

Manual Desludging Hand Pump (MDHP)

MDHP is one of the means to desludge (empty) a septic tank or cincins. A septic tank is a sealed watertight tank where the wastewater (black water) is retained to permit separation between solid and liquid particles. A cincin is a ring-shaped precast concrete that commonly use constructing wells or containing faecal waste, particularly in Indonesia. Many of septic tanks and or cincin's were built in remote areas where mechanical desludging services are not available or accessible.

Equally in urban contexts the mechanical desludging services incur access problems in highly density areas, therefore necessitating the need for a small and mobile unit. A MDHP is one of the ways, which could respond to faecal sludge collection problems effectively in congested urban and remote rural settings.

There are four main initiatives that need equal attention when considering the manual desludging pump. First is with regards to the environmental feasibility, secondly health & safety, thirdly the social acceptance and lastly the technical feasibility.



Figure 2. Valve



Figure 3. Valve with screen

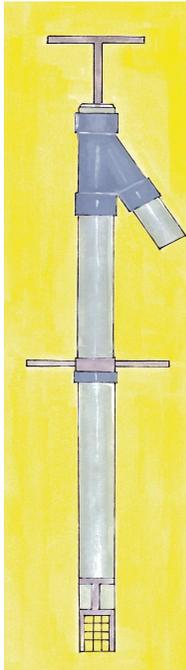


Figure 1. Manual Desludging Hand Pump (MDHP)



Figure 4. Foot step

Environmental Feasibility

The MDHP is suitable for septic tank / cincin located in remote rural and urban congested areas*), and where there is no access to desludging services. The MDHP fits well in rural settings where the dwellings are scattered therefore permitting easier siting of sludge containment than the urban setting, where it will be more difficult, or near impossible. MDHP in urban settings needs to be closely managed to prevent illegal dumping, by establishing a designated communal sludge containment site.

The MDHP ideally should be used in areas where the groundwater level is low (min. 2 m).

The sludge containment should be placed at minimum distance of 30 m from the nearest water source to prevent groundwater contamination either through infiltration or surface run off. It is best to carry out the desludging activities during the dry season to minimise the risks of contamination to the water source.

Note:

¹ MDHP can also be used in urban congested areas where it supposed to be supported by desludging services to convey the sludge to the sludge-dumping site, since it is usually difficult to find available on site dumping site in urban areas.

Health and Safety Precautions

Sludge from the septic tank contains harmful organisms such as helminths, protozoan, virus, bacteria, etc that may give serious health impact. Thus, health and safety are highly considered in conducting desludging activities. Operating MDHP at least it takes 2(two) operators and 1(one) assistance.

Mainly, there are only 3 (three) things that need to be considered in carrying out desludging activities using MDHP:

1. Protect yourself

Protect body parts that might be intact with the sludge during desludging activities. Wear protection tools: overall outfit, rubber gloves, rubber boot, and masker.

2. Clean the MDHP after use

Wash the MDHP with soap/disinfectant and rinse all the parts that have been in contact with the sludge during the desludging activity.

3. Personal hygiene

Ensure that all personals carry out the necessary precautions after handling sludge – hand washing, showering using soap and or disinfectant.

How to use MDHP:

1. Inspection

- Ensure that the latrine has no problems with piping blockages that leads the user to believe the septic tank is full, as the WC pan is not flushing.
- Observe condition septic tank and area around it, make sure there is space area for dumping the sludge
- Open the manhole access cover and examine the depth of the sludge in the septic tank.
- If it is ascertained that the septic tank is full of sludge then prepare all the required equipments.

2. Site Preparation

- Estimate the sludge volume by measuring the sludge depth, width and length of septic tank and calculate the sludge volume.
- Dig a pit to contain collected sludge based on estimated sludge volume. Ideally, the sludge containment hole should be located near the septic tank, as it will necessitate means of transport if it is located too far away from the dwelling.
- The designated pit should be located a distance of 30 m from local water sources, and the bottom of the pit should be at least 2m from the local groundwater level (wet season).
- If there are several septic tanks to be desludged at the same time. It is best to use 1 (one) common sludge containment site to localise the sludge.

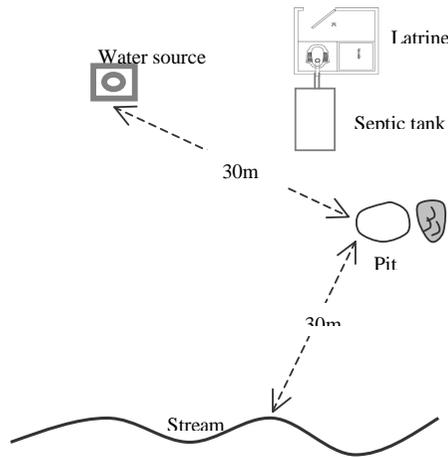


Figure 5. Dumping location plan

3. Required tools/equipments

There are several important tools/equipments to carry out desludging activities:

