4.3 SEWER MATERIALS

Sewer is a pipe or conduit carrying sewage. Sewers are usually not flow full (Gravity Flow). The full flowing sewers are called force main as the flow is under pressure.

Following are types of sewer according to material

1. Asbestos Cement (AC) Sewer
2. Brick Sewer
3. Cement Sewer
4. Cast iron (CI) Sewer
5. Steel Sewers
6. Plastic Sewers

1. Asbestos Cement (AC) Sewer

Types of sewer like Asbestos Cement (AC) Sewers are manufactured from a mixture of cement and asbestos fiber. Asbestos Cement (AC) Sewers are suitable for carrying domestic sanitary sewage.

Asbestos cement sewer is best as vertical pipe for carrying sullage from upper floors of multistory buildings (in two pipe system of plumbing).

Advantages of Asbestos Cement (AC) Sewer

1. Smooth
2. Light in weight
3. Can easily be cut, fitted and drilled
4. Durable against soil corrosion

Disadvantages of Asbestos Cement (AC) Sewer

1. Brittle cannot withstand heavy loads
2. They are easily broken in handling and transport.

2. Brick Sewers

These types of sewer (Brick Sewers) are made at site and used for construction large size sewer. Brick Sewers are very useful for construction of storm sewer or combined sewer**.** Nowadays brick sewers are replaced by concrete sewer. Brick sewers my get deformed and leakage may take place. A lot of labour work is required.

Note: To avoid leakage the brick sewer should be plastered.

3. Cement Concrete

i. PCC - for dia upto 60 cm

Suitable for small storm drains. Not durable.

ii. RCC - for dia > 60 cm

They may be cast in situ or precast, resistant to heavy loads, corrosion and high pressure. These are very heavy and difficult to transport.

4. Cast Iron (CI) Sewers

These types of sewer are High strength and durability water tight. Cast Iron sewers can withstand high internal pressure and can bear external load. Cast Iron sewers are suitable for the following conditions.

When the sewage is conveyed under high pressure.

When the sewer line is subject to heavy external load e.g. under railway line

When there is considerable difference in temperature.

5. Steel Sewers

These types of sewer (steel sewers) are Impervious, light, resistant to high pressure, flexible, suitable when;

The sewage is carried under pressure

The sewage has to be carried across a river under waterThe

sewer has to cross under a railway track.

6. Plastic sewers

Nowadays PVC sewers are used for carrying sewage. Plastic sewers are resistant to corrosion. Such types of sewer are light in weight, smooth and can be bent easily. But these types of sewer (Plastic sewers) are having high co-efficient of thermal expansion and cannot be used in very hot areas.

