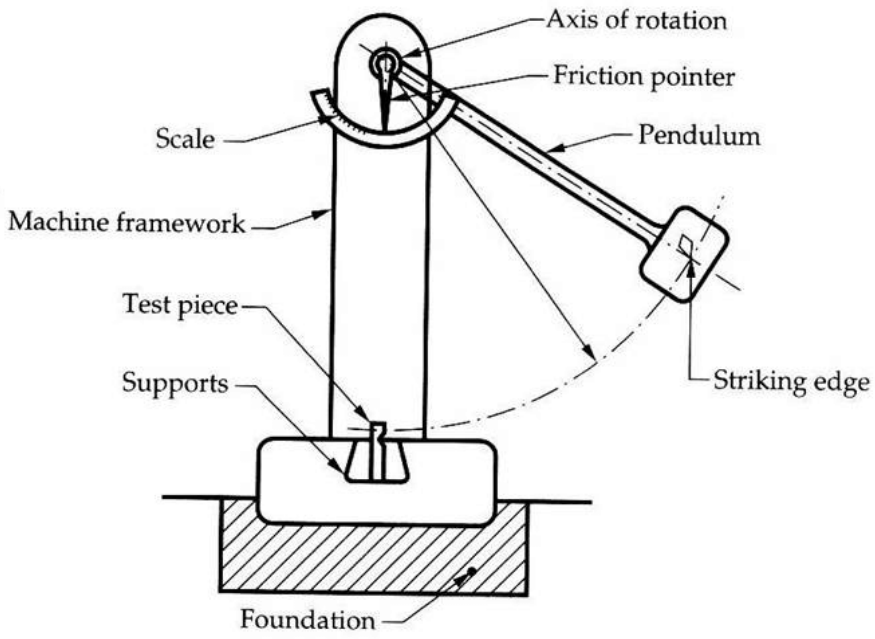
IZOD IMPACT TEST

Aim:-

To find the impact resistance of mild steel and cast iron.

Apparatus used:- Impact Testing Machine



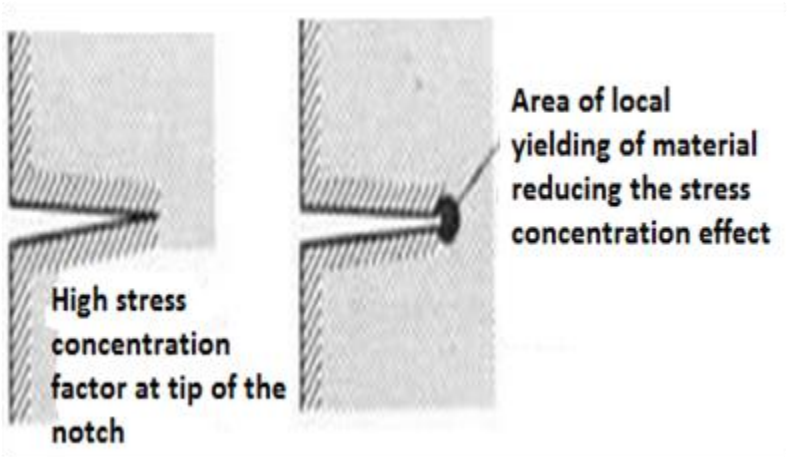
Theory

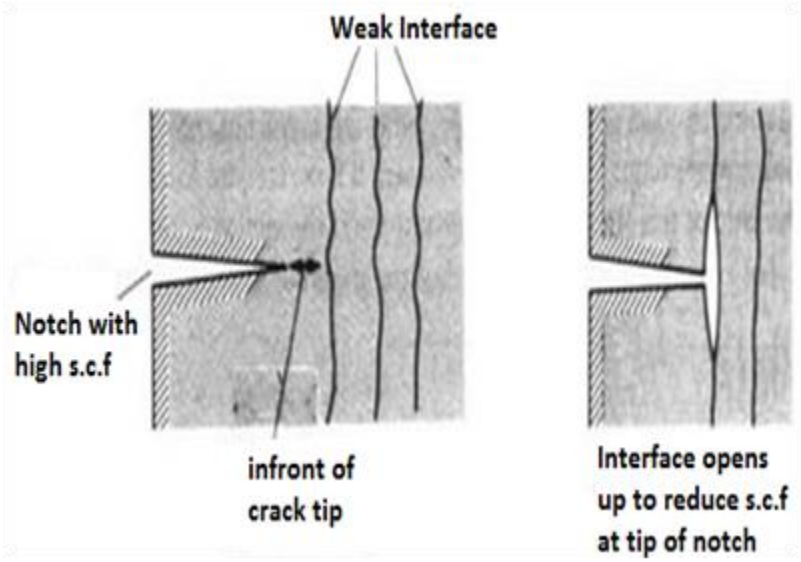
Impact test signifies toughness of material that is the ability of material to absorb energy during plastic deformation.Toughness takes into account both the strength and ductility of the material.There are two distinct type of toughness mechanism and in this case it is appropriate to consider notch as a very high local stress concentration.

