

METHOD OF TEST FOR SEGREGATION AND SETTLEMENT OF FRESHLY MIXED SELF-CONSOLIDATING CONCRETE BY THE COLUMN METHOD

1. SCOPE

1.1 This test method covers the procedures for determining column segregation and column settlement of self-consolidating concrete (SCC) in the plastic state. The procedures are suitable for use in the laboratory or in the field, and are used as measures of stability of SCC.

2. REFERENCES

2.1 ASTM C1610 Standard Test Method for Static Segregation of Self-Consolidating Concrete Using Column Technique

3. DEFINITIONS

3.1 Self-Consolidating Concrete (SCC): Highly flowable yet stable concrete that can spread readily into place, fill the formwork, and encapsulate the reinforcement without any mechanical consolidation and without undergoing segregation or excessive bleeding.

4. APPARATUS

4.1 Apparatus for column segregation shall be according to ASTM C1610.

4.2 Apparatus for column settlement shall be according to ASTM C1610 and the following:

4.2.1 Solid plate of lightweight material to fit inside the diameter of the column to prevent evaporation during the settlement test. An acrylic plate, 2 mm in thickness, is suitable. The plate should be free to move up and down with settlement of the concrete.

4.2.2 DISPLACEMENT GAUGE: With accuracy of at least 0.001 mm.

4.2.3 TIME-LAPSE RECORDING DEVICE: Capable of recording at 1 min intervals for a period of at least 5 h.

5. COLUMN SEGREGATION

5.1 Determine segregation of SCC according to ASTM C1610 except for the following:

5.1.1 When placing SCC into the mould, ensure that concrete is deposited from a height of 150 mm or less above the top of the mould.

6. COLUMN SETTLEMENT

6.1 Obtain sample of SCC, place it in column mould, and strike off the top surface according to ASTM C1610, except that when placing concrete into the mould ensure that concrete is deposited from a height of 150 mm or less above the top of the mould.

6.2 Place the lightweight solid plate on the top surface of the concrete to prevent evaporation during the test period.

6.3 Install the displacement gauge on the top surface of the plate and begin the time-lapse recording device. Settlement readings should be taken at least every minute up to 30 min and then may be reduced to every 5 min until test completion. Settlement should be recorded to the 0.001 mm.

6.4 Let the concrete sit until there is no measurable change in the displacement over a period of 30 min.

6.5 Record the maximum settlement. Record any observations including identification of the presence and amount of any bleed water that has collected at the surface.

6.6 Graph the settlement results over time.

7. COLUMN SEGREGATION CALCULATIONS

7.1 Calculate static segregation according to ASTM C1610.

8. REPORT

8.1 COLUMN SEGREGATION REPORTING:

8.1.1 Static segregation in per cent.

8.2 COLUMN SETTLEMENT REPORTING:

8.2.1 Maximum settlement.

8.2.2 Graph of the settlement results over time.

8.2.3 Any observations; such as the presence and amount of any bleed water that has collected at the surface.