Further Information to Quotation

GNTQ17790

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Customer: Selka Ltd.
Enquiry Ref.: ITÜ University, Turkey

Item	Description	Code	Qty.
1	Beam on 2 Supports: Shear Force & Bending Moment Diagrams	WP 960	1
2	Beam on Two Supports: Bending Moment Diagram	WP 962	1
3	Beam on Two Supports: Shear Force Diagram	WP 961	1
4	Lines of Influence on the Gerber Beam	SE 110.12	1
5	Mounting Frame	SE 112	1
6	Deformation of Straight Beams	WP 950	1
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	Please click here for further information: http://www.gunt.de/static/s4883_1.php		

WP 960 Beam on 2 Supports: Shear Force & Bending Moment Diagrams

*** Application of the method of sections to determine internal reactions of the beam**

*** Direct indication of shear force and bending moment at a section on the beam**

Technical Description

Statics observes the effect of forces on a rigid body, ignoring any possible deformations which may occur in the process. The forces are in equilibrium. In reality, forces always produce an effect in the component, such as deformation. These effects are investigated in the science of the strength of materials. The methods applied in strength of materials serve to design components so that they cannot be deformed or destroyed by applied forces.

A simple example is a statically determinate bearing-mounted beam subjected to point loads. The reactions are determined from the 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.

WP 960 includes a beam mounted on two supports. The beam is cut at one point. At that point there is a low-friction hinge with two degrees of freedom. Two force gauges determine the internal reactions to the externally applied forces at the section. The shear force is recorded and displayed directly by a force gauge. The bending moment occurring at the section is recorded by a second force gauge acting on a fixed lever arm. This force readout, divided by 10, gives the bending moment in Nm.

Adjuster nuts on the two force gauges are used to align the beam horizontally and balance out any deflection.

In evaluating the experiment it becomes clear that the shear force, as opposed to the bending moment, is mostly negligible when designing components.

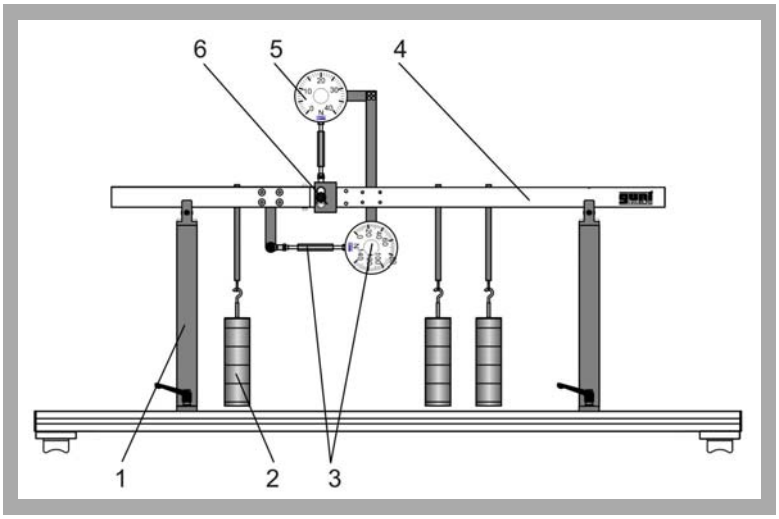
The various elements of the experiment are clearly laid-out and housed securely in a storage system. The complete experimental setup is arranged on a frame.

The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

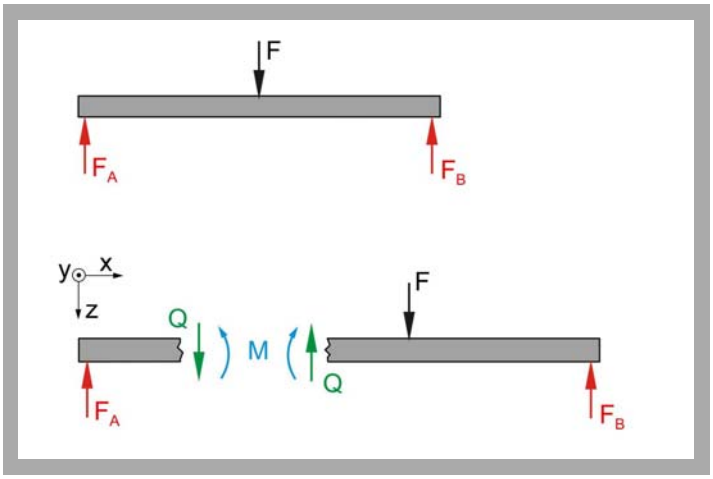
Learning Objectives / Experiments

- calculation of the reactions arising from the static conditions of equilibrium
- application of the method of sections to calculate the internal forces and moments
  * under a point load
  * under multiple point loads
- calculation of the shear force diagram
- calculation of the bending moment diagram
- comparison of calculated and measured values for shear force and bending moment

