



UNIT I

Mechanical Testing

Engineering Materials and Metallurgy

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MECHANICAL TESTING





Testing Types



- **Mechanical tests** – the material may be **physically tested to destruction**. Will normally specify a value for properties such as strength, hardness, toughness, etc.
- **Non-destructive tests (NDT)** – samples or finished articles are tested before being used **and can be reused after testing**.

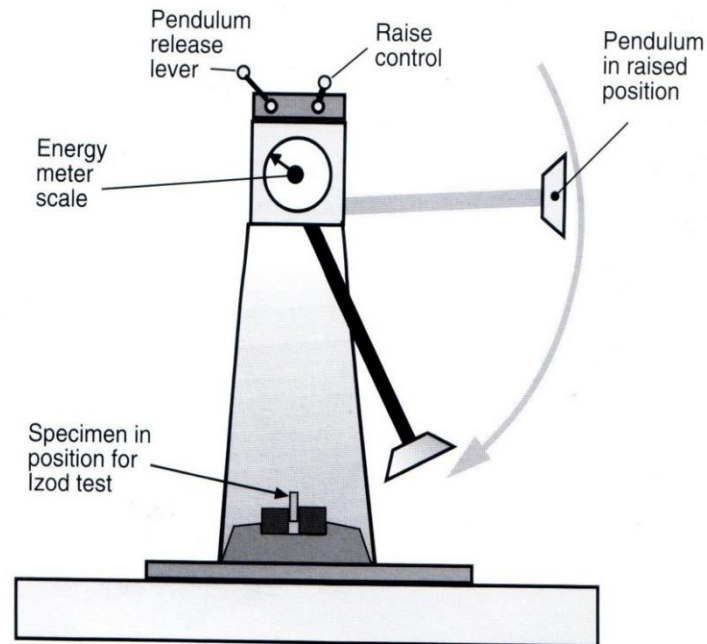




Impact Tests

Toughness of metals is the ability to withstand impact

Impact or notched bar testing machine set-up

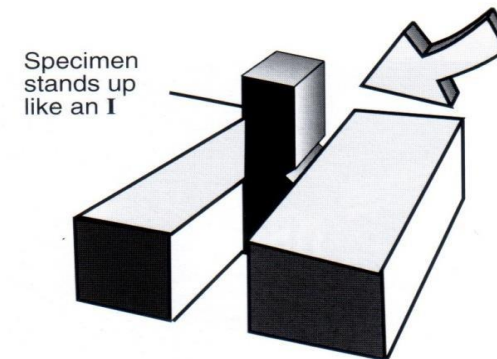
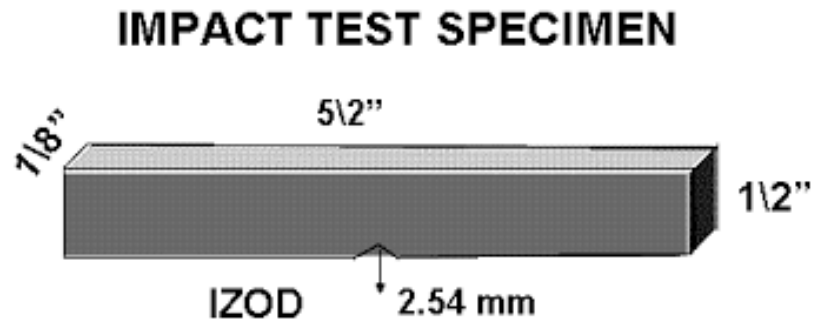
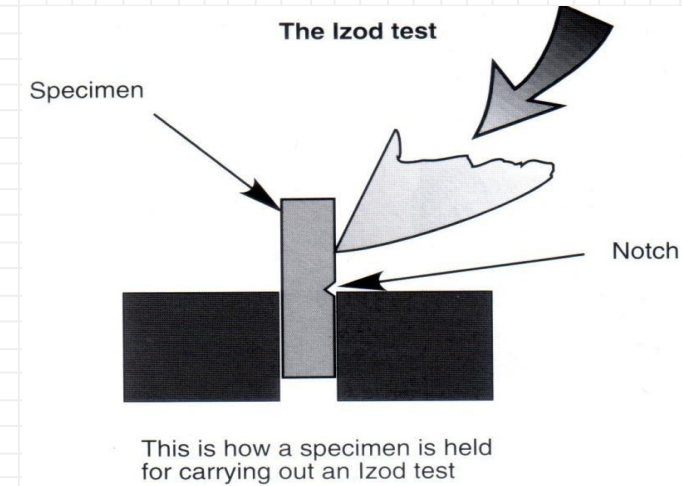


A different striker is fitted for Charpy testing and the specimen is held in a horizontal position with the notch facing away from the pendulum



Izod Test

- Strikes at 167 Joules.
- Test specimen is held vertically.
- Notch faces striker.