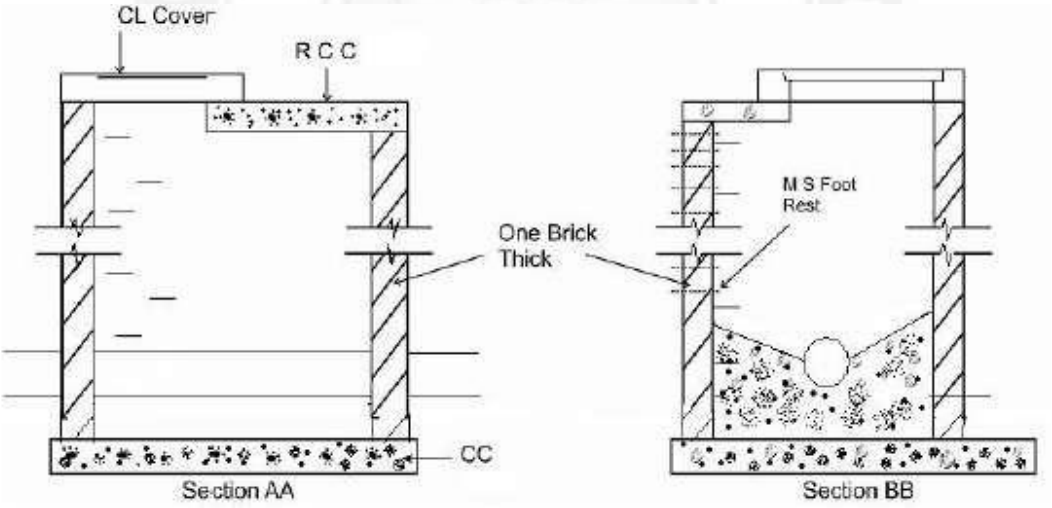
4.3.1 SEWER APPURTENANCES

The structures, which are constructed at suitable intervals along the sewerage system to help its efficient operation and maintenance, are called as sewer appurtenances. These include:

(1) Manholes, (2) Drop manholes, (3) Lamp holes,
(4) Clean-outs, (5) Street inlets (6) Catch basins,
(7)Inverted siphon,

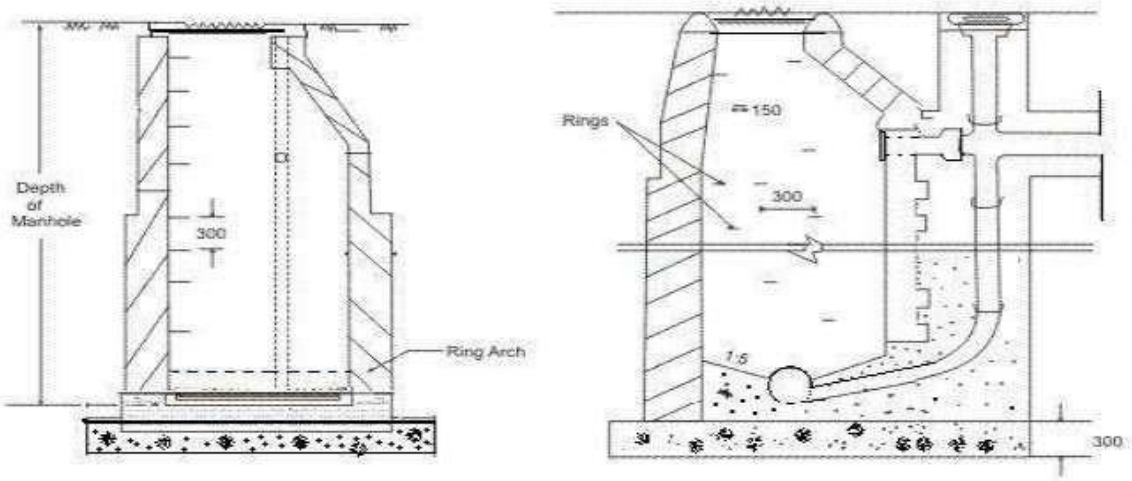
Manholes

The manhole is masonry or R.C.C. chamber constructed at suitable intervals along the sewer lines, for providing access into them. Thus, the manhole helps in inspection, cleaning and maintenance of sewer. These are provided at every bend, junction, change of gradient or change of diameter of the sewer. The sewer line between the two manholes is laid straight with even gradient. For straight sewer line manholes are provided at regular interval depending upon the diameter of the sewer. The minimum width of the manhole should not be less than internal diameter of the sewer pipes plus 150 mm benching on both the sides.



Drop Manholes

When a sewer connects with another sewer, where the difference in level between invert level of branch sewer and water line in the main sewer at maximum discharge is greater than 0.6 m, a manhole may be built either with vertical or nearly vertical drop pipe from higher sewer to the lower one. The drop manhole is also required in the same sewer line in sloping ground, when drop more than 0.6 m is required to control the gradient and to satisfy the maximum velocity i.e., non-scouring velocity.

