(ABRASION TEST)

(INTRODUCTION):- The movement of traffic on the road causes excessive wear on the contact surface. When a vehicle moves on the road, the particles of soil present between the vehicle and the road produce particles. Powered vehicles with plows and wooden wheels also use the road. Therefore, for the construction of a good and durable road, it is necessary that the up resistance of its upper surface is high. For this, the stone soil used in road construction should be of high resistance so that it can tolerate the formation.

The hardness of the soil used in road construction i.e. abrasion resistance is determined by laboratory tests. There are the following three methods of gauge test in the laboratory-

(1) Los Angeles abrasion test
(2) Table gauge test (Devel Abrasion test)
(3) Dorry Abrasion test

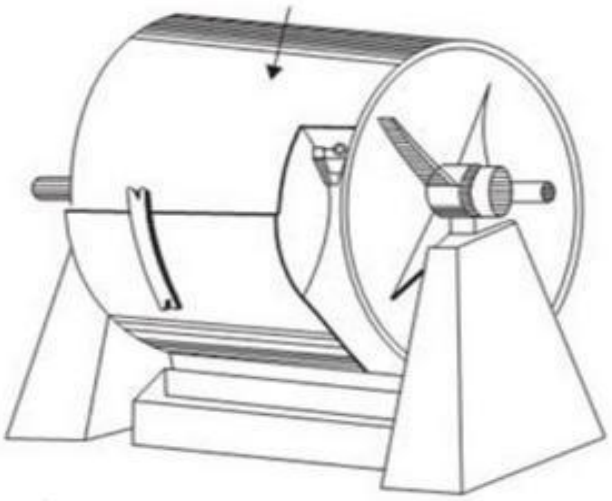
The Los Angel test is more popular for road works.

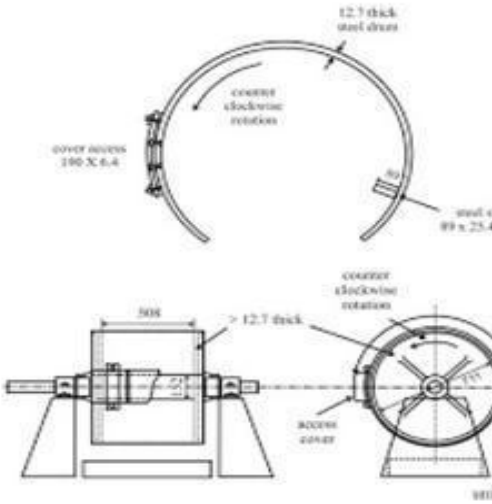
2. Objective

Los angels abrasion test machine to determine the value of ballast and use it for road works.
3. Apparatus: As per IS 2386 (Part IV) - 1963 the description of the equipment is as follows

Type is-

(i) Los Angeles machine - It consists of a steel bolim with both ends closed, inner diameter 700 mm and length 500 mm. This I'm able to be rotated on a horizontal axis. To put ballast sample





gates

Rack

Saile
500mm-

Experimental part

Steel Cylinder

Shelves

Axis of rotation

Cover. Plates

Abrasive Charge and Aggregate

Support
Collecting Tray

Figure Log Angelus Machine

(H) Abrasion charge Twelve balls of 390 to 445 grams in diameter each, made of iron or steel, about 48 mm in diameter, are used as abrasion charges.

(iii) IS 170mm Sieve

(iv) Calling 5 to 10 kg capacity
v) Thermostatically controlled furnace

(vi) Tray
Oven)
4. Principle:
In this test, stones were used as ballast and steel balls were placed in the machine.

is put. Now by rotating this apan is generated on the soil. The process is due to the ballast hitting the balls and falling down from the top of the

balls. This action will result in failure and wear and tear in the ballast, the less the gage resistance of the ballast will be. The wear resistance is expressed by the abrasion value.
Test Sample – 1.70 mm from chimney mine
Table [number] 1. 4. Principle In this test, the stone is placed in the ballast and steel balls in the machine.
is put. Now by rotating this apan is generated on the soil. The process is due to the ballast hitting the balls and falling down from the top of the balls. This action will result in failure and wear and tear in the ballast, the less the gauge resistance of the ballast will be. The wear resistance is expressed by the abrasion value.
5. Procedure:
Test Sample – 1.70 mm Sieve\
Table [number]
Principle: In this test, stones were used as ballast and steel balls were placed in the machine.

is put. Now by rotating this a pan is generated on the soil. The process is due to the ballast hitting the balls and falling down from the top of the balls. This action will result in failure and wear and tear in the ballast, the less the gage

