CONCRETE SASK

TECH TIP #24

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JOB SITE ADDITION OF WATER

WHAT is job site addition of water?

This is the addition of water to ready mixed concrete in a truck mixer after arrival at the location of the concrete placement. Such tempering of concrete may be done with a portion of the design mixing water that was held back (referred to as trim or hold water), during the initial mixing. The design mixing water is the quantity of water set by the mixture proportions for required performance of the concrete.

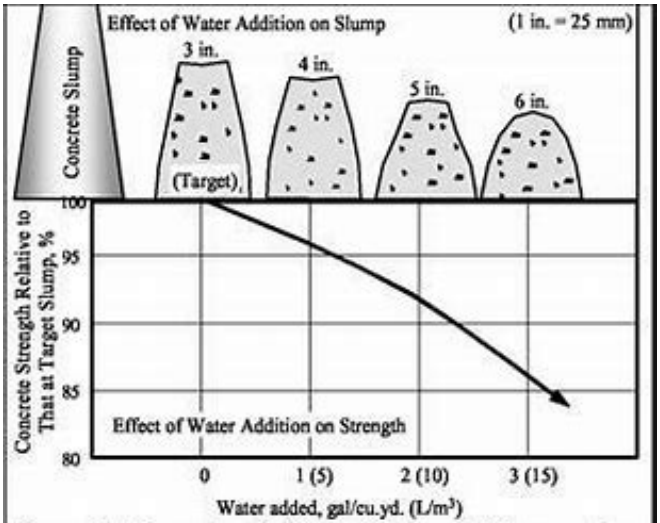

Figure 1 Example of effect of water addition on slump and strength of concrete

WHY is water added at the job site?

Water is added to concrete at the jobsite or in the mixer during delivery using automated systems to increase its slump. When concrete arrives at the jobsite at a slump that is lower than that allowed by design or specification and/or is of such consistency so as to adversely affect the place-ability of the concrete, water can be added to the concrete to bring the slump up to an acceptable or specified level. The ready mixed concrete supplier establishes the the proportions of materials for concrete mixtures according to industry standards to provide the intended performance. Addition of water in excess of the design mixing water will delay setting time, reduce strength, adversely impact durability, and increase the potential for cracking. If the purchaser requests additional water, in excess of the design mixing water or to increase slump greater than maximum permitted, the purchaser assumes responsibility for the resulting concrete quality.

A water reducing admixture or superplasticizer can be used to increase concrete slump at the jobsite. Increasing the slump of concrete using admixtures usually will not alter concrete properties provided an excess amount is not used and the mixture does not segregate. Jobsite adjustment with admixtures is not a trivial process. This option should be decided at a pre-pour conference as qualified personnel may need to be available at the jobsite. Adding admixture to achieve slump at the plant ensures better control. There is no prohibition to add water at the jobsite to concrete containing water reducing admixture or superplasticizer added at the plant.

HOW to add water on the job site?

The maximum allowable slump of the concrete must be specified or determined from the specified nominal slump plus tolerances. CSA A23.1 specifies the following tolerances:

- Prior to discharging concrete on the job, the actual slump of the concrete must be estimated or determined. If the slump is measured, it should be on a sample from the first 20L of discharged concrete. This result is used as an indicator of concrete consistency and it is not an acceptance test. Tests for acceptance of concrete should be made in accordance with CSA A23.2-5C. The sample should be taken from the first or last 10% of the load.
- At the jobsite, water should be added to the entire batch so that the volume of concrete being tempered is known. A rule of thumb that works reasonably well is 5 litres, or 5kg, of water per cubic meter for 25mm increase in slump.
- All water added to the concrete on the jobsite must be measured and recorded on the delivery ticket.
- CSA A23.1 requires 30 or more revolutions of the mixer drum at mixing speed or equivalent time after the addition of water.

- The amount of water added should be controlled so that the maximum slump and/or water cementing ratio, as indicated in the specification, is not exceeded. After more than a small portion of the concrete is discharged, no further water is permitted to be added.
- Upon obtaining the desired slump and/or maximum water cementing ratio, no further addition of water on the jobsite is permitted.
- A preconstruction meeting should be held to establish proper procedures to be followed, to determine who is authorized to request water addition, and to define the method to be used for documentation of water added at the jobsite.

References:

1. *CAN CSA A23.1-24/A23.2-24.*
2. *Concrete in Practice (CIP26 – Jobsite Addition of Water), National Ready Mix Concrete Association*