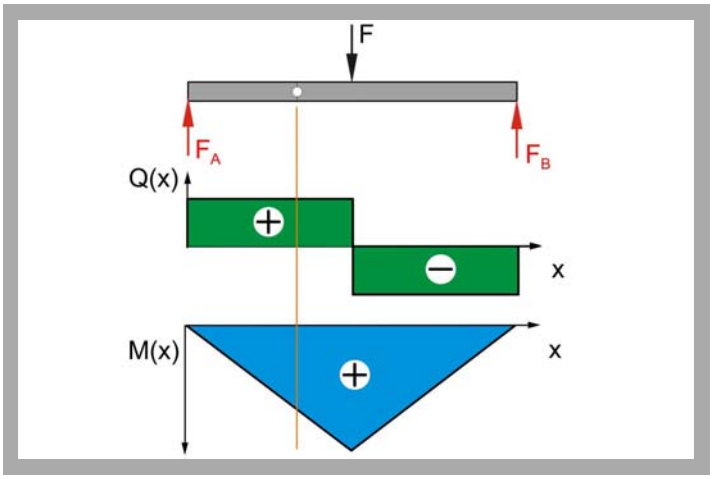
WP 960 Beam on 2 Supports: Shear Force & Bending Moment Diagrams



1 beam support, 2 load, 3 force gauge with adjuster nut to determine the bending moment, 4 beam, 5 force gauge (shear force), 6 hinge with 2 degrees of freedom



Internal forces on the beam under mid point load:
F applied point load, F_A/F_B reactions (0.5F), Q shear force, M bending moment



Shear force and bending moment diagram on beam with mid point load:
line (orange): position of the hinge at which the internal forces of the beam are indicated

Specification

[1] determination of shear force and bending moment on beam mounted on 2 supports
[2] measurement of shear force and bending moment in beam by low-friction hinge with 2 degrees 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 gauges to indicate shear force and determine bending moment
[7] bending moment determined by force measurement and lever arm
[8] adjuster nuts for horizontal alignment of beam
[9] steel rule to determine positions of point loads
[10] storage system to house the components

Technical Data

Beam
- total length: 1000mm
- span: 800mm

Measuring ranges
- bending moment via force gauge and lever arm
  lever arm: 100mm
  Force gauge: -100...+100N
  bending moment: -10...+10Nm
- shear force: -50...+50N
- steel rule: 1000mm, graduations: 1mm

Load
- 3x 1N (hangers)
- 12x 1N
- 9x 5N
- max. load per hanger: 20N

Dimensions and Weight

LxWxH: 1400x320x600mm
Weight: approx. 35kg
LxWxH: 1170x480x178mm (storage system)
Weight: approx. 12kg (storage system)

Scope of Delivery

1 experimental unit
1 set of loads
1 steel rule
1 storage system with foam inlay
1 set of instructional material

Order Details

020.96000 WP 960 Beam on 2 Supports: Shear Force & Bending Moment Diagrams

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web http://www.gunt.de

WP 962 Beam on Two Supports: Bending Moment Diagram

* Application of the method of sections to determine the bending moment

Technical Description

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

Scope of Delivery

1 experimental unit, 1 set of loads, 1 steel rule, 1 storage system with foam inlay, 1 set of instructional material

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: 1000mm, span: 800mm
Bending moment measuring range: -10...+10Nm
Load
- 3x 1N (hangers), 12x 1N, 9x 5N
- max. load per hanger: 20N

Dimensions and Weight

LxWxH: 1400x320x600mm
Weight: approx. 35kg
LxWxH: 1170x480x178mm (storage system)
Weight: approx. 12kg (storage system)

Order Details

020.96200	WP 962	Beam on Two Supports: Bending Moment Diagram

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web http://www.gunt.de

WP 961 Beam on Two Supports: Shear Force Diagram

* Application of the method of sections to determine the shear force

Technical Description

WP 961 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 force gauge indicates the internal reaction (shear force) at this point on the beam. An adjuster nut on the force gauge is used to align the beam horizontally and balance out any deflection.

