

MODERN CONCRETE

VII SEM CIVIL UCVL-702

N.KALIDOSS

SEMINAR HELD ON 25.09.08

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READY MIX CONCRETE

A concrete whose constituents are weight batched at a central batching plant, mixed either at the plant itself or in truck mixers, and then transported to the construction site and delivered in a condition ready to use, is termed as READY MIXED CONCRETE(RMC)

This enables the places of manufacture and use of concrete being separated and linked by suitable transport operation.

This technique is useful in congested sites or at diverse work places and saves the consumer from the botheration of procurement, storage and handling of concrete materials.

Ready mix concrete is produced under factory conditions and permits a close control of all operations of manufacture and transportation of fresh concrete

Due to its durability, low cost and its ability to be customized for different applications, ready mix concrete is one of the most versatile and popular building materials.

SPECIFICATIONS:

Quality of ready mix concrete is generally specified in terms of two systems

1. Performance parameters
2. Prescriptive specifications

1. Performance parameters:

Purchaser specifies the strength level and intended use of concrete. It is the best way to order ready mixed concrete because RMC producer, who is expert in the field, would design an economical mix with the desired properties

The RMC producer accepts the responsibility for the design of the mixture for the desired performance

2. Prescriptive specifications:

Purchaser specifies aggregate size, slump, air content, cement content, or weight of cement per cubic meter of concrete, maximum water content and admixtures required.

In this case, the purchaser accepts the responsibility for concrete strength and its performance.

ORDERING OF CONCRETE:

RMC is ordered and supplied by volume (cum) in a freshly mixed and unhardened state. When ordering concrete, 5 to 10 percent more concrete than estimated from a volumetric calculation is ordered.

This will account for the wastage, over excavation, spreading of forms, some loss of entrained air, settlement of wet mixture and change in volume.

PROPORTIONING OF RMC:

The proportioning of an RMC aims at obtaining an economical and practical combination of materials to produce concrete with the properties desired for its intended use, such as workability, strength, durability and appearance.

The following basics of a good concrete mix should be considered While proportioning RMC for the desired performance.

1. Concrete aggregates should be clean, strong and durable.

2. Fly ash or other supplementary cementitious materials, which enhance concrete properties, are normally added to RMC.
3. Admixtures are commonly used in relatively small quantities to improve the properties of fresh and hardened concrete such as the rate of setting and strength of development of concrete, especially during hot and cold weathers.

PRODUCTION OF RMC:

There are three principal categories of RMC.

1. Transit mixed concrete
2. Shrink mixed concrete
3. Central mixed concrete

1. TRANSIT MIXED CONCRETE:

It is also called truck mixed or dry batched concrete, all the ingredients are charged directly in the truck mixer. Most of the water usually batched at the plant.

There are three options for truck mixed concrete.

- **Concrete mixed at the job site:**

While traveling to the job site the drum is turned at agitating speed (slow speed). After arriving at the job site, the concrete is completely mixed. The drum is then turned for 70 to 100 revolutions, or about 5 minutes, at mixing speed.

- **Concrete mixed in the yard or central batching plant:**

The drum is turned at high speed or 12-15 rpm for 50 revolutions. This allows quick check of batch. The concrete is then agitated slowly while driving to the job site.

- **Concrete mixed in transit:**

The drum is turned at medium speed or about 8 rpm for 70 revolutions while driving to the job site. The drum is slowed to agitating speed.

2. SHRINK - MIXED CONCRETE:

Concrete that is partially mixed in a stationary plant mounted mixer and then discharged into the drum of truck mixer for completion of mixing is called shrink mixed concrete. Generally it is two minutes of mixing in truck drum at mixing speed.

3. CENTRAL- MIXED CONCRETE:

Central mixed concrete batch plants include a stationary, plant mounted mixer that mixes the concrete before it is discharged into a truck mixer. Central mix plants are sometimes referred to as wet batch or pre mix plants.

There are several types of batch plants and plant mixers, including tilt drum mixer, horizontal shaft paddle mixer, pan mixer, and slurry mixer.

