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CONSTRUCTION OF DRAINS/ SEWERS

16.1 INTRODUCTION

Drains are made to allow the exit for rain water. These are of two types:- 1. open and 2. covered. For the out let of house hold water, an open drain is constructed in front of the house, which takes away the house hold water away to a long distance.

16.2 OBJECTIVES

After going through this lesson you will be able to:

- explain the reason for drain construction;
- differentiate between drain and sewer;
- describe the process of giving specific slope, while constructing drains and sewer and digging of the trench;
- describe various parts of pipe;
- explain about manholes and its applications;
- explain sanitary fittings used in the buildings.

16.3 DRAINS

For the outlet of house hold water, an open drain is constructed in front of the house which takes away the water to a long distance. Since there is a possibility of getting water deposited in the open drains and also there is a possibility of breeding

mosquitoes therefore as far as possible, covered drains should be made. In the colonies of the city, underground sewer lines are laid besides constructing the rain drains and bigger drains. These are normally made of R.C.C. pipes.

16.4 THE PROCESS OF GIVING SPECIFIC SLOPE WHILE DIGGING THE TRENCH DURING THE CONSTRUCTION OF DRAIN OR SEWERS

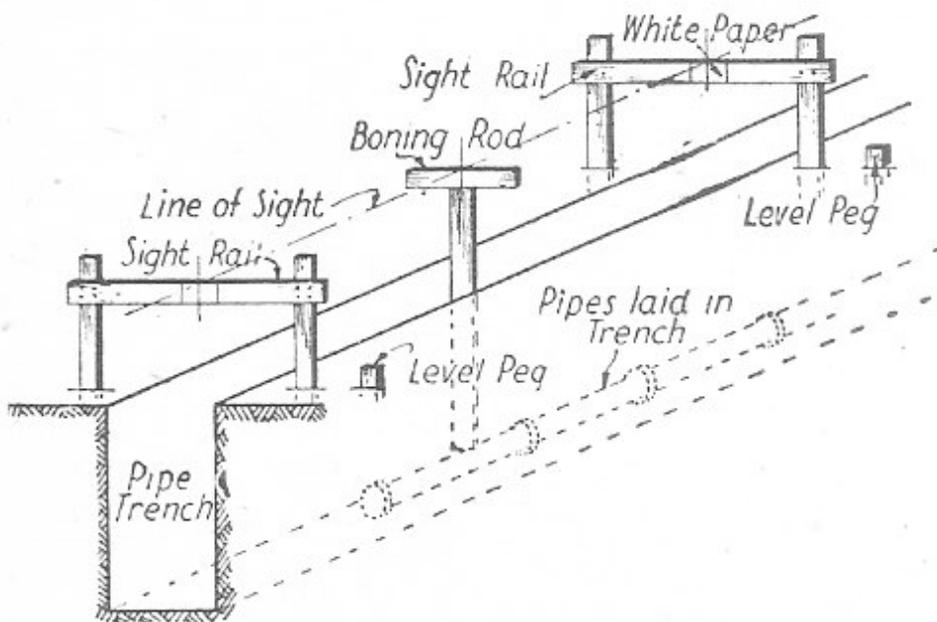


Fig 16.1: The process of examining the digging of trench

Trench: The earthen drain which is dug for putting pipe is called trench. This should be much more than the thickness of the pipe so that work can be done easily. Pipes should be put in a straight line and in the same grade as shown in the map.

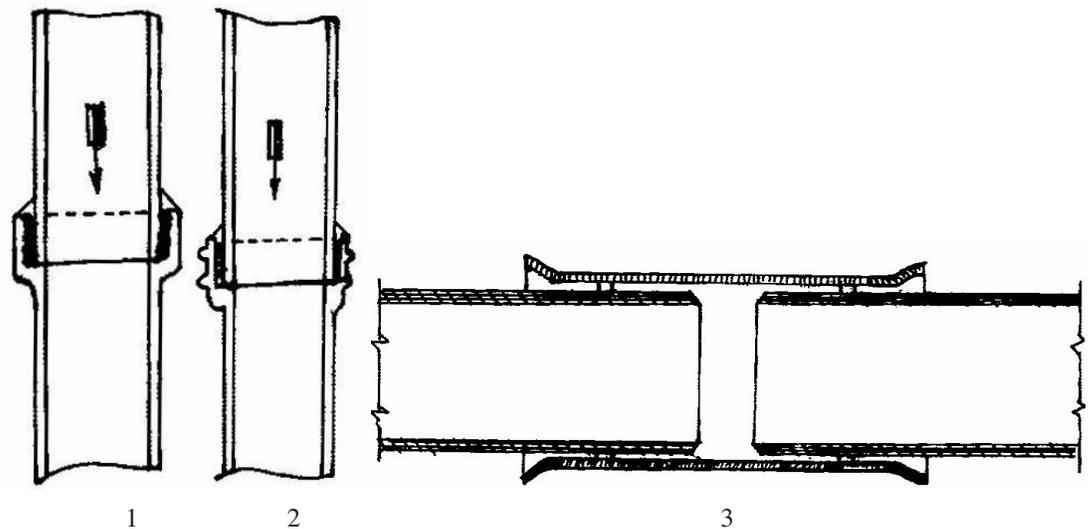
Drains are open and sewers are covered. Sewers are generally made by joining pipes. Since the drains are not covered, cleaning can be done easily and manholes are constructed for the same in the sewers. Design of slope of the bottom of the trench which is to be dug for sewers and open drains, should be in exact proportion. In case of faults, flow of water is obstructed and there is no other way out but to construct the faulty portion once again. Therefore at a specific height A from the bottom (which can be more or less according to the depth of trench), strong woods are fitted on both sides of the trench and then site rails

are fitted over and across the trench at a distance of about 20 metres each (see Fig. 16.1).

