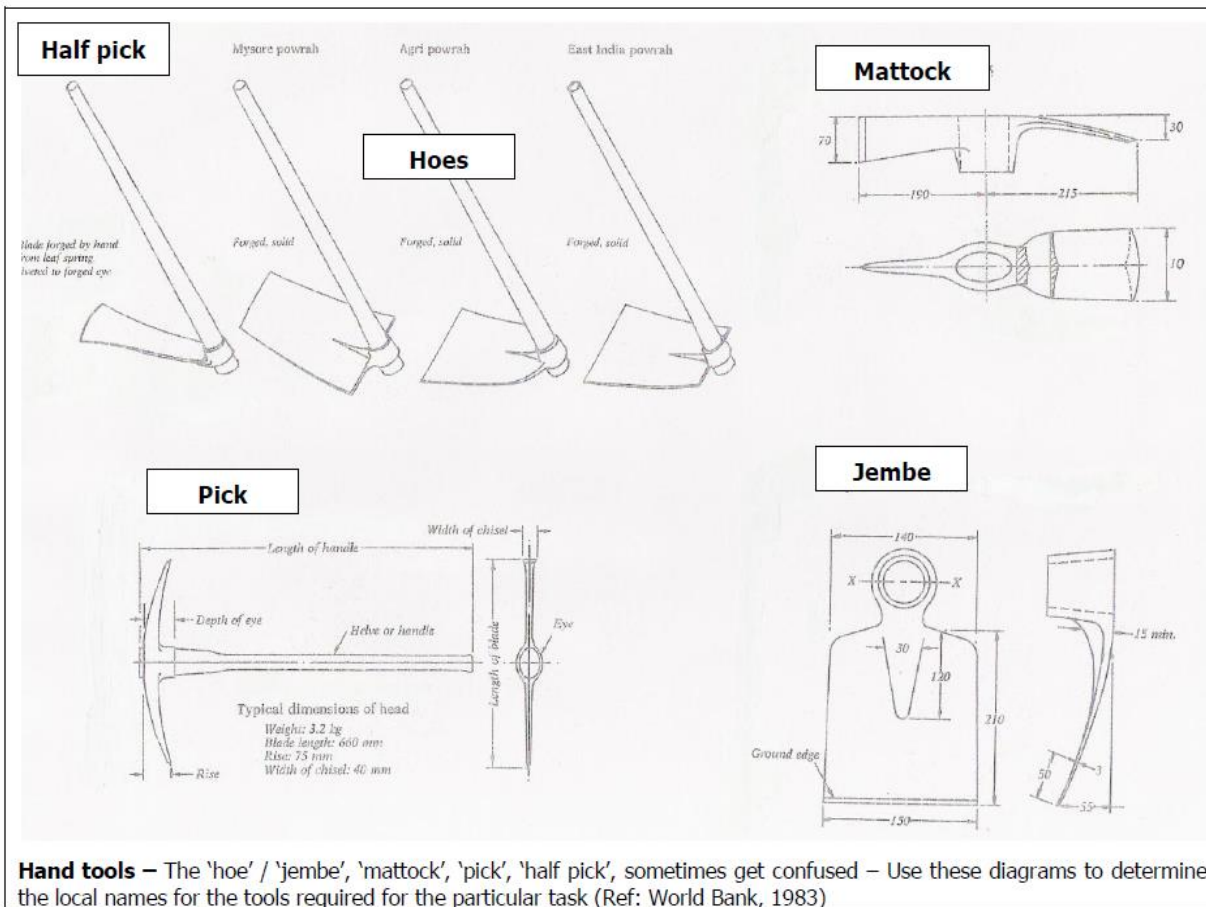
Drainage

The purpose of surface water drainage is:

1. To remove water safely and effectively from living areas and hence improving the living environment.
2. To prevent standing water, flooding and erosion.
3. To ensure that vehicular and pedestrian access is possible at all times, particularly for access in medical emergencies.



