TORSION TEST

Aim:- To conduct torsion test on mild steel.

Apparatus:- 1. A torsion test machine along with angle of twist measuring attachment.

2. Standard specimen of mild steel.
3. Steel rule.
4. Vernnier caliper or a micrometer.

Theory:- For transmitting power through a rotating shaft it is necessary to apply a turning force. The force is applied tangentially and in the plane of transverse cross section. The torque or twisting moment may be calculated by multiplying two opposite turning moments. It is said to be in pure torsion and it will exhibit the tendency of shearing off at every cross section which is perpendicular to the longitudinal axis.

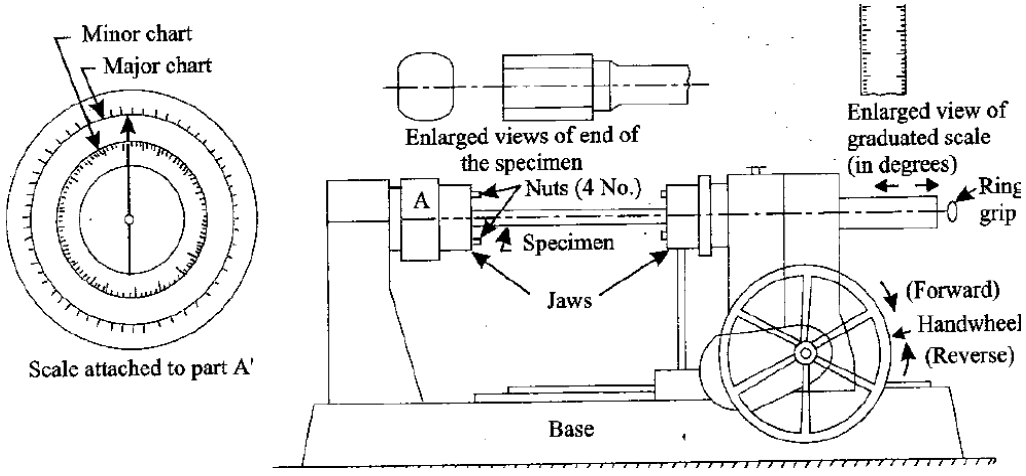

Fig:- Torsion Testing Machne

Torsion equation:-

$T/J = \tau/R = G\theta/L$

$G = T L/J \theta$ N/mm^2

T= maximum twisting torque (N mm)

J = polar moment of inertia (mm^4) = $\pi d^4/32$

τ = shear stress (N/mm^2)

G = modulus of rigidity (N/mm^2)

θ = angle of twist in radians

L= length of shaft under torsion (mm)

Procedure:-

1. Select the driving dogs to suit the size of the specimen and clamp it in the machine by adjusting the length of the specimen by means of a sliding spindle.
2. Measure the diameter at about three places and take the average value.
3. Choose the appropriate range by capacity change lever
4. Set the maximum load pointer to zero.
5. Set the protractor to zero for convenience and clamp it by means of knurled screw.
6. Carry out straining by rotating the hand wheel in either direction.
7. Load the machine in suitable increments.
8. Then load out to failure as to cause equal increments of strain reading.
9. Plot a torque- twist (T- θ) graph.
10. Read off co-ordinates of a convenient point from the straight line portion of the torque twist (T- θ) graph and calculate the value of G by using relation.

Precautions:-

1) Measure the dimensions of the specimen carefully
2) Measure the Angle of twist accurately for the corresponding value of Torque.
3) The specimen should be properly to get between the jaws.
4) After breaking specimen stop to m/c.

Obeservations:-

Gauge length of the specimen, L = ……

Diameter of the specimen, d = ……

Polar moment of inertia, $J = \pi d^4/32$ = ...

Tabulation:-

Sl. No.	Torque, Kg-cm	Torque, N - mm	Angle of twist		Modulus Rigidity, G N/mm^2	Average G, N/mm^2
			Degrees	Radians		

Result :- Thus the torsion test on given mild steel specimen is done and the modulus of rigidity is ----------N/mm^2.