Standard Method of Test for
Method for Determining Flat and Elongated Particles in Coarse Aggregate
SCDOT Designation: SC-T-77 (7/09)

1.   SCOPE

This method will be used to determine the percentage of flat and elongated particles in coarse aggregate.

2.   REFERENCED DOCUMENTS

2.1   ASTM Standards
 D 4791   Test Method for Flat Particles, Elongated Particles, or Flat and
Elongated Particles in Coarse Aggregate

2.2   SC Test Methods
 T 1   Methods of Sampling Coarse Aggregates
 T 4   Sieve Analysis of Fine and Coarse Aggregates

3.   APPARATUS

3.1   Proportional Caliper – The proportional caliper device is illustrated in ASTM D 4791 and will be used in the 1:5 ratio setting.

3.2   Sieves – Standard ASTM sieve stack.

4.   TEST SPECIMEN

4.1   Sample the coarse aggregate in accordance to SC T 1.

4.2   Reduce sample to obtain a suitable amount for testing. A suitable amount for testing is outlined in the following chart.

Nominal Maximum Size, mm (in.)	Minimum Mass of Test Sample, kg. (lb.)
9.5 ($^3/_8$)	1 (2)
12.5 (½)	2 (4)
19.0 (¾)	5 (11)
25.0 (1)	10 (22)
37.5 (1½)	15 (33)

5.   PROCEDURE

5.1   Sieve the sample to be tested in accordance to SC T 4. Reduce and group each size fraction larger than the 9.5 mm (3/8") sieve until approximately 100 particles of each group are obtained.

5.2   Test each of the particles in each size fraction and place into one of two groups: (1) flat and elongated or (2) not flat and elongated.

5.2.1   Set the larger opening equal to the particle's maximum dimension. Keep the arm in the same location and place the particle's minimum dimension into the device's smaller opening. DO NOT move the device's arm. The particle is flat and elongated if the minimum dimension can be placed in the device's smaller opening.

5.2.2   After each particle has been classified, determine the proportion (by count) of the sample in each group.

6.   CALCULATIONS

6.1   Calculate the proportions (by count) of flat and elongated particles.

$$\% = \frac{A}{B} \times (100)$$

Where: A = The number of particles in the flat and elongated group.
              B = The total number of particles.

6.2   After calculating the number of flat and elongated particles in each size group, take an average of the percentages. This will be the percentage of flat and elongated particles.

7.   REPORT

None.

8.   EXAMPLE CALCULATIONS

See below calculations for example:

Sieves to be tested	9.5 mm ($^3/_8$")	12.5 mm(½")	19.0 mm(¾")
Flat and Elongated	9	12	10
Not Flat and Elongated	91	102	95
Total Particles	100	114	105
Percentage for each sieve	9.0%	10.5%	9.5%
Percentage of Flat and Elongated Particles	9.7%		Average