

WP 962

Beam on two supports: bending moment diagram



Description

■ application of the method of sections to determine the bending moment

WP 962 consists of a beam mounted on two supports which is subjected to point loads. The beam is cut at one point. At that point there is a low-friction hinge with one degree of freedom. The bending moment occurring at the section is recorded by a force gauge acting on a fixed lever arm. An adjuster nut on the force gauge is used to align the beam horizontally and balance out any lowering.

The reactions are determined from the static conditions of equilibrium. To investigate the effect of the point loads in the beam, it is notionally split into two segments. Applying the method of sections, the internal forces and moments are plotted onto the two segments and calculated by way of conditions of equilibrium.

Learning objectives/experiments

- calculation of the reactions arising from the static conditions of equilibrium
- application of the method of sections to calculate the internal moments
 - ▶ under a point load
 - ▶ under multiple point loads
- calculation of the bending moment curve
- comparison of calculated and measured bending moment values

Specification

- [1] investigation of bending moment on beam mounted on 2 supports
- [2] indication of bending moment in beam by low-friction hinge with 1 degree of freedom
- [3] position of hinge at $1/3$ span
- [4] 2 bearing supports
- [5] loading of beam by 1 to 3 point loads
- [6] force gauge and lever arm to indicate bending moment
- [7] adjuster nut for horizontal alignment of beam
- [8] storage system to house the components

Technical data

Beam

- total length: 1100mm
- span: 800mm

Bending moment measuring range: $\pm 10\text{Nm}$

Weights

- 3x 1N (weight holder)
- 3x 1N (hanger), 12x 1N, 9x 5N
- max. weight per hanger and weight holder: 20N

LxWxH: 1100x320x540mm (assembled)

LxWxH: 1180x490x180mm (storage system)

Total weight: approx. 40kg

Scope of delivery

- 1 experimental unit
- 1 set of weights
- 1 set of accessories
- 1 storage system with foam inlay
- 1 set of instructional material

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Optional accessories

WP 300.09

Laboratory trolley