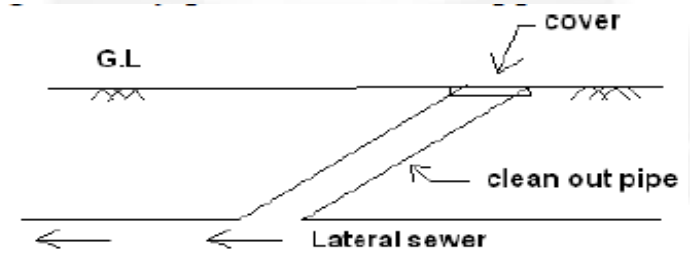


Lamp hole

It is an opening or hole constructed in a sewer for purpose of lowering a lamp inside it. It consists of stoneware or concrete pipe, which is connected to sewer line through a T-junction as shown in the. The pipe is covered with concrete to make it stable. Manhole cover of sufficient strength is provided at ground level to take the load of traffic. An electric lamp is inserted in the lamp hole and the light of lamp is observed from manholes. If the sewer length is unobstructed, the light of lamp will be seen. It is constructed when construction of manhole is difficult. In present practice as far as possible the use of lamp hole is avoided. This lamp hole can also be used for flushing the sewers. If the top cover is perforated it will also help in ventilating the sewer, such lamp hole is known as fresh air inlet.

Clean out

It is a pipe which is connected to the underground sewer. The other end of the clean-out pipe is brought up to ground level and a cover is placed at ground level (Figure 8.8). A clean-out is generally provided at the upper end of lateral sewers in place of manholes.



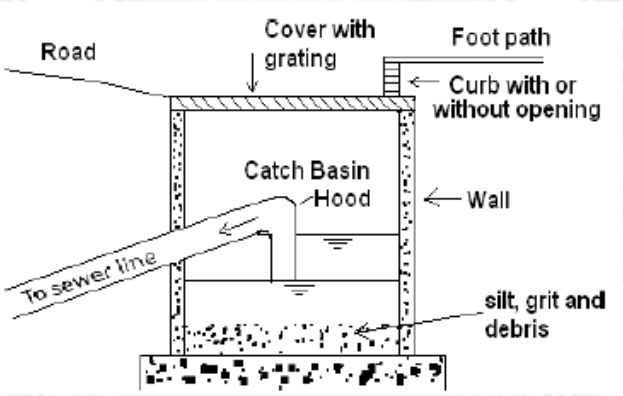
During blockage of pipe, the cover is taken out and water is forced through the clean-out pipe to lateral sewers to remove obstacles in the sewer line. For large obstacles, flexible rod may be inserted through the clean-out pipe and moved forward and backward to remove such obstacle.

Storm water inlets

Storm water inlets are provided to admit the surface runoff to the sewers. These are Classified in three major groups viz. curb inlets, gutter inlets, and combined inlets. They are provided either depressed or flush with respect to the elevation of the pavement surface. The structure of the inlet is constructed with brickwork with cast iron grating at the opening confirming to IS 5961. Where the traffic load is not expected, fabricated steel grating can be used. The clear opening shall not be more than 25 mm. The connecting pipe from the street inlet to the sewer should be minimum of 200 mm diameter and laid with sufficient slope. A maximum spacing of 30 m is recommended between the inlets, which depends upon the road surface, size and type of inlet and rainfall.

Catch basins

Catch basins are provided to stop the entry of heavy debris present in the storm water into the sewers. However, their use is discouraged because of the nuisance due to mosquito breeding apart from posing substantial maintenance problems. At the bottom of the basin space is provided for the accumulation of impurities. Perforated cover is provided at the top of the basin to admit rain water into the basin. A hood is provided to prevent escape of sewer gas.



Inverted Siphon

An inverted siphon or depressed sewer is a sewer that runs full under gravity flow at a pressure above atmosphere in the sewer. Inverted siphons are used to pass under obstacles such as buried pipes, subways, etc. This terminology ‘siphon’ is misnomer as there is no siphon action in the depressed sewer. As the inverted siphon requires considerable attention for maintenance, it should be used only where other means of passing an obstacle inline of the sewer are impracticable.