For examining the level of the bottom, boring rods are fitted controlling the alignment from over the side rails. The level below this are marked by putting level pegs.

16.5 DESIGN OF PIPE

There is a socket on the front end of the pipe and the rear end is called spigot. The spigot of the next pipe is fixed in the socket of the previous pipe. In this sequence pipe line is laid and later on the empty space left between each socket and fixed pipe is fitted with cement mixture, which is made in 1: 2 ratio. The mixture should be fitted tightly. After the entire pipe is laid down, trench is filled compactly with the soil.



1. Porcelene pipe to porcelene pipe 2. Iron pipe to iron pipe 3. P.V.C. pipe to P.V.C. pipe

Fig. 16.2: Design of pipe and joint

16.6 MANHOLES

A manhole is constructed at the point where the grade, direction or size of the pipe changes. The distance between each manhole varies from 60 to 150 metres and it depends on the pipe line/sewer line grade (slope).

Generally manholes are of three types. Manholes are used for cleaning the sewers

and connecting small sewer/house sewers to the bigger sewers. (see fig 16.3)

The chambers which are of size 90 cm × 80 cm, are covered with a lid of cast iron of the size 455 × 610 mm. similarly 120 cm × 90 cm manholes are covered with round iron lid of 500 mm diameter.

House connecting chambers of 90 cm × 80 cm are build inside the houses. Manholes appear in the middle of the rods. Foot rest are put inside these holes in order to get down into it. These are put at the intervals of 30 cm and are not in a straight line but are put side by side.

Similarly if a deep drain comes in the middle of the road, then rod gali traps are build at that point.

Special precautions must be taken while installing sanitary fittings inside the houses and putting joints in the sewer lines, so that when used, there should be no leakage.

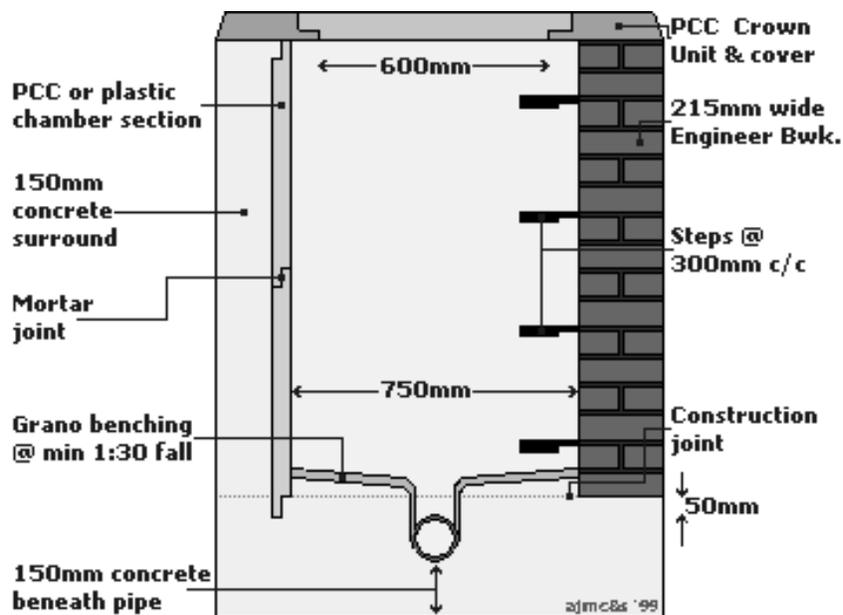


Fig. 16.3: Manhole

16.7 VENT SHAFT

The point where the sewer line starts, a chamber is constructed and a pipe is erected there. Similarly at those points from where there is a slope or height

starts in the sewer line, a pipe is erected. Its major advantage is that sewer gases are released through this.



Fig. 16.4: Vent Shaft

16.8 SANITARY INSTALLATIONS

Sanitary installation work include fittings of Indian or English pots, wash basins, urine pots, wooden sheets (over the pots), water sistern, brackets etc. All these things should be used according to the standards set by I.S.I.

Indian W.C.: It is made of glazed porcelene and its size varies from 21 to 23 inches. There is a P or S type of band lies at its lower end and below this there is a 5 cm vent arm. It is set by making a concrete base and it is joined with cement, sand (1: 10 mixture with trap.



(a) Orissa pattern W.C.



(ii) Indian W.C.

Fig. 16.5

Flushing Cistern: In order to clean the pot with water, a small tank, which is of the shape of a basket, is used. There is a push button attached on its top and on pressing this button, water comes out of the tank and takes away the human waste along with it. This is called flushing Cistern. Plastic Cisterns are also used these days.



Fig. 16.6: Flushing Cistern

European type W.C.: This is also made of porcelene and it is very smooth. Water cistern is attached with this in the backside wall. A P or S type band is attached at the lower end of this.



Fig. 16.7: European W.C.

Wash Basin: It is a pot made of glazed earth which is used for washing hands.



Fig. 16.8: Wash basin

Sink: Pot used for washing utensils.



Fig. 16.9: Sink

16.9 WHAT HAVE YOU LEARNT

- How many types of drains are there and where are they used?
- What is the process of giving specific slope while making drains and sewers?
- What is the purpose of making manhole and where are they constructed?
- What is the material of the pipe which is used in sewer lines?

16.10 TERMINAL QUESTIONS

1. With the help of a diagram, explain the use and objective of boning rod and site rail.
 2. What precaution must be taken while joining the sewerage connection of the house to the manhole?
 3. Why are the main holes built?
 4. Explain the objective of the vent pipe with the help of a diagram.
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