METHOD B1

THE DETERMINATION OF THE AGGREGATE CRUSHING VALUE

1 SCOPE

The ACV of an aggregate as defined hereunder is determined by crushing a prepared confined aggregate sample under a specified, gradually applied compressive load and determining the percentage of the material crushed finer than a specified size.

Definition

The aggregate crushing value (ACV) of an aggregate is the mass of material, expressed as a percentage of the test sample. which is crushed finer than a 2,36 mm sieve when a sample of aggregate passing the 13,2 mm and retained on the 9,50 mm sieve is subjected to crushing under a gradually applied compressive load of 400 kN.

2 APPARATUS

2.1 An open-ended steel cylinder of 150 mm nominal diameter with plunger and base plate (Figure B1/l).

2.2 A metal tamping rod 16 mm in diameter and 450 mm to 600 mm long. One end must be hemi-spherical.

2.3 A balance to weigh up to 3 kg, accurate to 1gram

2.4 One each of the following sieves of 200mm diameter and complying with SABS 197: 13,2 mm, 9,50 mm and 2,36 mm.

2.5 A compression testing machine capable of applying a load of 400 kN and which can be operated at a uniform rate of loading so that this load is reached in 10 minutes.

2.6 A cylindrical measure with an internal diameter of 115 mm and 180 mm deep.

3 METHOD

3.1 Dry test

3.1.1 Preparation of the test sample. The field sample is quartered down to a suitable size from which a sufficient quantity of the fraction passing the 13,2 mm and retained on the 9,50 mm sieve is sieved out (i.e. enough to fill the cylindrical measure as described below, see 5.1).

Transfer the sample to a shallow tray and dry for at least four hours at a temperature of 105 - 110 EC.

3.1.2 Filling the cylinder. The cylindrical measure is filled to overflowing with the aggregate in three more or less equal layers, each layer being tamped 25 times with the rounded end of the tamping rod. The measure is then levelled off using the tamping rod as a straight-edge and the mass of the aggregate in the measure is determined (see 5 2). The open-ended cylinder is now placed on the base plate and the test sample added in thirds, each third being tamped 25 times with the tamping rod. The surface of the aggregate is levelled and the plunger inserted, making sure that the plunger does not jam in the cylinder.

3.1.3 Crushing and sieving of the sample. The apparatus with the test sample is now placed between the platens of the testing machine and load is applied at as uniform a rate as possible to reach 400 + 5 kN in 10 minutes + 15 seconds. When 400 kN is reached, the load is released, the sample removed from the cylinder, placed in a suitable pan and sieved on a 2,36 mm sieve (see 5.2). The fraction passing the sieve is weighed.

3 2 **Wet test**

3.2.1 **Preparation of the test sample**

The same as in 3.1.1.

3.2.2 **Filling the cylinder**

Proceed as in 3.1.2. When the mass of the aggregate has been determined, the aggregate is immersed in water for 24 h.

After soaking, take the aggregate out, allow to drain for 5 minutes, and then surface-dry it by rolling it in a damp cloth. The test cylinder is then filled as in 3.1.2.

3.2.3 **Crushing and sieving of the sample**

Proceed as in 3.1.3 but before sieving dry the material taken from the cylinder at 105 -110EC for at least 16 h.

4 **CALCULATIONS**

Calculate the dry or wet aggregate crushing value to the nearest 0,1 % as follows and report it to the nearest 0,1% on form B4/3 or a similar form.

Aggregate crushing value (wet or dry) percentage (m/m) =

$$ACV = \frac{B}{A} \; x \; 100$$

where :

A = mass of test sample before test.
B = mass of fraction passing the 2,36 mm sieve.

5 NOTES

5.1 The test described above is the standard test but if the available aggregate does not contain a sufficient quantity of the standard fraction, a non-standard test can be done using the same procedure as described in 3.1 and/or 3.2 on material in any of the size ranges given below.

SIEVE SIZES in millimetre's		
For preparation of test samples		For separating of fines after crushing
Passing	Retained	
26.5	19.0	4.75
19.0	13.2	3.35
9.5	6.7	1.70
6.7	4.75	1.18

For sizes larger than the standard, the standard apparatus should be used.

For tests on the smaller sizes use:

instead of 2.1 a crushing cylinder of diameter 77 mm, depth 75 mm and a plunger of diameter 75 mm;

instead of 2.6 a measure with internal diameter 60 mm and depth 90 mm.

5.2 If the test is to be repeated, a similar mass of aggregate is used. However, the repeatability of the test has been found to be very good (--0,2 %) and it is normally not necessary for routine tests to be done in duplicate

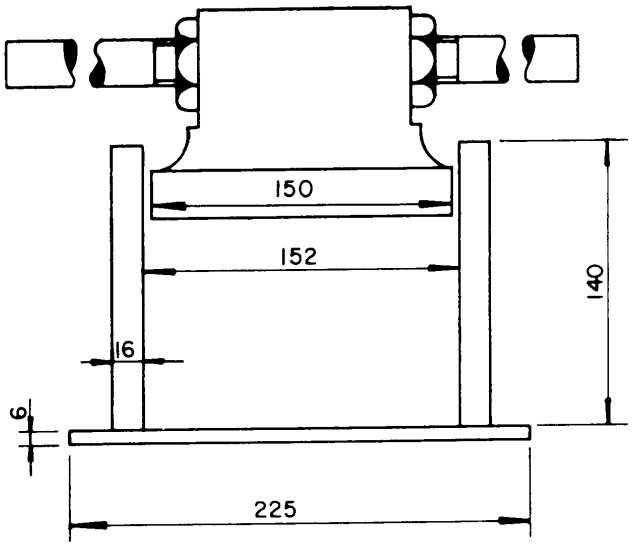

FIGURE BI/1

The steel cylinder with plunger and base plate

REFERENCE

SABS Method 841