- A Manual Desludging Hand Pump (MDHP)
- A bucket (min 50 litres)
- Hoe/shovel
- 2 (two) pairs of rubber gloves
- 2 (two) masks
- 2 (two) pairs of rubber boots
- Overall protecting suite e.g. raincoat

4. Pumping Method:

- Prepare the bucket and place near located over the manhole
- Place the MDHP into the manhole then ensure the discharge pipe enters the bucket.
- Step on the MDHP's foot-step to stabilise the pump while holding the MDHP's handle with both hands
- Start pumping the sludge by lifting the handle with both hands.
- After the bucket is almost full, stop pumping the sludge. Put the lid on the bucket.
- Dump the sludge into the sludge containment site. Use the same bucket to repeat the pumping activities.

- Pump the sludge until no more sludge can be discharged
- Note: Sludge inside the septic tank will remain of +/- 10 cm to be used in the next decomposition process.

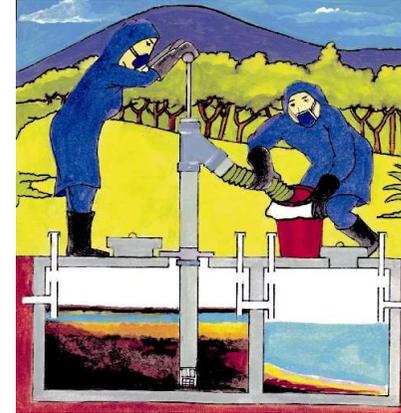


Figure 6. Pumping septic tank

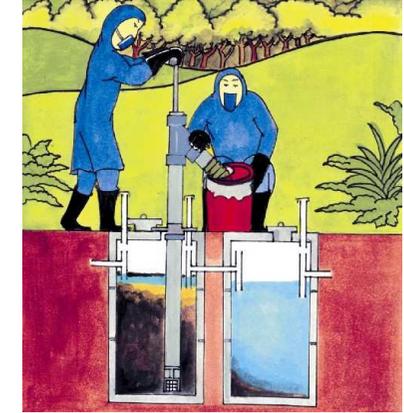


Figure 7. Pumping septic tank

5. Sludge Containment Method

- Choose a location with minimum distance of 30 m from the nearest water source, and the bottom of the sludge containment pit should be at least 2 m deep from local groundwater level (wet season).
 - Dig a hole to contain the collected sludge according to the estimated sludge volume.
 - Fill back the hole once it fills by the sludge using the excavated soil.
- Mark the sludge containment location so it could be easily identified. E.g. by put a stick or plant some vegetation (banana tree).



Figure 8. Sludge dumping

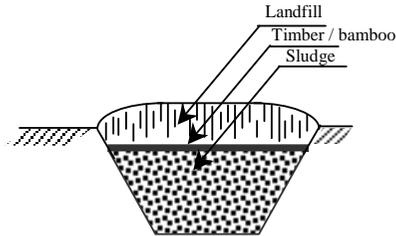
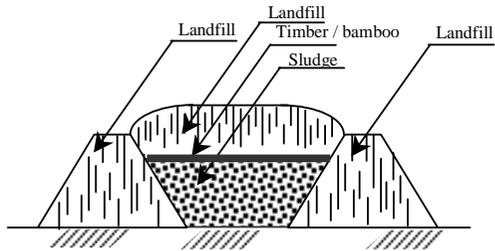


Figure 10.

Pit cross section for high water table

Figure 9.

Pit cross section for low water table

6. Maintenance

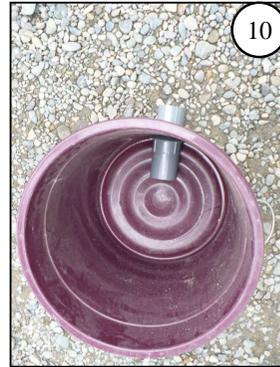
- Bring all tool kits near pit area for cleaning /sterilization
 - Wash/cleanse the MDHP after use by dismantle the pump parts and rinse them using soap/detergent/disinfectant. Ensure that the suction plates are clean from dirt.
 - Lubricate the pipe and suction plates using oil or other form of lubricants.
- Keep the MDHP in a dry and shaded place (protecting from a direct sunlight), particularly if the main components of the MDHP are made from PVC.

Further Information

- Oxfam GB Septic tank guidelines
- Metcalf & Eddy, *Wastewater Engineer – Fourth edition*, Mc Graw Hill
- WHO guidelines for the safe use of wastewater, excreta and grey water Volume 1, Policy And Regulatory Aspects
- WHO guidelines for the safe use of wastewater, excreta and grey water Volume 2, Wastewater Use In Agriculture
- WHO guidelines for the safe use of wastewater, excreta and grey water Volume 3, Wastewater And Excreta Use In Aquaculture

Step of installing MDHP







Operatioanl and Maintenance of MDHP





