April 19, 2011 Matls. IM 317
Supersedes October 19, 2004

SLUMP OF HYDRAULIC CEMENT CONCRETE

SCOPE

This procedure provides instructions for determining the slump of hydraulic cement concrete. It is not applicable to non-plastic or non-cohesive concrete, nor when the maximum size of the coarse aggregate is over 2 in. (50 mm).

SIGNIFICANCE

The slump test is used to determine the consistency of concrete. Consistency is a measure of the relative fluidity or mobility of the mixture. Slump does not measure the water content or workability of the concrete. While it is true that an increase or decrease in the water content will cause a corresponding increase or decrease in the slump of the concrete, many other factors can cause slump to change without any change to water content. One cannot assume that the water/cement ratio is being maintained simply because the slump is within specification limits.

PROCEDURE

A. Apparatus

1. Slump Cone. The slump cone shall conform to AASHTO T 119: The mold shall be provided with foot pieces and handles. The mold may be constructed either with or without a seam. The interior of the mold shall be relatively smooth and free from projections such as protruding rivets. The mold shall be free of dents. A mold that clamps to a rigid non-absorbent base plate is acceptable provided the clamping arrangement is such that it can be fully released without movement of the mold.

2. Tamping Rod. The tamping rod shall be 5/8 in. (16 mm) in diameter and approximately 24 in. (600 mm) in length, having a hemispherical tip.

3. Scoop.

4. Tape Measure or Ruler. These should have at least 1/8 in. (5 mm) gradations.

5. Base. The base shall be rigid with a non-absorbent surface on which to set the slump cone.

B. Test Procedure

1. Obtain the sample in accordance with IM 327.

2. Dampen the inside of the cone and place it on a dampened, rigid, non-absorbent surface that is level and firm.

3. Stand on both foot pieces in order to hold the mold firmly in place.

4. Fill the cone 1/3-full in volume, to a depth of 2 5/8 in. (67 mm) in depth.

5. Consolidate the layer with 25 strokes of the tamping rod, using the rounded end. Distribute the strokes evenly over the entire cross section of the concrete. For this bottom layer, incline the rod slightly and make approximately half the strokes near the perimeter, and then progress with vertical strokes, spiraling toward the center.

6. Fill the cone 2/3-full in volume, to a depth of 6 1/8 in. (155 mm) in depth.

7. Consolidate this layer with 25 strokes of the tamping rod, penetrating the bottom layer approximately 1 inch (25 mm). Distribute the strokes evenly.

8. Fill the cone to overflowing.

9. Consolidate this layer with 25 strokes of the tamping rod, penetrating the second layer approximately 1 inch (25 mm). Distribute the strokes evenly. If the concrete falls below the top of the cone, stop, add more concrete, and continue rodding for a total of 25 strokes. Keep an excess of concrete above the top of the mold at all times. Distribute strokes evenly as before.

10. Strike off the top surface of concrete with a screeding and rolling motion of the tamping rod.

11. Clean the overflow concrete away from the base of the mold.

12. Remove the mold from the concrete by raising it carefully in a vertical direction. Raise the mold 12 in. (300 mm) in 5 ± 2 seconds by a steady upward lift with no lateral or torsional motion being imparted to the concrete.

    The entire operation from the start of the filling through removal of the mold shall be carried out without interruption and shall be completed within an elapsed time of 2 1/2 minutes.

13. Invert the slump cone and set it next to the specimen.

14. Lay the tamping rod across the mold so it is over the test specimen.

15. Measure the distance between the bottom of the rod and the displaced original center of the top of the specimen to the nearest 1/4 in. (6 mm).

NOTE: If a decided falling away or shearing off of concrete from one side or portion of the mass occurs, disregard the test and make a new test on another portion of the sample. If two consecutive tests on a sample of concrete show a falling away or shearing off of a portion of the concrete from the mass of the specimen, the concrete probably lacks the plasticity and cohesiveness necessary for the slump test to be applicable.