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 forces
  * under a point load
  * under multiple point loads
- calculation of the shear force diagram
- comparison of calculated and measured shear force values

Scope of Delivery

1 experimental unit, 1 set of loads, 1 steel rule, 1 storage system with foam inlay, 1 set of instructional material

Specification

[1] investigation of shear force on beam mounted on 2 supports
[2] measurement of shear force 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 to indicate shear force
[7] adjuster nut for horizontal alignment of beam
[8] storage system to house the components

Technical Data

Beam
- total length: 1000mm, span: 800mm
Shear force measuring range: -50...+50N
Load
- 3x 1N (hangers), 12x 1N, 9x 5N
- max. load per hanger: 20N

Dimensions and Weight

LxWxH: 1400x320x600mm
Weight: approx. 35kg
LxWxH: 1170x480x178mm (storage system)
Weight: approx. 12kg (storage system)

Order Details

020.96100	WP 961	Beam on Two Supports: Shear Force Diagram

SE 110.12 *Lines of Influence on the Gerber Beam*

The illustration shows SE 110.12 in a the frame SE 112.

*** Articulated beam with two cantilever beams and a suspended beam as an example of a typical bridge**

*** Direct indication of reactions**

*** Lines of influence for different load cases**

Technical Description

Many bridges are executed as Gerber beams. Bridges are subjected to moving loads. Consequently, it is important to take these moving loads into account in the design process. To that end, the so-called lines of influence are determined. Lines of influence describe static reactions to a moving load, such as the internal reactions of the beam or support reactions. The lines of influence are determined by way of method of sections and the conditions of equilibrium, in the same way as the bending moment diagram for a static load for example.

A Gerber beam is an articulated beam, in the case of SE 110.12 with two cantilever beams and a suspended beam between them. Two bearings support each cantilever beam. The suspended beam is mounted on articulated supports on each of the cantilever beam arms. As a result the entire beam is statically determinate.

The cantilever beam supports are equipped with force gauges which indicate the support reactions.

Single loads and a moving load are provided to place load on the beam. This means the beam can be subjected to point or distributed loads, or to a moving load. The force gauges indicate the effect of a moving load directly in the support reactions. The supports are movable.

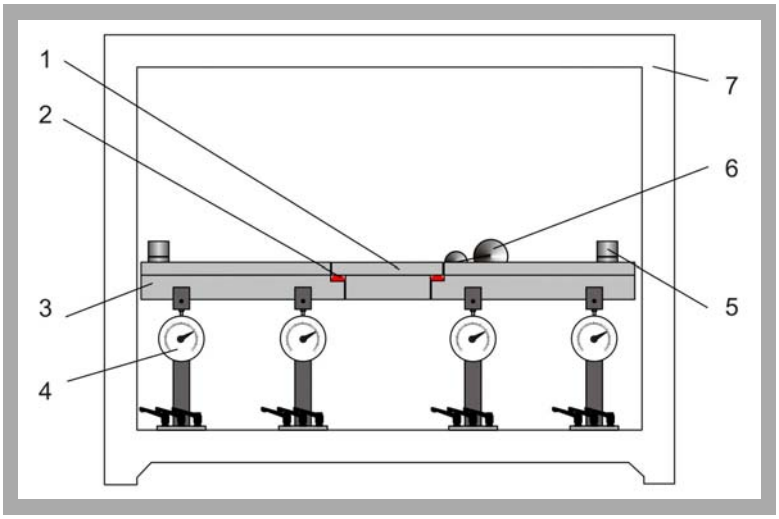
All the component elements of the experiment are clearly laid-out and housed securely in a storage system. The complete experimental setup is arranged in the frame SE 112.