Tools for drainage construction





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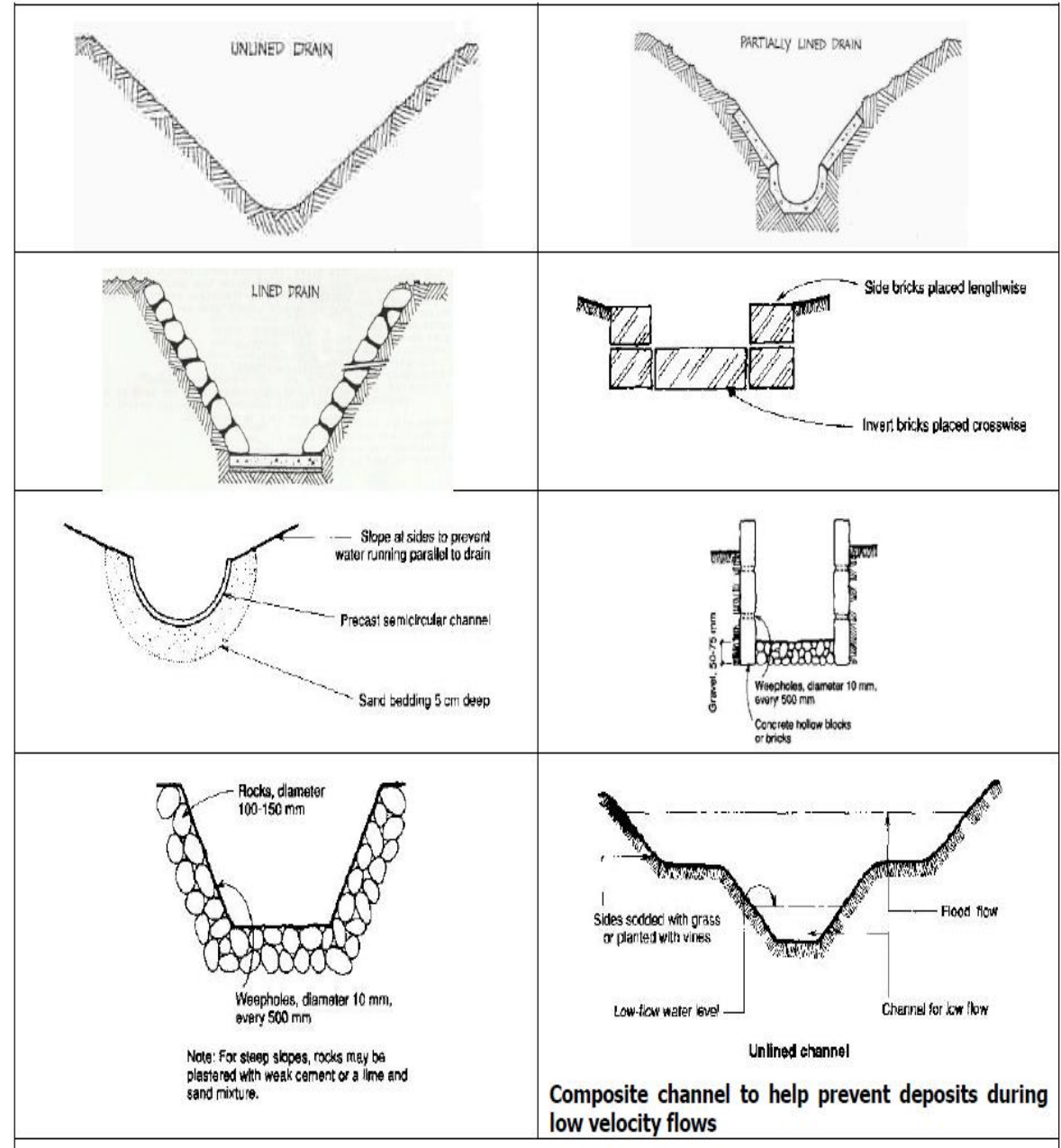
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Simple drainage channel designs





Drainage





Sphere Standards for Drainage

Surface water in or near settlements may come from household and water point wastewater, leaking toilets and sewers, rainwater or rising floodwater. The main health risks associated with surface water are contamination of water supplies and the living environment, damage to toilets and dwellings, vector breeding, and drowning. Rainwater and rising floodwaters can worsen the drainage situation in a settlement and further increase the risk of contamination.

Drainage standard 1: Drainage work

People have an environment in which health risks and other risks posed by water erosion and standing water, including stormwater, floodwater, domestic wastewater and wastewater from medical facilities, are minimised.

Water point drainage is well planned, built and maintained. This includes drainage from washing and bathing areas as well as water collection points and hand washing facilities

There is no pollution of surface water and/or groundwater sources from drainage water.

