

What is Concrete Yield?

Concrete yield is the volume of freshly mixed, unhardened concrete produced from a known quantity of ingredients. It is typically sold by volume, usually in cubic meters (m³).

Since ready-mix concrete is batched by mass, it is necessary to convert plant-scale readings to volume for sale. According to CSA-A23.1 Clause 5.2.2.2: “The volume of concrete in a given batch shall be determined from the total mass of the batch divided by the density of the concrete” and “The density shall be determined in accordance with CSA A23.2-6C.

Why do Yield Problems Occur?

Most yield problems involve an actual or perceived under-yield in concrete volumes. Actual yields can be verified and corrected using unit weight measurements and yield calculations. Apparent yield shortages may also be caused by factors such as:

- a. Miscalculating form volumes or slab thicknesses. Even a small error can result in more concrete being used than originally ordered.
- b. Form deflection or distortion under the weight of the concrete of fresh concrete.
- c. Irregular subgrades which require extra concrete, or subgrade settlement under pressure from the fresh concrete.
- d. Waste, spillage, loss of some entrained air, settlement of wet mixes and use of excess concrete in incidental mud sills

How are they prevented?

To prevent or minimize yield problems:

- Eliminate or minimize known causes of apparent yield discrepancies identified earlier
- Verify concrete yield by performing CSA Test Method A23.2-6C early in the project and

repeat testing periodically or when concerns arise

- Use mixer truck weight measurements as a rough check by weighing the truck empty and loaded while ensuring fuel level added water and residual mud do not affect results
- Measure formwork accurately and near the end of the pour carefully estimate remaining volume requirements to avoid shortages or excess concrete
- Construct forms to resist the pressure of fresh concrete without deflection or distortion
- Ensure the subgrade is level and properly compacted especially for slabs on grade
- Include adequate concrete quantities to account for waste spillage over excavation and other construction factors with contingency allowances adjusted to project needs

Three Rules to Consider:

1. Measure and verify yield using unit weight testing and plant scale data.
2. Check form dimensions, slab thickness, and subgrade to prevent shortages
3. Plan for losses from waste, spillage, settlement, and air loss

References

1. CSA A23.1 A23.2 2024. *Concrete materials and methods of concrete construction Test methods and standard practices for concrete*. CSA Group
2. *Design and Control of Concrete Mixtures*. 9th Edition. Cement Association of Canada
3. *Ready Mixed Concrete*, Gaynor, R.D. NRMCA Publication 186, NRMCA, Silver Spring, Maryland.
4. *No Minus Tolerance on Yield*, Malisch, W. R. and Suprenant, B.A., *Concrete Producer*, May 1998
5. *Causes for Variation in Concrete Yield*, Suprenant, B. A., *The Concrete Journal*, March 1994



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