Izod Test

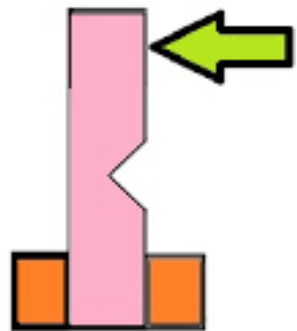




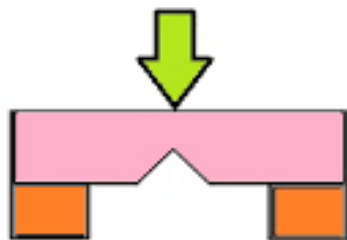
Charpy Test



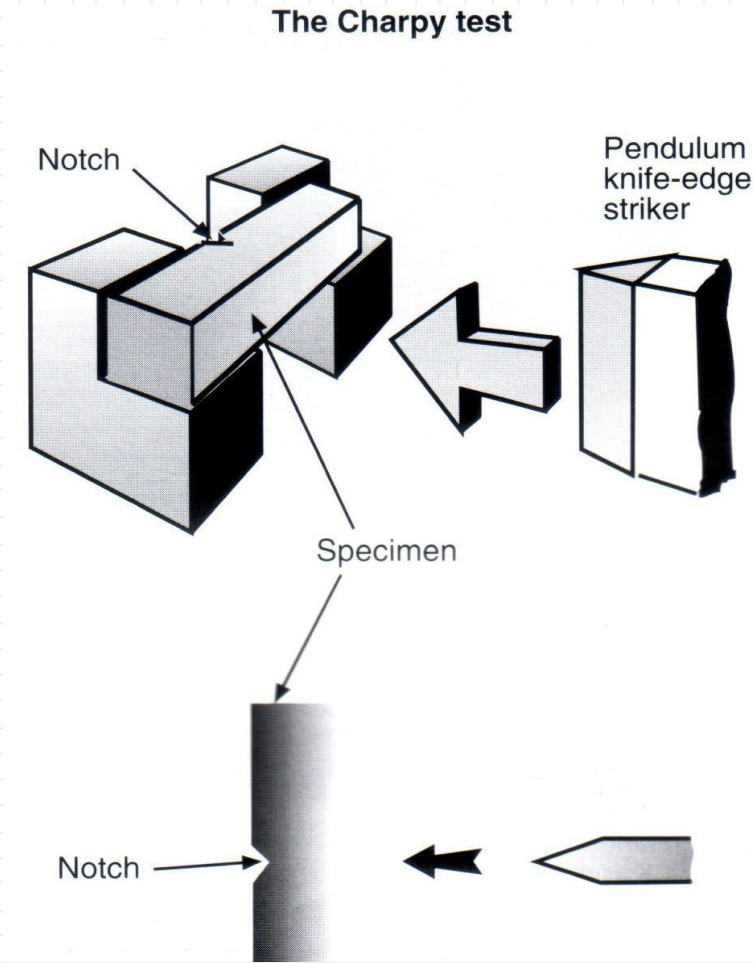
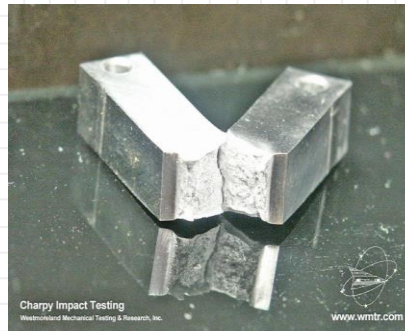
- ✓ Strikes from higher position with 300 Joules.
- ✓ Test specimen is held horizontally.
- ✓ Notch faces away from striker.



(a) Izod Test



(b) Charpy Test





Charpy Test



Charpy Impact Test



Tensile Testing

- Uses an extensometer to apply measured force to an test specimen. The amount of extension can be measured and graphed.
- Variables such as strain, stress, elasticity, tensile strength, ductility and shear strength can be gauged.
- Test specimens can be round or flat.





