

ENVIRONMENTAL ENGINEERING

Notes by-

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COLLECTION & CONVEYANCE OF SEWAGE

Method of carrying disposal:-

→ Conservancy system: / Dry system

→ Water carriage system:
 → Separate
 → Combined
 → Partially comb separate system

① Conservancy system or Dry system:-

In this system, the different types of wastes are collected separately & each type is conveyed separately. This system is not in use now a days due to following disadvantages:-

- 1) More maintenance or operating cost
- 2) Compact design of house is not possible.
- 3) Unhygienic system.
- 4) Causes lot of foul smell.
- 5) Out break of epidemic is possible.
- 6) More labour reqd.
- 7) More land reqd. for disposal.

② Water carriage system:-

In this system, sewage is conveyed along with water through closed conduits. This system has high initial cost but very low operating cost & have advantages than above system from the same aspects.

There are 3 types of water carriage system:-

- 1) Partial sys separate system:- The storm water (drainage) & sewage are conveyed independantly through two different conduits.
- 2) combined system:- In this system, storm water & sewage is conveyed through single conduit.
- 3) partially separate system:- sometimes some part of storm water is allowed to flow through the sewage conveying conduit.

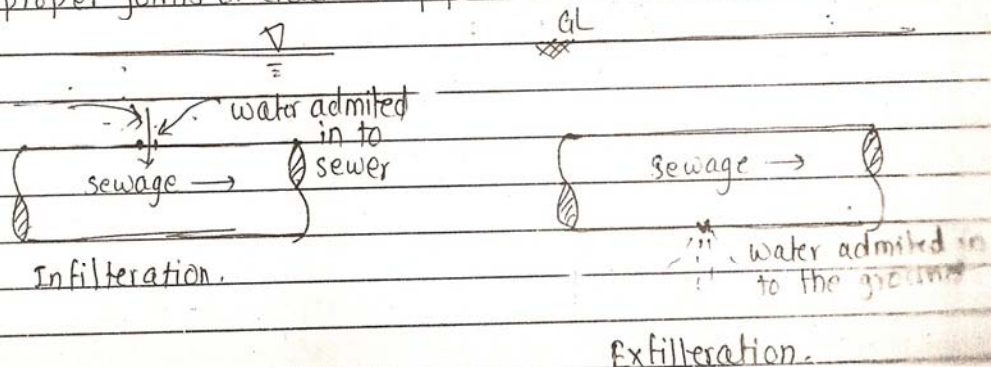
Comparism

Factor	separate system	Combined system
1) Const ⁿ cost.	less	very High
2) Maintenance cost	More	less
3) load of effluent on treatment unit	less	More
4) chocking Problems	Yes..	No
5) Lifting of sewage	Economical	Uneconomical
6) Pollution of storm water	No pollution	Pollution takes place

* Sources of sewage / wastewater:-

- 1) Domestic / sanitary wastewates.
 - 2) Industrial wastewater.
 - 3) Infiltration / Inflow
 - 4) storm water.
- } Dry weath. How (DWF)

⑥ The Infiltration:- Infiltration indicates leakage of water from surrounding ground into the sewer, which increases quantity of sewage. Exfiltration indicates leakage of water from sewer into the surrounding water which decreases quantity of sewage. The leakage are takes place through unproper joints or cracks in pipes.



② Industrial waste water:-

The quantity & quality of w/w from industries changes industry to industry & in the same industry in various periods depending upon processes.

2] Domestic waste water:-

The w/w coming from buildings i.e. from bathroom, w/c, sinks etc depends on the population of area & quantity of water supplied & sources of water.

The domestic, industrial w/w & infiltration are known as Dry weather flow (D.W.F.) i.e. quantity of water which is available during non rainfall period.

4] Storm water:- (Wet weather Flow) WWF

The quantity of storm water can be calculated from following ~~three~~ methods:-

- 1) Rational method
- 2) Empirical formula.

$$L = \sqrt{2RLS \cdot C}$$

$$L^2 = 2RLS \cdot C$$

$$\frac{L^2}{LS} = 2RC$$

① Rational Method:-

$$Q = K \cdot A \cdot I \cdot R$$

Where Q = Runoff from area (m^3/s)

K = constant

A = Area of catchment (ha).

I =

R = Intensity of rainfall. (mm/hr) $\rightarrow m/s$

$$\therefore Q = (10^4 A) \times I \times \left(\frac{10^3}{3600} R\right)$$

$$\therefore Q = \frac{AIR}{3.6}$$

$$K = \frac{1}{3.6}$$