Shelters, paths and water and sanitation facilities are not flooded or eroded by water .

There is no erosion caused by drainage.



Solid waste management

Immediate response

Activities should be prioritised according to present and future health hazards of different waste types and sources. Activities are likely to focus on clearing of existing scattered waste and managing waste from households and markets.

On-site household disposal

Suitable where space is not too limited and where waste has a high organic content (as it will decompose and reduce in volume). Also useful in areas where access is difficult.

Pits should be 1m deep and be frequently covered with ash/soil to prevent access to waste by insects and rats, and to reduce odours.

Community pits

Must be located within 100m walking distance of any household (SPHERE Guidelines).

As a rough guide, 50 people will fill 1m³ of a pit each month, depending on generation rates and density.

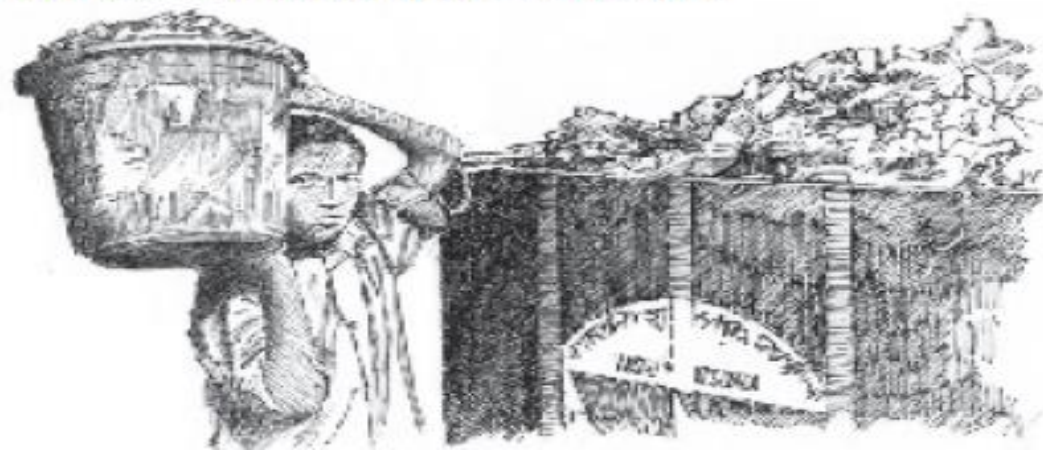
These are rapid to implement and requires little operation and maintenance. Note that some people may object to walking 100m to deposit waste.

Collection and storage

In some situations on-site, community pits may be a suitable medium-term solution, whilst in others it will be necessary to devise ways of removing and disposing of waste. This will usually involve the following:

- storage in the house;
- deposition at intermediate storage point; and
- collection and transport to final disposal.

In the home, plastic bags or a small container with a lid make suitable storage containers.





Intermediate solutions

Community issues

Consultation. It is useful and important to consult potential users of a waste management system before and during design and implementation.

Education. It is important for participating communities to understand how good solid waste management can be achieved and can benefit their health.

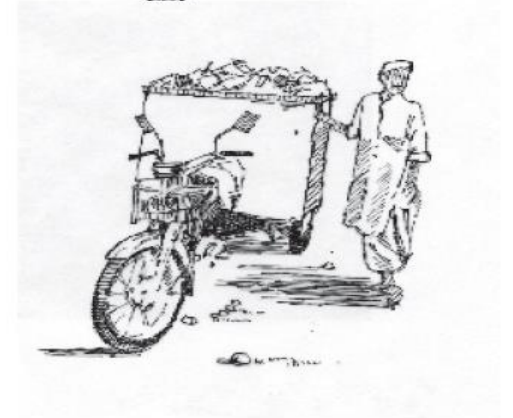
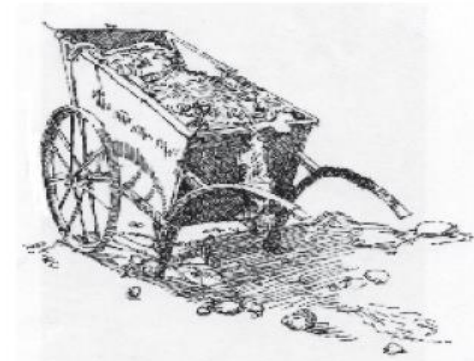
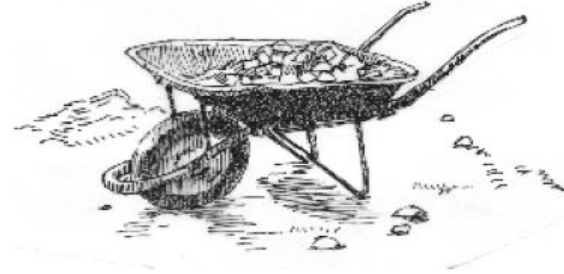


Transport

When selecting suitable vehicles, waste generation rates and densities need to be considered along with:

- areas they need to access (e.g. narrow alleys or uneven paths); and
- distance between collection and disposal points.

