ALDOT-452

SIEVE STABILITY TEST FOR SELF-CONSOLIDATING CONCRETE

1. Scope

1.1. This procedure provides a method for quantitatively measuring the stability of fresh self-consolidating concrete (SCC). This test method is used to monitor the ability of the freshly mixed SCC to resist segregation, or separation of its constituent materials, during or after placement.

2. General

2.1. This test method is intended for laboratory or field use.

2.2. This test shall be conducted near concurrent fresh-property testing but shall be positioned to avoid disturbance from vibration or impact during testing.

2.3. The use of at least one apparatus to obtain the result is required. The simultaneous use of two apparatuses to obtain an average result is recommended. When using two apparatuses to obtain an average result, filling of the apparatuses shall be conducted consecutively within a single 60-second period.

2.4. The Contractor shall supply all equipment necessary to execute this procedure. The equipment shall be approved by the Materials and Tests Engineer prior to use.

3. Equipment

3.1. 12 in. {305 mm} diameter No. 4 sieve, at least 2 in. {50 mm} tall from upper surface of wire mesh to upper lip of sieve.

3.2. Sieve pan, from which the sieve can be easily removed by lifting vertically.

3.3. Scale, having a flat platform to firmly support the sieve and pan, a capacity of at least 22 lbs {10 kg}, and calibrated increments of $\leq$ 0.02 lbs {10 g}.

3.4. Cylindrical sample container, either plastic or metal, with an internal diameter of 12 in. ± 3/8 in. {300 mm ± 10 mm} and a capacity of 3 gal. ± 0.1 gal. {11.4 L ± 0.4 L}. The sample container shall be clearly marked to indicate a volume of 2.6 gal. {10 L} for use when obtaining the concrete sample. An example of this marking is illustrated in Figure 3.

3.5. Pouring apparatus, which shall be used to support the sample container and ensure a constant pouring height of 20 in. ± 2 in. {510 mm ± 51 mm}. Example pouring apparatuses are shown in Figures 1 and 3.

4. Testing Procedure

4.1. Weigh the pan while empty, and record the mass (pan). Then add the sieve, weigh the empty sieve and pan, and record the mass (sieve + pan).

4.2. Place 2.6 gal. ± 0.1 gal. {10 L ± 0.5 L} of concrete in the sample container and allow it to stand in a level position undisturbed for 80 s ± 5 s.

4.3. While the sieve and pan are still on the scale, and after the 80 s standing period, pour 10.5 lbs ± 0.5 lbs {4.8 kg ± 0.2 kg}, of concrete (including bleed water) onto the center region of the sieve from a height of 20 in. ± 2 in. {510 mm ± 51 mm} above the sieve mesh. Record the total weight on the scale (sieve + pan + SCC total).

4.3.1. The 20 in. {510 mm} height is measured from the lowest point of the rim of the cylindrical sample container to the upper surface of the sieve mesh, as illustrated in Figure 2.

4.3.2. An example of a pouring apparatus is illustrated in Figure 1. The hinge for the pouring apparatus is positioned such that the lowest point of the rim of the cylindrical sample container remains at a constant height as the concrete is poured. Note: To maintain a constant pouring height of 20 in. ± 2 in. {510 mm ± 51 mm} above the sieve mesh, the distance from the ground to the hinge will depend on the combined height of the scale, pan, and sieve utilized, as shown in Figure 1.

4.3.3. A scale with instantaneous reading display is recommended for use when pouring 10.5 lbs ± 0.5 lbs {4.8 kg ± 0.2 kg} of concrete (including bleed water) onto the center of the sieve.

4.4. Allow the concrete to rest on the sieve for 120 s ± 5 s, and then remove the sieve vertically from the pan while avoiding any agitation. Record the mass of the pan and concrete that has passed into it from the sieve (pan + SCC sieved fraction).

5. Result

5.1. The sieved fraction (S) is calculated by dividing the weight of SCC passing into the pan by the total weight of SCC tested. It is calculated according to the following equation:

$$S = \frac{[(pan + SCC\ sieved\ fraction) - (pan)]}{[(sieve + pan + SCC\ total) - (sieve + pan)]} \times 100$$

