

# Technology in Practice

## What, Why & How?



### TIP 12 - Slump Loss of Concrete

*This TIP facilitates the understanding of the change in slump that can occur during delivery of concrete.*

#### WHAT is Slump Loss?

The term “slump” describes the consistency or fluidity of a concrete mixture. Slump is not a good measure of the water content in batches that contains admixtures and there are various other factors that affect slump. Slump is measured by ASTM C143. For self-consolidating concrete slump flow is measured by ASTM C1611.

Slump loss is the reduction in slump from the time of original batching to the point when concrete is discharged from a truck mixer or other delivery vehicle. Concrete is a dynamic material and its consistency changes with time as mixing water is consumed through absorption by aggregates, cement hydration and evaporation. These factors are dependent on ambient conditions, types and combination of concrete materials and the total available water. Prudent control of the factors that affect concrete’s workability requires an understanding of the factors, how they are interrelated, and what can be controlled by reasonable means. Mixture proportions, aggregate quantities, moisture contents, and admixtures are some of the factors that affect the rate and extent of slump loss and that a ready mixed concrete producer can control. Concrete should achieve the required slump with consideration of the delivery time that can range from 45 to 90 min.

Slump loss does not necessarily coincide with a change in the setting characteristics of concrete. While changes in slump and setting time may appear to behave similarly, they are distinctly different properties. Slump is important for placement while setting time determines the scheduling of finishing. Contractors requesting longer setting times may actually need longer slump life for placing and finishing the mixture.

#### WHY is Controlling Slump Loss Important?

Slump is an important consideration for the contractor as it impacts his ability to place, consolidate and finish concrete. Different handling and placing methods have different slump requirements as an indicator of the workability of the mixture. The rate of slump loss should be predictable so that loads of concrete arrive at the jobsite at a consistent slump. The concrete placing and finishing crew often reacts to a lower slump by adding water. At times, water is indiscriminately added, inadequately mixed and undocumented, causing variability in fresh and hardened concrete properties. Excess water causes problems with strength and potential cracking.

#### HOW Can Slump Loss be Controlled?

Developing a properly designed concrete mixture involves more than meeting specified strength, w/cm or other specified requirements. It is important to understand the concrete materials used and how the fresh concrete properties are affected by ambient conditions when it is delivered and placed.

The following is a list of controllable factors that influence slump loss:

1. Use the correct amount of mixing water needed to achieve the specified slump within tolerances at the jobsite with consideration of ambient temperature and delivery time.
2. Maintain aggregate stockpiles through stock rotation and proper loading procedures to achieve consistent gradation and moisture content of aggregates being batched.
3. Frequently measure aggregate moisture contents and make adjustments accordingly, so that the mixture has the proper amount of batch water for target slump. Incorrectly assumed values of aggregate moisture