For example, a wheelbarrow could collect waste from approximately 50 individuals before requiring emptying.





Sphere Standards for Solid waste management

Solid waste management is the process of handling and disposal of organic and hazardous solid waste which, if unattended appropriately, can pose public health risks to the affected population and can have a negative impact on the environment. Such risks can arise from the breeding of flies and rodents that thrive on solid waste

Solid waste management standard 1: Collection and disposal

- All households have access to refuse containers which are emptied twice a week at minimum and are no more than **100 metres from a communal refuse pit**.
- All waste generated by populations living in settlements is removed from the immediate living environment on a daily basis, and from the settlement environment a minimum of twice a week
- At least one **100-litre refuse container is available per 10 households**, where domestic refuse is not buried on-site
- There is timely and **controlled safe disposal of solid waste** with a consequent minimum risk of solid waste pollution to the environment
- All **medical waste** (including dangerous waste such as glasses, needles, dressings and drugs) is isolated and disposed of separately in a correctly designed, constructed and operated pit or incinerator with a deep ash pit, within the boundaries of each health facility



Sphere Standards for Hygiene promotion

Affected men, women and children of all ages are aware of key public health risks and are mobilised to adopt measures to prevent the deterioration in hygienic conditions and to use and maintain the facilities provided

Hygiene promotion standard 1: Hygiene promotion implementation

All user groups can describe and demonstrate what they have done to prevent the deterioration of hygiene conditions

All facilities provided are appropriately used and regularly maintained.

All people wash their hands after defecation, after cleaning a child's bottom, before eating and preparing food.

All hygiene promotion activities and messages address key behaviours and misconceptions and are targeted at all user groups.

Representatives from all user groups are involved in planning, training, implementation, monitoring and evaluation of the hygiene promotion work.

Care-takers of young children and infants are provided with the means for safe disposal of children's faeces



Sphere Standards for Hygiene promotion

The disaster-affected population has access to and is involved in identifying and promoting the use of hygiene items to ensure personal hygiene, health, dignity and well-being.

Hygiene promotion standard 2: Identification and use of hygiene items

Women, men and children have access to hygiene items and these are used effectively to maintain health, dignity and well-being.

All women and girls of menstruating age are provided with appropriate materials for menstrual hygiene following consultation with the affected population

All women, men and children have access to information and training on the safe use of hygiene items that are unfamiliar to them

Information on the timing, location, content and target groups for an NFI distribution is made available to the affected population

The safety of affected populations and staff is prioritised when organising an NFI distribution



Sphere Standards for Hygiene promotion

Basic hygiene items: A basic minimum hygiene items pack consists of water containers (buckets), bathing and laundry soaps, and menstrual hygiene materials.

10–20 litre capacity water container for transportation	One per household
10–20 litre capacity water container for storage	One per household
250g bathing soap	One per person per month
200g laundry soap	One per person per month
Acceptable material for menstrual hygiene, e.g. washable cotton cloth	One per person

Menstrual hygiene: Provision must be made for discreet laundering or disposal of menstrual hygiene materials.

Special needs: Some people with specific needs (e.g. incontinence or severe diarrhoea) may require increased quantities of personal hygiene items such as soap. Persons with disabilities or those who are confined to bed may need additional items, such as bed pans. Some items may require adaptation for sanitary use (such as a stool with a hole or commode chair).

Additional items: Existing social and cultural practices may require access to additional personal hygiene items. Subject to availability, such items (per person per month) could include:

- 75ml/100g toothpaste
- one toothbrush
- 250ml shampoo
- 250ml lotion for infants and children up to 2 years of age
- one disposable razor
- underwear for women and girls of menstrual age
- one hairbrush and/or comb
- nail clippers
- nappies



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