

What is Job Site Addition of Water?

Job site addition of water refers to the practice of adding measured quantities of water to ready-mixed concrete at the placement site after it has been delivered from the batch plant. This adjustment is often made when the concrete appears too stiff for the intended placement or finishing operations. During transport, concrete can lose slump due to evaporation, temperature effects, or normal hydration, which may make it more difficult to place, pump, or consolidate.

By carefully adding water within the limits permitted by CSA A23.1/2, contractors can restore workability to its original, specified slump without compromising quality. However, any addition must be controlled, accurately measured, and properly recorded to ensure that the maximum water-to-cementing materials ratio (w/cm) is not exceeded, as this directly affects the concrete's strength, durability, and long-term performance.

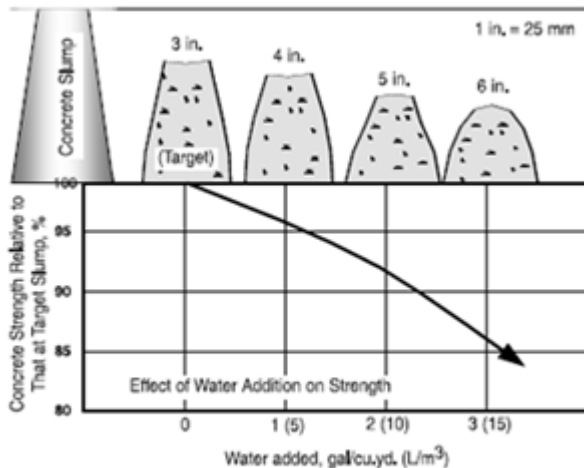


Figure 1 Example of effect of water addition on slump and strength of concrete

Example of water addition on slump

Why Add Water on the Job Site?

Concrete may arrive on site with a lower slump than specified, often due to temperature, haul time, or normal slump loss during delivery. In such cases, water can be added to bring the slump to the specified range, provided:

- The addition does not cause the water-to-cementing materials ratio (w/cm) to exceed the specified maximum.
- No more than the less of 16L/m³ or 10% of the mixing water is added.
- No more than 60 minutes have elapsed from the time of batching (see batch time on ticket)
- The concrete is remixed for at least 30 revolutions at mixing speed.

These conditions are defined in CSA A23.1/2 Clause 5.2.5.3.2.2. If water is added on site it shall be recorded on the delivery ticket along with whose authority it was.

Adding water at the job site is typically done to improve workability for placement, pumping, or consolidation. However, exceeding the design mixing water can significantly reduce strength, increase shrinkage, and make the concrete more susceptible to cracking and scaling.

When additional workability is needed, the preferred alternative is to use a water-reducing admixture or superplasticizer. These admixtures increase slump without significantly affecting strength or durability when used properly.

It is also important to note that adding water can influence the air content of the concrete. If water is added, the air content should be verified to ensure it remains within specification.

How to Add Water at the Job Site?

The following should be considered when adding water on site:

- a. The maximum allowable slump for the concrete must be specified or determined from the nominal slump range and tolerances in CSA A23.1/2:24:
- b. Water should be added to the entire batch so that the total water content is uniform throughout. As a general guideline, an addition of approximately 5 L of water per cubic metre of concrete increases slump by about 25 mm, depending on the mix design.
- c. All water added to the concrete must be measured and recorded on the delivery ticket to ensure traceability and compliance with CSA A23.1/2:24.
- d. After adding water, the concrete must be remixed for at least 30 revolutions of the mixer drum at mixing speed before discharge.
- e. The total water content after the addition must remain within the maximum allowable water-to-cementing materials ratio (w/cm) specified for the exposure class. No further water shall be added after discharge has begun or once the concrete has been partially unloaded.
- f. Once the desired slump and/or maximum allowable w/cm ratio has been reached, no additional water may be added at the site.
- g. A pre-construction meeting should establish clear procedures for requesting water additions, determine who is authorized to approve them, and define the documentation process for recording all job site additions. Project specifications should also be reviewed to ensure site additions are acceptable.

What Restrictions if Any are there on the Job Site?

CSA A23.1/2:24 permits water to be added on site only when all of the following conditions are met:

- The maximum specified water-to-cementing materials ratio (w/cm) for the exposure class is not exceeded.
- The concrete is remixed for a minimum of 30 revolutions at mixing speed after water is added.
- 60 minutes have not passed since the time of batching
- The amount of water added and the resulting slump are recorded on the delivery ticket.

How Can Additional Water Affect My Concrete?

Adding more water than permitted increases the w/cm ratio, which can:

- Reduce strength and durability
- Increase shrinkage and cracking
- Lower resistance to freeze-thaw cycles and surface scaling
- Shorten long-term service life

Before adding water, verify:

- The maximum allowable w/cm per CSA A23.1 for the mix and exposure class
- That the concrete still meets specification limits after water addition
- That documentation of the addition will be made on the ticket

If workability is still inadequate, consult the supplier about using a water-reducing admixture instead of extra water.

for reviewing and complying with all project specifications, contract documents, and governing standards before applying any of the information discussed.

Three Rules to Consider:

1. Only add water if the mix is still within the specified w/cm and time limits
2. Every litre added must be measured, recorded and followed by full remixing
3. Once target slump or maximum w/cm is reached stop adding water

References

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7. *Adjusting Slump in the Field,* Bruce A. Suprenant, Concrete Construction, January 1994.
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