UNIT-9

Concreteting Operations

Process of Manufacture of Concrete

- It is interesting to note that the ingredients of good concrete and bad concrete are the same.
- If meticulous care is not exercised, and good rules are not observed, the resultant concrete is going to be of bad quality.
- With the same material if intense care is taken to exercise control at every stage, it will result in good concrete.
- The various stages of manufacture of concrete are: (a) Batching (b) Mixing (c) Transporting (d) Placing (e) Compacting (f) Curing (g) Finishing.

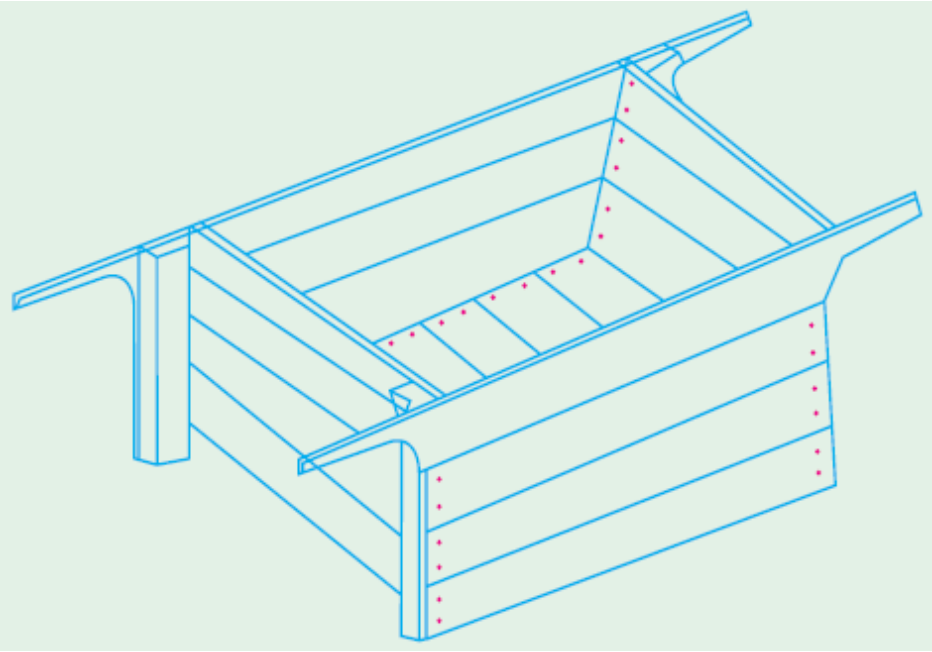
Batching :

1. Volume Batching:

- Volume batching is not a good method for proportioning the material because of the difficulty it offers to measure granular material in terms of volume.
- Volume of moist sand in a loose condition weighs much less than the same volume of dry compacted sand.
- The effect of bulking should be considered for moist fine aggregate.
- For unimportant concrete or for any small job, concrete may be batched by volume.

Batching : Volume Batching

1. Volume batching:



Batching : Volume Batching

Table 6.3. Volume of Various gauge boxes

Item	*Width cm*	*Height cm*	*Depth cm*	*Volume litres*	*Quantity number*
A	33.3	30	20	20	1
B	33.3	30	25	25	2
C	33.3	30	30	30	2
D	33.3	30	35	35	2

Table 6.4 Batch volume of materials for various mixes

	Cement kg.	*Sand, litres*	*Coarse aggregate, litres*
1 : 1 : 2 (M 200)	50	35	70
1 : 1 1/2 : 3 (M 200)	50	52.5	105
1 : 2 : 3	50	70	105
1 : 2 : 4 (M 150)	50	70	140
1 : 2 1/2 : 5	50	87.5	175
1 : 3 : 6 (M 100)	50	105	210

Batching :

1. Weigh Batching:

- Weigh batching is the correct method of measuring the materials.
- Use of weight system in batching, facilitates accuracy, flexibility and simplicity.
- Large weigh batching plants have automatic weighing equipment.
- On large work sites, the weigh bucket type of weighing equipment's are used.

Batching : Weigh Batching

Batching : Weigh Batching

Batching : Weigh Batching

Mixing

- Thorough mixing of the materials is essential for the production of uniform concrete.
- The mixing should ensure that the mass becomes homogeneous, uniform in colour and consistency.
- There are two methods adopted for mixing concrete: (i) Hand mixing (ii)Machine mixing

Mixing: Hand mixing

- Hand mixing is practised for small scale unimportant concrete works.
- As the mixing cannot be thorough and efficient, it is desirable to add 10 per cent more cement to cater for the inferior concrete produced by this method.
- Hand mixing should be done over an impervious concrete or brick floor of sufficiently large size to take one bag of cement.
- Spread out the measured quantity of coarse aggregate and fine aggregate in alternate layers.

Mixing: Hand mixing

- Pour the cement on the top of it, and mix them dry by shovel, turning the mixture over and over again until uniformity of colour is achieved.
- Water is taken in a water-can fitted with a rose-head and sprinkled over the mixture and simultaneously turned over.
- This operation is continued till such time a good uniform, homogeneous concrete is obtained.

Mixing: Hand mixing

Mixing: Machine Mixing

- Mixing of concrete is almost invariably carried out by machine, for reinforced concrete work and for medium or large scale mass concrete work.
- Machine mixing is not only efficient, but also economical, when the quantity of concrete to be produced is large.
- They can be classified as batch-mixers and continuous mixers.
- Batch mixers produce concrete, batch by batch with time interval, whereas continuous mixers produce concrete continuously without stoppage till such time the plant is working.

Mixing: Machine Mixing

- In normal concrete work, it is the batch mixers that are used. Batch mixer may be of pan type or drum type.
- The drum type may be further classified as tilting, non-tilting, reversing or forced action type.
- As per I.S. 1791–1985, concrete mixers are designated by a number representing its nominal mixed batch capacity in litres. The following are the standardized sizes of three types:
  - a. Tilting: 85 T, 100 T, 140 T, 200 T
  - b. Non-Tilting: 200 NT, 280 NT, 375 NT, 500 NT, 1000 NT
  - c. Reversing: 200 R, 280 R, 375 R, 500 R and 1000 R

Mixing: Machine Mixing

Mixing: Machine Mixing

Mixing: Machine Mixing

Mixing: Machine Mixing