

9. INTRODUCTION TO NON-WATER CARRIAGE SANITATION SYSTEMS

This is the oldest system by which garbage or dry refuse of a town is collected in dustbins, placed along the roads, from where it is conveyed (trucks or covered carts), once or twice a day to the points of disposal.

1. All the for filling, the noncombustible portions of garbage (sand dust clay) are used for filling the low-level areas to reclaim land for further development of town.
2. The combustible portion of garbage (dry leaves, waste paper, broken furniture etc) is burnt.
3. The decayed fruits and vegetables, grass and other such things are first dried and then disposed of by buring or in the manufacture of manure (substance especially dung as fertilizer)

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Human excreta or night soil is collected separately in privies or conservancy latrines. The liquid and semi liquid wastes are collected in separate pans in same latrine, from where they are removed through human agency and after removal night soil is taken outside the town in closed animal drawn carts, trucks and is buried in trenches. After 2 to 3 years the buried night soil is converted in to excellent manure, which can be used for growing crops.

Waste Disposal in Non-Sewered Areas

In case of poor countries , it is not possible to have the water carriage system in all the towns, villages and cities in the rural areas, seated localities and isolated colonies which are not served by the piped water supply, always have a shortage of water, due to which the quantity of wastewater also small . The wastewater from such areas therefore can be easily disposed be developed for the safe collection and disposal of human excreta from such areas under such circumstances. Conservancy is chosen and in such system human excreta is collected in various types of privies

Sewerage system (wastewater collection and treatment) is not available for the disposal of sanitary wastes in most towns and all rural areas of our country. Therefore, privies are in use for collection and disposal of night soils. The types of privies that may be adopted are the following:

- Bore -hole latrines
- Pour- flush latrines
- Conventional unimproved pit latrines
- Ventilated improved pit latrines(VIP)
- Double tank latrines
- Septic tank latrines

Aqua privy
Chemical toilets
Working type privy

1. Borehole Latrine

- In bore-hole latrine a hole usually not than 45 cm in diameter and 4 m deep is constricted.
- The hole generally penetrates in the ground water table---. This permits anaerobic digestion of faecal solids and longer use of the pit.
- The top the hole is ten protected by a slab with slanting foot rest adjacent to a slot through which the excreta falls in the hole.
- The major disadvantage of a borehole latrine is pollution of the ground water.

2. Pour Flush (PF) Latrine

- Such toilets comprise water latrines connected directly offset pits
- Approximately 1-2 liters water poured by hand to flush the excreta in to the pits.
- The pit is provided with open brickwork or masonry with suitable openings for dispersion of the effluent to the surrounding subsoil. The pit, therefore, serves as a combined setting, digestion and dispersion tank.
- Usually two pits are constructed in parallel so that when the first pit is full, the second pit is put in to operation, when the second pit is nearly full the first can be emptied and the toilet connected to it. A pair with alternating pits can, therefore, be used indefinitely
- The excavated soil from the pit can be applied on land as manure.
- The PF may be installed inside the house since it is free from odors and fly & most nuisance.

3. Conventional Unimproved Pit Latrine

- ❖ The most commonly observed technology around the world, especially rural areas is the pit latrine,
- ❖ A pit latrine comprises of the pit, squatting plate, and the toilet super structure.
- ❖ The pit is simply a hole dug into the ground to receive the excreta
- ❖ When the pit is nearly full, the super structure and the squatting plate are removed and the pit is sealed with soil from a new pit dug nearby.
- ❖ The unimproved pit latrine described above has both odor and insect problems.

4. Ventilated Improved Pit Latrine (VIP)

- The undesirable features of the unimproved pit latrine can be eliminated in the VIP latrine where the external vent pipe is provided to take the foul gases.
- The top of the vent pipe should be at least 30 cm above the high point of a slopping roof with a conical roof the vent pipe should extend as high as apex of the roof.
- Wind passing across the top of the pipe causes an up draught, which removes bad smells. If the latrine is sited where there is no wind, up draught may be encouraged by putting the pipe on the sunny side of the latrine and painting the outside of the pipe black (unless the pipe itself is black). Air in the pipe is heated and rises.

- Any fly which hatch in the pit try to move towards the light; if the superstructure is dark , the fly go towards the top of vent pipe , where , it sees day light.
- It should be noted that in areas where water is carried from distant water points or surface sources, the vip latrine is probably a better choice . For example, thousands of VIP latrines have been constructed in the most marginal areas of the city of Karachi, Pakistan.

5. Double Vault Composting Toilet

- This latrine is principally found in vietnam and some extent china ..it is particularly suited to densely populated areas where the water table high.
- In double vault and the one not in use is sealed so as to create anaerobic conditions the fecal matter is composed and after a minimum sealed off period of 45 days , rendered in to a dark gray harmless, odorless ,nitrogen rich organic manure which is then removed .
- Urine is prated from fecal mater by the use of channel in the floor, and around off in to a separate container.
- The double viable latrine is now being promoted by un chef in Bangladesh, Burma and Egypt.

6. Aqua Privy

- ☞ This is made on the similar principle as septic tank. it consists of a water tight tank and a squatting plate above it . a drop 10 cm in diameter goes into the tank below water level.
- ☞ Like in the septic tank anaerobic digesting takes place with much reduction of solid volume .the effluent is passed to a seepage pit.
- ☞ The capacity of the tank may be provided at the rate of 0.03 to 0.05 m³ per capita.

7. Chemical Toilet

- Chemical toilet usually consists of seat attached to metal cylindrical tank in which a strong solution of caustic soda in water has been put.
- The solution of caustic soda sterilizes and liquidifies the excreta in the tank and requires replacement only at interval of several months.
- The content of chemical toilet when emptied is liquid , sterile and practically free from odor .the discharge can bee used as fertilizer.
- The tank can be 74 cm in diameter and 150 cm long for one seat. And with additional 90 cm length for each extra seat.

9. Working Type Privy

It consists of plat from with a centrally located hole and a squatting arrangement .under the plat from below the whole a container is placed. Excreta gets temporarily collected in the container. From there it may be collected by municipality truck and disused off.