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SPECIAL CONCRETE

COLD WEATHER CONCRETING

Any concrete operation performed below 5°C is known as cold weather concreting.

The production of concrete in cold weather may generate special and peculiar problems which may affect the overall performance of the concrete.

Effects of low temp. on concrete :-

Delayed Setting and Hardening → Rate of hydration depends upon temperature. At low temperature, development of concrete strength is retarded as compared to strength development at normal temperature.

Early freezing of concrete → When temp. goes below freezing point the free water available in plastic concrete tends to freeze which results in expanding of concrete.

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proportioning ✓

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Stresses due to differential temperatures → The concrete subjected to cold weather may experience a large temperature difference within concrete member, may promote cracking and also reduce durability.

Precautions :-

Before concreting :→

① All ingredients of concrete should be stacked on wooden platforms. Temporary shelter may also be created for covering.

② Mixing & batching plants should be covered from direct exposure of winds

③ The water should be heated below 60°C and agg. should be heated only if temp. is below freezing point. ④ ⑤ cement must not be heated, Admix can be used in super

After placing concrete :-

① Large amount of heat is generated during hydration of cement, this can be conserved by proper insulation formwork.

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Concrete surface should be covered till it hardens.

Formwork and props should be kept for longer time as compared to normal concreting.

HOT WEATHER CONCRETING

Any concrete operations performed at temp. above 40°C is called hot weather concreting.

Effects of high temp on concrete :-

1. Increased water demand.
2. Rapid loss of workablity of concrete.
3. Rapid rate of hydration.
4. Absorption of water by subgrade.
5. Rapid setting and hardening of concrete.
6. Increased possiblity of plastic cracking.
7. Critical need for early curing.
8. Less timing for finishing.

Adding water at job site is not advisable may result in following effects

1). Decreased Strength..
2). Decreased durability.
3). Decreased tightness
4). Increased drying Shrinkage.
5). Increased tendency of thermal cracking.

Precautions :-

Before Concreting

Concreting should be started after consulting with the weather forecast department, since sometime high velocity winds also flow in high temp. which is not permissible.

ources of water must be permanent so sprinkling may be done frequently on the aggregates, wooden mwork and the prepared sub-base.

Temporary sun-shades and wind barriers may se used with the help of tarpaulines.

Avoid operations in afternoon, water must be sprinkled on surface, form work, Reinforced steel.

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After Concreting

1). Placing of concrete should be done immediately so that loss of moisture can be minimised.

2). compaction and finishing operations must be performed immediately after placing.

3). The freshly laid concrete should be covered with wet jute bags.

4). 5) Retarders may be used but under high supervision, minimum cement content should be taken.

UNDER WATER CONCRETING

(7.) Ready Mix Concrete (RMC)

The concrete whose constituents are weigh and batched at a central plant are mixed either at the plant or in the truck mixers and is transported to construction site in a condition ready to use is called RMC.

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). Plant mixed · 2-6 rpm · Equipment required → Mixing plant
). Transit mixed 4-16 rpm → Agitator trucks.
). Shrink mixed · partly → · concrete pumps.
→ piping for delivery.
→ couplings.

Advantages

consistency in quality.
Better durability.
Cost ↓
Time ↓
Pollution ↓
Temp. controlled.

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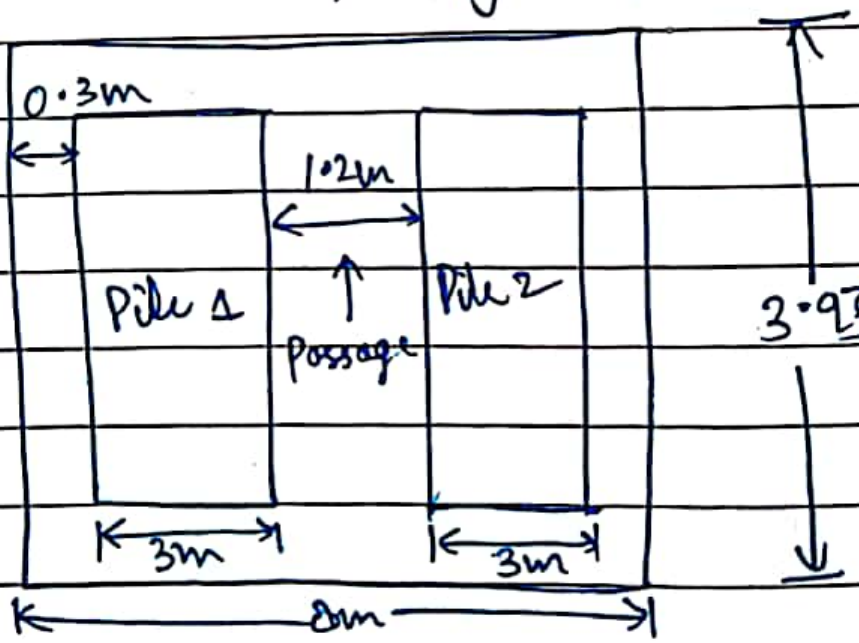
Capacity of a warehouse :-

Guidelines :-

Floor area covered by one bag of cement = $0.3 m^2$
height of each cement bag = 0.10m
max. width of each pile = 3m
max. height of each pile = 2.7m (15 bag)
passage between two pile = 1.2m
distance between wall and pile = 0.3m
distance between top of pile to ceiling = 1m

consider the following diagram



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Length of each pile = 3.99 - 0.3 - 0.3
= 3.33m

floor area of 2 pipe = 2 [3.33 X 3]
= 19.98m

height of one pipe of 15 bags = 15 X height of one bag
= 15 X 0.18
= 2.7m

Number of bags which can be stored = Total volume of bags / Volum of one bag

= area of 2 pile x height / area of one bag x one bag hight

= 19.98 x 2.7 / 0.3 x 0.18

≈ 54 / 0.054

= 1000 bags.

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