The first type of mechanism occurs in ductile material. This is because very high stresses at the end of the notch produce local yielding of the material and local plastic flow at the crack tip. This has a action of blunting the sharp tip of the notch and hence reduces the stress concentration effect.

The second mechanism occurs in fibers, wood materials etc which have a weak interface. Local tensile stress developed at the front of a propagated crack opens up the interface and produces a crack sink i.e., blunts the crack by effectively increasing

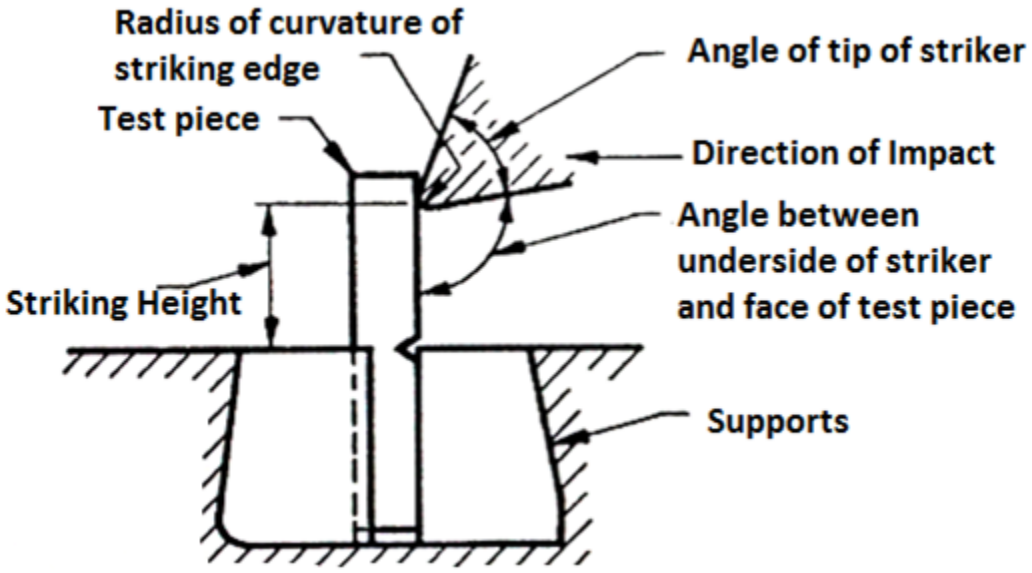
the radius of the crack tip. The stress-concentration at the notch increases with decreasing notch radius.





Impact testing machine consists of a pendulum suspended from a short shaft that rotates in ball bearing and swings midway between two rigid upright stands supported on a rigid base near the bottom of which are the specimen supports anvils. The knife-edge or striking edge is slightly rounded. The pendulum can be raised to any desired height and rested at that position. It is supported in the starting position by a catch and can be released by a trigger. The mechanism is so designed that the pendulum is not disturbed when the catch is released.

Impact strengths are generally lower as compared to strengths achieved under slowly applied loads. Indian standard method of izod impact test consists of breaking the specimen by one blow from a swinging hammer under specified condition, a notched test piece is gripped vertically with the bottom of the notch in the same plane as the upper face of the grips.The-blow is struck at a fixed position on the face having the notch. When a striker impacts the specimen, the specimen will absorb energy till it yields. At this point the specimen will begin to undergo plastic deformation at the notch. The specimen continues to absorb energy and work harden at the plastic zone, when the specimen can absorb no more energy fracture takes place.



Procedure:-

1. With the striking hammer (pendulum) in safe position, hold the specimen in impact testing machine's vice in such a way that the notch face the hammer and hammer and is half inside and half above the top surface of the vice.
2. Bring the striking hammer to its top most striking position unless it is already there, and lock it at that position.
3. Bring indicator of the machine it zero, or follow the instructions of the operating manual supplied with the machine.
4. Release the hammer. It will fall due to gravity and break the specimen through its momentum, the total energy is not absorbed by the specimen . then it continues to swing. At its top most height after breaking the specimen, the indicator stops moving, while the pendulum falls back. Note the indicator at that topmost final position.

5. Again bring back the hammer to its idle position and back.

Mild steel	
Length L (mm)	76.6
Breadth B (mm)	9.42
Depth D (mm)	9.23
Depth of Notch d (mm)	5

Total loss of energy during transit of hammer Et= 49 J

Energy for failure of Specimen = Et- Ef= 45 J

Observation:-

Initial energy of the hammer = 164 J

Average loss of energy due to friction Ef = 4 J

Total loss of energy Et during transit of hammer = 49 J

Energy for failure of specimen = Et- Ef = 45 J

Trial	Loss of energy due to friction Ef (J)	Total loss of energy Et during transit of hammer (J)	Energy for failure of specimen = KU/ Impact Value = Et – Ef in J
1	4	49	45
2	2	51	49
3	2	44	42

Average energy for failure of specimen = 45.33 J

Results :- The energy absorbed for mild steel is found out to be 45.33 J.