MIX MOBILES OR MOBILE PROPORTIONING PLANTS:

Mix- mobile plants or plants-on wheels are truck mounted, volumetric batching and continuous mixing units which often supply small volume or specialty pours and offer the convenience of freshly mixed concrete in fairly précised quantities.

DELIVERY OF RMC:

While ready mix concrete can be delivered to the point of placement in a variety of ways, a overwhelming majority of it is brought to the construction site in truck-mounted, rotating drum mixers.

Truck mixers have a revolving drum with the axis inclined to horizontal. Inside the shell of the mixer drum are a pair of blades or fins that wrap in a helical configuration from the head to the opening of the drum.

To load or charge the raw materials from a transit mixed plant or central mixed plant into the truck, the drum must be turned very fast in the changing direction. After the concrete is loaded and mixed, it is normally hauled to the job site with the drum turning at the speed of less than 2 rpm.

The truck mixer having front discharge units are more popular than the traditional ones having rear discharge units.

Commonly used specifications for RMC stipulate that the concrete shall be discharged on the job site within 90 minutes and before 300 revolutions after water is added to the cement. In certain situations, air entraining, water-reducing, high range water reducing (HRWR) admixtures may need to be added to concrete prior to discharge, to compensate for the loss of air, high temp., or long delivery times.

INSPECTION AND TESTING

Since RMC is a manufactured product, specific control tests and evaluations are required during the manufacturing process to produce predictable high quality concrete. Some of the important properties of concrete that are measured by basic quality control tests are strength, temperature, slump, air content, and unit weight.

When there are no formal job specifications, such as with a homeowner or small contractor, it is important for the concrete producer to agree to supply concrete in accordance with relevant national codes.

Any agreement between the producer and a purchaser should include definition of the basis of purchase.

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- ❖ Enables the places of manufacture and use of concrete being separated and linked by suitable transport operation.

APPLICATIONS:

- ❖ This technique is useful in congested site or diverse work Places and saves the consumer from the botheration of procurement, storage and handling of concrete materials.
- ❖ Ready mix concrete is produced under factory conditions and permits a close control of all operations of manufacture and transportation of fresh concrete

SPECIFICATIONS:

Quality of ready mix concrete is generally specified in terms of two systems

1. Performance parameters
2. Prescriptive specifications

1. Performance parameters:

- ❖ It is the best way to order ready mixed concrete because RMC producer, who is expert in the field, would design an economical mix with the desired properties
- ❖ The RMC producer accepts the responsibility for the design of the mixture for the desired performance

2. Prescriptive specifications:

- ❖ Purchaser specifies aggregate size, slump, air content, cement content, or weight of cement per cubic meter of concrete, maximum water content and admixtures required.
- ❖ The purchaser accepts the responsibility for concrete strength and its performance.

ORDERING OF CONCRETE:

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- ❖ Types-Tilt drum mixer, horizontal shaft paddle mixer, pan mixer, and slurry mixer.

MIX MOBILES:

- ❖ Mix- mobile plants or plants-on wheels are truck mounted, volumetric batching and continuous mixing units which often supply small volume or specialty pours
- ❖ Offer the convenience of freshly mixed concrete in fairly précised quantities.

DELIVERY OF RMC:

- ❖ Ready mix concrete can be delivered to the construction site in truck- mounted, rotating drum mixers.
- ❖ Truck mixers have a revolving drum with the axis inclined to horizontal.
- ❖ To load or charge the raw materials from a transit mixed plant or central mixed plant into the truck, the drum must be turned very fast in the changing direction.
- ❖ After the concrete is loaded and mixed, it is normally hauled to the job site with the drum turning at the speed of less than 2 rpm.
- ❖ The truck mixer having front discharge units are more popular

INSPECTION AND TESTING

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- ❖ Some of the important properties of concrete that are measured by basic quality control tests are strength, temperature, slump, air content, and unit weight
- ❖ Concrete producer to agree to supply concrete in accordance with relevant national codes.
- ❖ Any agreement between the producer and a purchaser should include definition of the basis of purchase.