The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

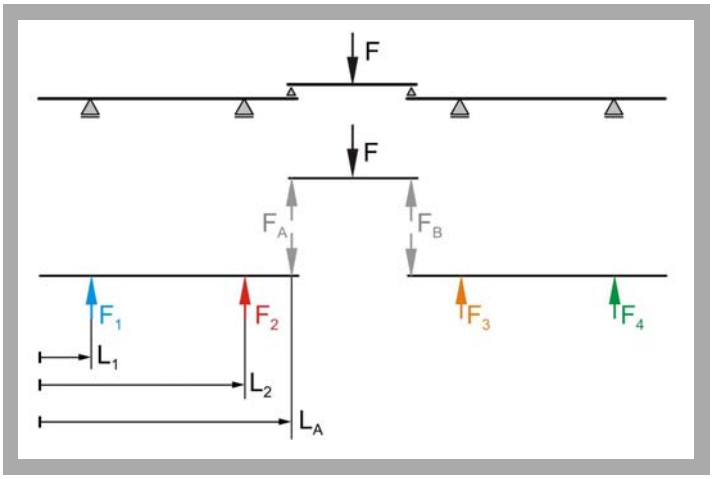
Learning Objectives / Experiments

- familiarisation with a Gerber beam
- application of the method of sections and the conditions of equilibrium to calculate the support forces for
  * point load
  * distributed load
  * moving load
- determination of the internal reactions under static load
  * shear force curve
  * bending moment diagram
- determination of the lines of influence under moving load
- comparison of the calculated and measured reactions for static and moving load

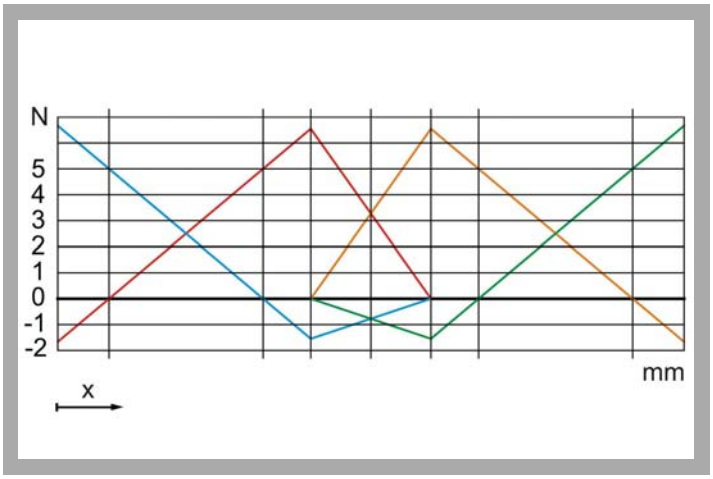
SE 110.12 Lines of Influence on the Gerber Beam



1 suspended beam, 2 articulated support, 3 cantilever beam, 4 support with force gauge, 5 load, 6 moving load, 7 frame SE 112



Top: simplified experimental setup (Gerber beam),
bottom: free body diagram: F applied load, F_A + F_B reactions of the articulated supports, F_1...F_4 reactions of the supports with force gauge,
L_1, L_2, L_A positions of the supports



Lines of influence for a moving point load (see also free body diagram):
blue: support 1, red: support 2, orange: support 3, green: support 4

Specification

[1] investigation of the lines of influence in a statically determinate Gerber beam under different loading
[2] Gerber beam comprising 2 cantilever beams and 1 suspended beam
[3] suspended beam mounted by articulated supports on cantilever beams
[4] beam subjected to moving load or loaded down by single loads
[5] 4 movable supports with force gauge
[6] storage system to house the components
[7] experimental setup in frame SE 112

Technical Data

Beam
- total length: 1220mm
- cantilever beam length: 503mm
- suspended beam length: 250mm
Force gauge: -50...+50N
Load
- 24x 5N
- 12x 1N
- moving load: 10+20N

Dimensions and Weight

LxWxH: 1170x480x178mm (storage system)
Weight: approx. 40kg (total)

Scope of Delivery

Gerber beam (2 cantilever beams + 1 suspended beam)
4 supports with force gauge
1 moving load
1 set of loads
1 storage system with foam inlay
1 set of instructional material

Order Details

022.11012	SE 110.12	Lines of Influence on the Gerber Beam

SE 112 Mounting Frame

* Mounting frame for set-up of experiments in statics, strength of materials and dynamics

Technical Description

The mounting frame SE 112 provides a clearly laid-out, user-friendly means of setting up experiments in the fields of statics, strength of materials and dynamics.

