



# COMBINED BENDING and TORSION APPARATUS

## HSM11



Year 3  
study

### Features

- High Quality, compact bench unit
- Excellent Visual apparatus
- Combined bending and Torsion in one unit
- Three specimen materials, five of each
- Length of test material supplied for own specimen creation
- Common specimens with HSM19 Rotating Fatigue

### Description

The object of this experiment is to determine what levels of combined bending and torsion cause elastic failure in different materials, and to compare them with various theories of failure. The HSM11 uses specially machined 'necked' specimens made from round bar. The specimen is clamped at one end to the base plate and at the other end to a counterbalanced circular loading plate. The loading plate is suspended using a cord and counterbalance to ensure the specimen is not loaded prior to experimental loading. The loading plate is graduated in 15° intervals and at each interval has an indent to allow a special hanger to locate. The special hanger suspends from the indents in the loading plate and hangs over the test bench. The special hanger enables pure bending, pure torque or combined loads to be applied depending on its position. The specimen deflection is measured by a dial gauge mounted diametrically opposite the load point. In the event of a specimen failure safety is ensured by set screws attached to the underside of the base plate. A set of test specimens in mild steel, aluminium alloy and brass is supplied, with optional test specimens also available separately. A set of test rods of the same specimen material is also supplied so that specimens of differing neck geometry can be produced.

#### Related Laws/Applications

- Rankine (Principal Stress).
- Principal Strain.
- Shear Stress (Guest).
- Strain Energy (Haigh).
- Shear Strain Energy (Von Mises and Hencky).

#### Learning capabilities

- To determine elastic failure of a specimen subjected to several ratios of bending and torsion simultaneously
- To compare the results with the established theories of failure

#### Technical Specification

- Test specimen: 5 x Mild steel, 5 x aluminium alloy, 5 x brass
- Test specimen dimensions: 65mm(L) x 20mm gauge length,  $\varnothing$ 4mm neck diameter
- Dial gauge: Analogue, 0...25mm travel; 0.01mm resolution
- Loading plate graduations: 15° (degrees)
- Test rods: Mild Steel, Aluminium alloy, Brass
- Test rods:  $\varnothing$ 9 x 300(L) mm

#### What's in the Box?

- 1 x HSM11
- 1 x Load hanger
- 3 x Specimens bar
- 5 x Steel specimens
- 5 x Brass specimens
- 5 x Aluminium specimens
- 1 x Vernier calipers
- 1 x Hex wrench set
- 1 x 2m Spare cord
- 1 x Dial gauge
- 1 x 1N; 2 x 2N; 1 x 5N; 4 x 10N
- Instruction manual
- Packing list
- Test sheet

#### You might also like

- HSM19
- HSM35

#### Weights & Dimensions

- Weight: 20 kg
- Length: 530mm
- Width: 230mm
- Height: 330mm

#### Essential Services

- Sturdy Bench top

#### Ordering information

To order this product, please call PA Hilton quoting the following code: HSM11

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