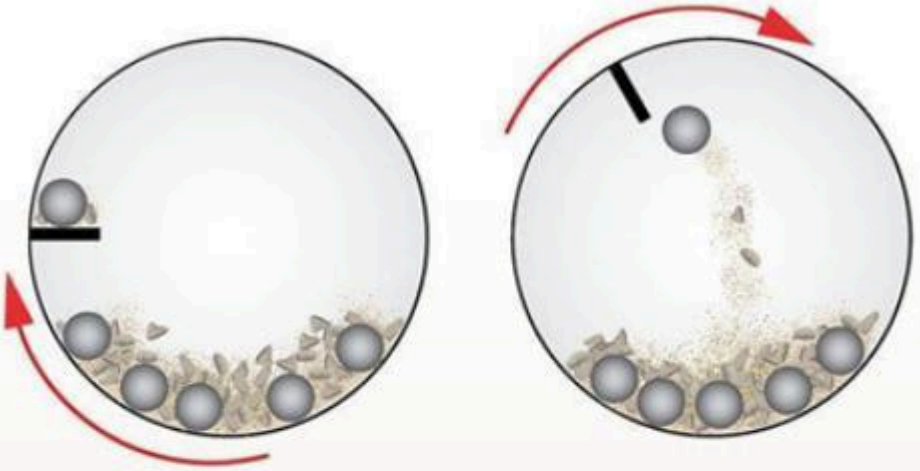
resistance of the ballast will be. The wear resistance is expressed by the abrasion value.
5. Procedure:

Test Sample – 1.70 mm from chimney mine
The coarse, clean soil sample is dried in a thermo-statically controlled oven at 105' - 110°C for four hours. The abdomen of the specimen is determined according to Table .
(i) Select the appropriate pending to be used for the test. As far as possible it should be similar to the pendis used in construction work.
(ii) 5 kg for grading A, B, C and D and pending E, F and G For this take 10 kg sample.
(iii) Select the value of abrasion charge according to the grade of the specimen from the following table.
Table No. 2 Selection of Abrasion Charge
(iv) Open the lid of the container and drop the soil sample into the container. Close the lid tightly
(v) Run the machine at 30 to 33 r. p. m. rotate at a uniform rate of (cycles per minute).
Experimental part
(vi) 500 cycles should be provided for painting A, B, C and D and 1000 cycles for painting E F and G. (vii) After rotating the desired cycle, the

material is taken out by removing the protective cover.
(viii) Sieve these materials through a sieve of ARE 1-70 mm size and wash the suspended matter on it and improve it in water.
(xi) Take the suspended material on the sieve with purity and take this weight out of the total sample in the material. Damage done known in percent

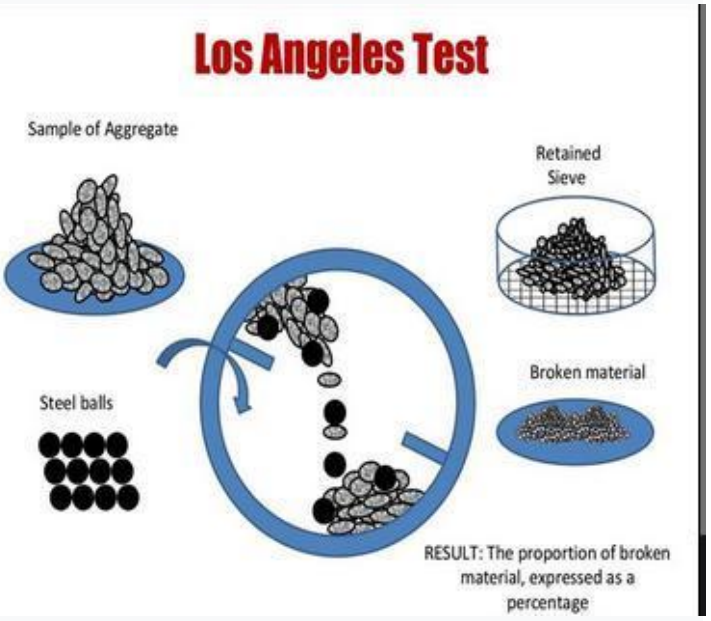
Do it (x) Test again by taking another sample and round off both the values (to the nearest integer).

LOS ANGELES ABRASION MACHINE



The Los Angeles Abrasion machine rotates at 30-33rpm, and is shown here with the shelf plate catching and dropping the aggregate sample and abrasive charge to the other side of the drum. This creates an impact-crushing affect. Aggregate sample and abrasive charge then roll within the drum creating abrading and grinding action. This action is repeated for 500 revolutions and degradation is determined as a percent loss of mass during the process.

E.I.S -



6. Calculations:

LOS ANGELES ABRASION TEST

RESULTS, DATA AND CALCULATIONS

$$\text{Abrasion Loss \%} = \frac{\text{Weight passing in sieve no.12}}{\text{Original Weight}} * 100\%$$

CONCLUSIONS:

Copy and Answer

1. What is the significance of this test?
2. How many steel balls were used in the test? (Refer this to your assigned data)
3. Are you going to recommend these aggregates in the future construction based on your results? Why?
4. Is the performance of the test affects the overall performance of aggregates when used in concrete? How?

Where, W is the basic weight of the ballast specimen, W = IS 1-70m.m. Load after soil sample test stopped on conduction

Hence, the loss due to $(W_1) – W_2$.).i.e sample taken and later sample weighed after abrasion for 500 cycles

8. Result:

Los Angeles Abrasion Value =

Grading	No of Steel balls	Weight of charge in 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

9. Precautions:

1. All equipment should be neat and clean.

2. There should be complete knowledge about the equipment before testing

3. Weight should be taken accurately.

4. The dustproof cover should be tightly closed before the test.

10. Analysis of Result:

Based on the results obtained, according to the specifications of the Indian Roads Congress, the suitability of ballast for different roads can be determined from the following table Above