Tensile Testing



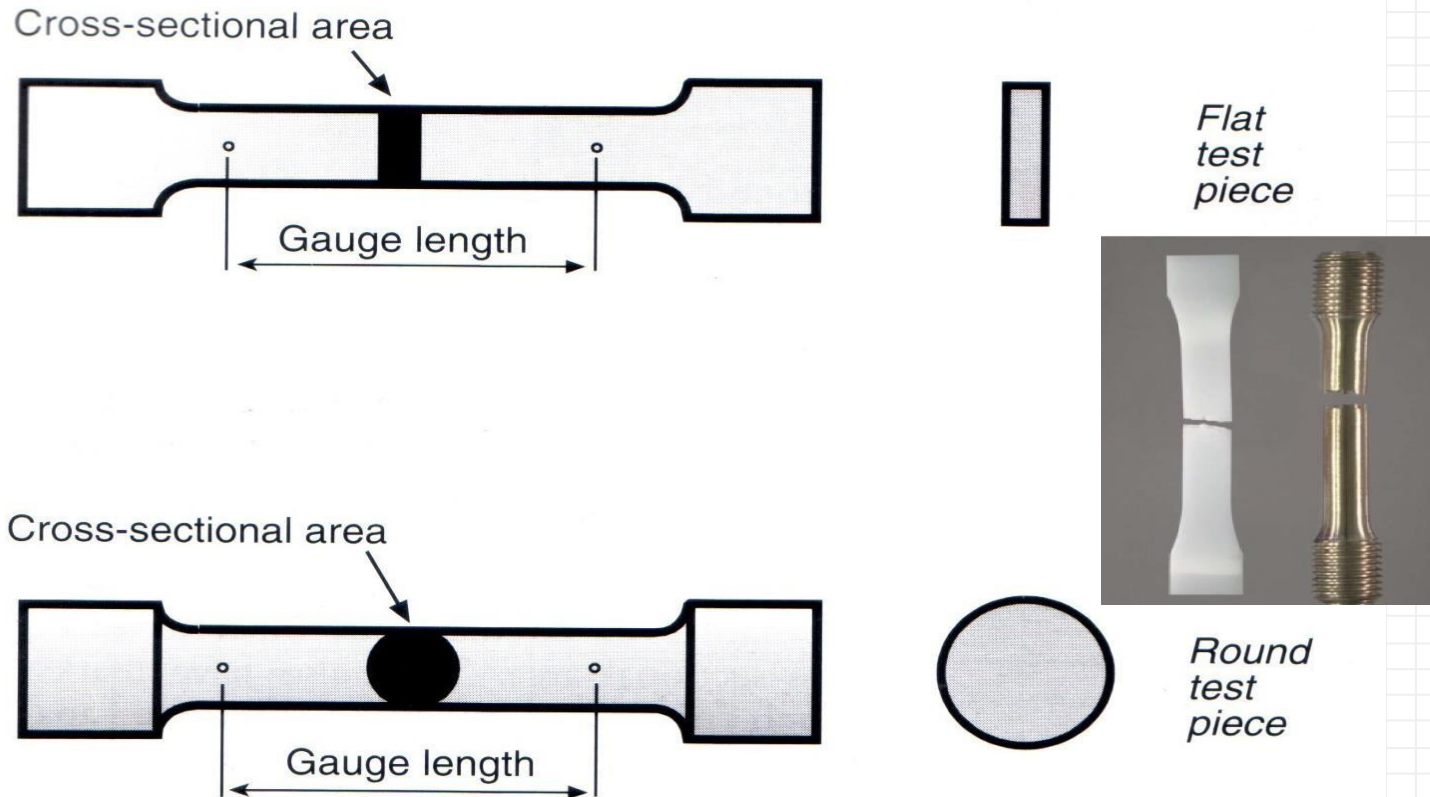
Tensile Test



Tensile Test Specimens



Tensile test specimens



Standard lengths are given below. As well as gauge length, minimum parallel, and total lengths, radii, width, and for round pieces, diameter, are also specified



Test results



Cup and cone fracture signifies a ductile material



A shear fracture would indicate a brittle material





Thank You

Assessment - <https://play.kahoot.it/v2/?quizId=859091e5-773d-4a4a-91c8-2698e016baf0>