

## Experiment No. 6: ABRASION TEST OF COARSE AGGREGATE

**Aim:** To determine the abrasion value of coarse aggregate by using Los Angeles machine

### Theory and Scope:

Abrasion is a measure of resistance to wear or hardness. It is an essentially property for road aggregates especially when used in wearing coarse. Due to the movements of traffic, the road stones used in the surfacing course are subjected to wearing actions at the top. When traffic moves on the road the soil particle which comes between the wheel and road surface causes abrasion on the road stone. The abrasion test on aggregate is found as per I.S.-2386 part-IV.

The principle of Los Angeles abrasion test is to find the percentage wear due to the relative rubbing action between the aggregates and steel balls used as abrasive charge pounding action of these balls also exist while conducting the test.

If aggregates are used in surface course as bituminous carpet, bituminous surface dressing, single or two coats, cement concrete surface coarse and etc. a value of 35%.

If aggregates are used for bituminous concrete, Cement concrete pavement as surface coarse than aggregate abrasion value of 30% maximum.

### Apparatus:

- Los Angeles machine with inside diameter 70 cm and inside length of 50cm.
- I.S Sieve with 1.7mm opening.
- Weighting Balance of 0.1gm accuracy.

### Procedure:

1. Clean and dry aggregate sample confirming to one of the grading A to G is used for the test.
2. Aggregates weighing 5 kg for grading A, B, C or D and 10 kg for grading's E, F or G may be taken as test specimen and placed in the cylinder.

*Table 1: Gradation of Aggregate*

Sieve size		Weight in gm of Test sample for Grade						
Passing(mm)	Retained (mm)	A	B	C	D	E	F	G
80	63					2500		
63	50					2500		
50	40					5000	5000	
40	25	1250					5000	5000
25	20	1250						5000
20	12.5	1250	2500					
12.5	10	1250	2500					
10	6.3			2500				
6.3	4.75			2500				
4.75	2.36				5000			

3. The abrasive charge is also chosen in accordance with table 1 and placed in the cylinder of the machine, and cover is fixed to make dust tight. The machine is rotated at a speed of 30 to 33 revolutions per minute.
4. The machine is rotated for 500 revolutions for grading's A, B, C and D, for grading's E, F and G, it shall be rotated for 1000 revolutions.

*Table 2: Number of Charges as per Grading of Aggregate*

Grading	Number of sphere	Weight of charge (gm)
A	12	5000 ± 25
B	11	4584 ± 25
C	8	3330 ± 20
D	6	2500 ± 15
E	12	5000 ± 25
F	12	5000 ± 25
G	12	5000 ± 25

5. After the desired number of revolutions, the machine is stopped and the material is discharged from the machine taking care to take out entire stone dust.
6. Using a sieve of size larger than 1.70 mm I.S sieve, the material is first separated into two parts and the finer position is taken out and sieved further on a 1.7 mm I.S sieve.
7. Let the original weight of aggregate be W1 gm, weight of aggregate retained on 1.70mm I.S. sieve after the test be W2 gm.

Los Angeles abrasion value % =  $(W1 - W2)/W1 * 100$

**Observation and Calculation:**

Sl. No.	Details of Sample	Trial 1	Trial 2	Trial 3
1	Weight of Specimen = W1 g			
2	Weight of Specimen after abrasion test, coarser than 1.70 mm IS sieve = W2 g			
3	Percentage wear = $((W1 - W2)/W1) * 100$			

**Result:** The mean value of Los Angeles abrasion test is \_\_\_\_\_ %.