

Cross Drainage Works

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- ▶ Whenever an irrigation canal intercepts natural drainage, which may be small stream or river or road, a concrete work has to be constructed to pass one above the other such work are known as cross drainage work.
- ▶ These works are generally very expensive and should be avoided or be reduced.
- ▶ Types of cross drainage works:
 1. Cross drainage works when canal crosses over drainage (aqueduct).
 2. Cross drainage works when drainage crosses over the canal(syphon).
 3. Cross drainage works when a road passes over canal or drain (culvert).

Culverts

- ▶ **Culverts are cross drainage works constructed to convey the discharge of canal or drain under road or railway.**
- ▶ **Types of culverts:-**
- ▶ **Pipe culvert.**
- ▶ **Reinforced concrete slab culvert.**
- ▶ **Box culvert.**
- ▶ **Pipe culvert: it consists of [base, pipe, upper slab and wing wall].
Minimum diameter of the pipe is 0.6 m to help in cleaning and repairing.
It is utilized for small discharges.**
- ▶ **Reinforced concrete slab culvert:**
- ▶ **It is economical up to 8m. Easier in construction, multi uses for (highway and railway.**

- ▶ **Box culvert:**
- ▶ **They are used for square or rectangular opening , the span up to about 4m. The height of vent not exceed 3m and used for large discharges.**
- ▶ **Example:**

It is needed to design box culvert to pass drain water under road. The drain discharge is 5 cumecs and permissible height of water infront the culvert is 0.2 m, the other details are shown below.