5.2. Record S to the nearest half of a percent.

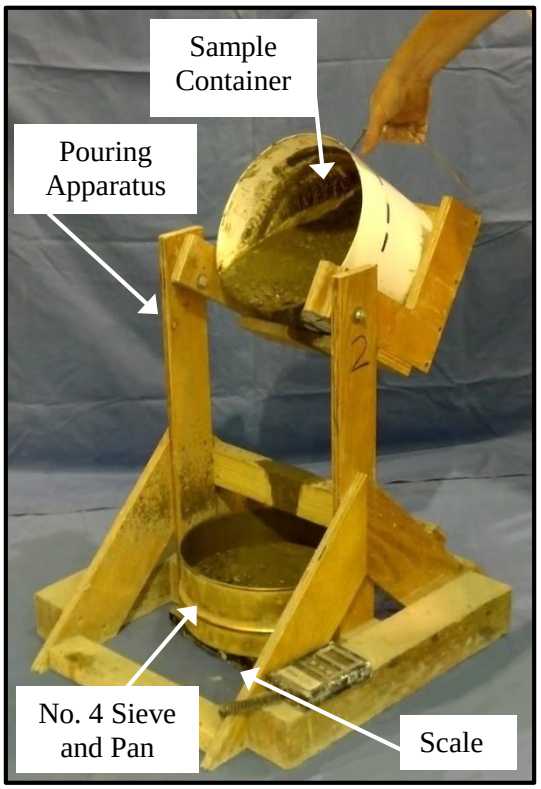

Figure 1: Testing equipment

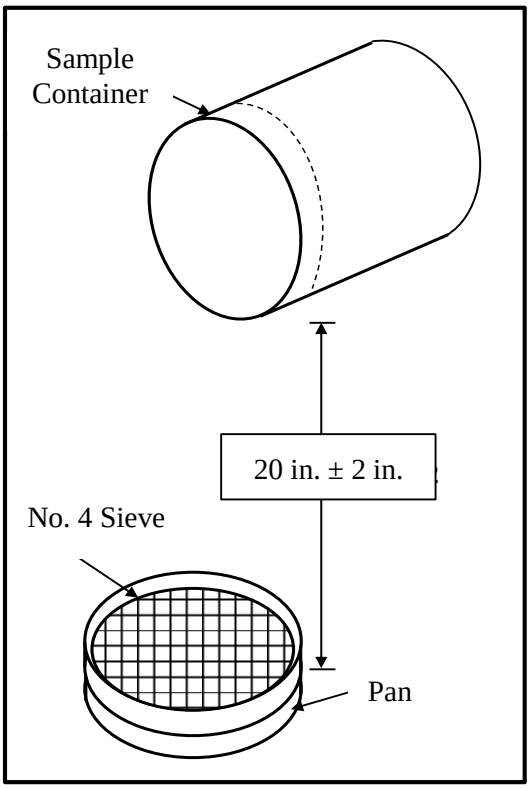

Figure 2: Sample container pouring height

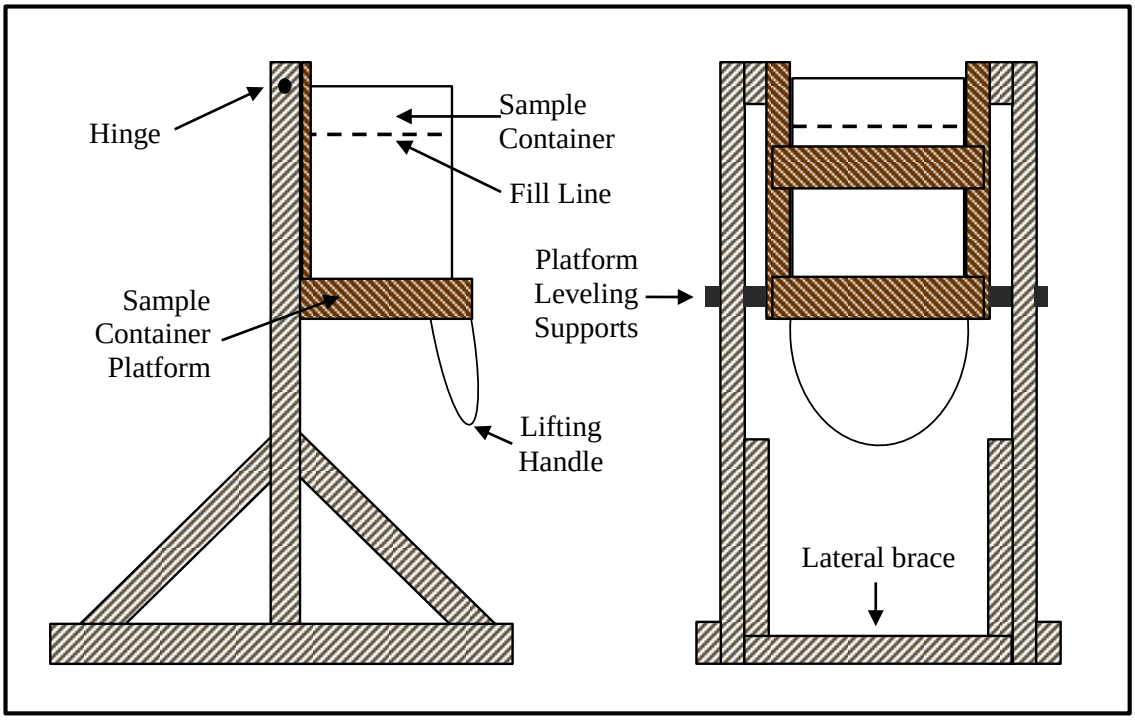

Figure 3: Pouring apparatus (side and front elevations)