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TP MDC N° 4

THE SLUMP CONE TEST

(essai d'ouvrabilité au cône d'Abrams)

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1 The slump cone Test

1.1 Introduction

This test is called the Abrams Cone Method. It is frequently used on construction sites because it is easy to perform and inexpensive. It is generally conducted for slump values ranging from 1 cm to 21 cm. This test requires speed and continuity, as it must not exceed 2 minutes and 30 seconds.

1.2 Objective of the Test

The Abrams cone is used to check the consistency class of the concrete to be used by measuring the slump of a sample A_{ff}

1.3 Equipment used

- **Abrams Cone**
- **Filling Funnel for the Cone**
- **Base Plates**
- **Tamping Rod**
- **Sample Shovel**
- **Steel Support**
- **Gravel**
- **Cement**
- **Sand**
- **Water**

(A) Abrams Cone and All Its Equipment

(B) Water

(C) Mixing Machine

(D) Gravel + Cement

(E) Sand

1.4 Operating Procedure

The sample used in this PW is the one previously prepared for the calculation of the material components using the Dreux-Gorisse method .

1. **Preparation:**
   (a) Dampen both the cone and the base plate.
   (b) Remove any excess moisture using a moist cloth.
   (c) Place the cone on the horizontal base plate or surface.
   (d) Secure the cone by clamping it in place or standing on the two foot pieces to prevent movement during the test.
2. **Filling the Cone:**
   (a) Fill the cone in three approximately equal layers (each layer should be about one-third of the cone's height).
   (b) Compact each layer with 25 strokes using a compacting rod.
   (c) For the first layer, incline the rod slightly and direct half the strokes spirally toward the center.

(d) Compact the first layer throughout its depth, taking care not to strike the base.

(e) Compact the second and third layers through their full depth, ensuring the strokes penetrate into the immediately underlying layer.

(f) For the top layer, heap the concrete above the cone before starting compaction.

3. **Final Compacting and Striking Off:**

   (a) If compacting the top layer causes subsidence of the concrete below the top edge of the cone, add more concrete to maintain an excess above the cone.

   (b) After compacting the top layer, strike off the surface of the concrete using a trowel or a sawing and rolling motion of the compacting rod.

   (c) Remove any spilled concrete from the base plate/surface.

4. **Removal of the Cone:**

   (a) Carefully raise the cone in a vertical direction in 2 to 5 seconds, ensuring no lateral or torsional motion is imparted to the concrete.

   (b) Perform the operation of raising the cone from filling to removal within 150 seconds, without interruption.

5. **Measuring Slump:**

   (a) Immediately after removal of the cone, measure and record the slump, A_{ff}, by determining the difference between the height of the cone and the highest point of the slumped test specimen.

1.5 Expression of results

Using the table from NF EN 206-1

Consistency Class	**Slump in mm**
S1 (Stiff)	10 - 40
S2 (Plastic)	50 - 90
S3 (Very Plastic)	100 - 150
S4 (Fluid)	160 - 210
S5 (Very Fluid)	$\geq$ 220

TABLE 1.1: Consistency Classes and Corresponding Slump

The measured slump is 7 cm, indicating that the mixture is in the plastic range ... S2.

1.6 Conclusion

The slump cone test resulted in a 7cm slump, classifying the concrete mix as S2 (plastic) per NF EN 206-1. This confirms the desired workability as designed by the Dreux-Gorisse method.