SE 112 comprises four steel sections which are bolted together to form a frame. Two feet on the sides provide stability. The frame is quick and easy to assemble, with just a few actions needed.

The frame is used for mounting the following experiments:
Forces and moments: SE 110.53
Trusses: SE 110.21, SE 110.22
Bridges, beams, arches, cables: SE 110.12, SE 110.16, SE 110.17, SE 110.18, SE 110.50
Elastic deformations: SE 110.47, SE 110.29, SE 110.20, SE 110.44
Stability: SE 110.19
Vibration: SE 110.58

Scope of Delivery

1 mounting frame, disassembled
1 set of bolts with hexagon socket wrench
1 instruction manual

Specification

[1] Frame for mounting of experiments in statics, strength of materials and dynamics
[2] Sturdy sectional steel double frame, welded
[3] Easy, exact mounting of all components by precision clamp fixings
[4] Stable on laboratory desktops or workbenches
[5] Frame supplied disassembled

Technical Data

Mounting frame made of steel sections
- frame opening w x h: 1250x900mm
- section groove width: 40mm

Dimensions and Weight

l x w x h: 1400 x 400 x 1130 mm (assembled)
l x w x h: 1400 x 400 x 200 mm (without mountings)
Weight: approx. 32 kg

Order Details

022.11200	SE 112 Mounting Frame

WP 950 Deformation of Straight Beams

*** Deformation of a beam on two or more supports under point loads (e.g. single-span beam)**

*** Deformation of a cantilever beam under point loads**

*** Statically determinate or indeterminate systems**

Technical Description

Beams are key structural elements in mechanical engineering and in construction. A beam is a bar-shaped component in which the dimensions of the cross-section are much smaller than the length and which is subjected to load along and perpendicular to its longitudinal axis. The load perpendicular to the longitudinal axis causes a deformation of the beam - that is, bending. Based on its size, the beam is viewed as a one-dimensional model.

The science of the strength of materials deals with stress and strain resulting from the application of load to a component. Many fundamental principles of the strength of materials can be illustrated well by a straight beam.

The beam under investigation in WP 950 can be supported in different ways. This produces statically determinate and indeterminate systems which are placed under load by different loads. The load application points are movable. Three dial gauges record the resulting deformation. Three articulated supports with integral force gauges indicate the support reactions directly. The articulated supports are height-adjustable, so as to compensate for the influence of the dead- weight of the beam under investigation. A fourth bearing clamps the beam in place.

Five beams of different thicknesses and made of different materials demonstrate the influence of the geometry and of the modulus of elasticity on the deformation of the beam under load.

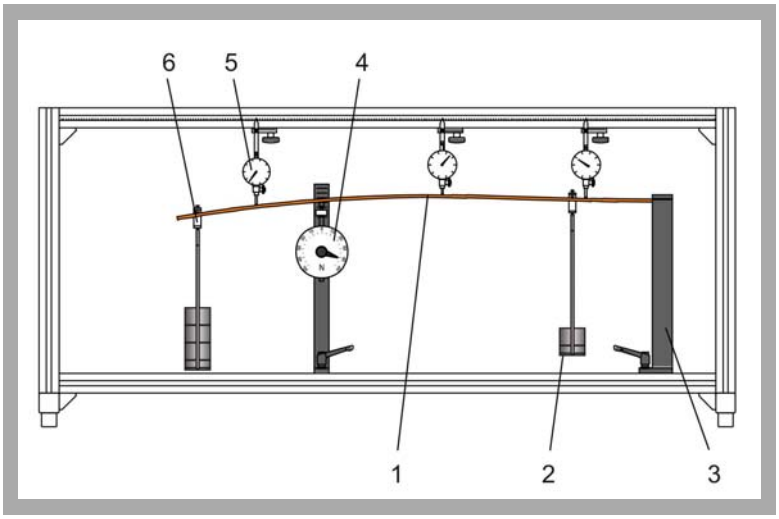
The various elements of the experiment are clearly laid-out and housed securely in a storage system. The complete experimental setup is arranged in the frame.

The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

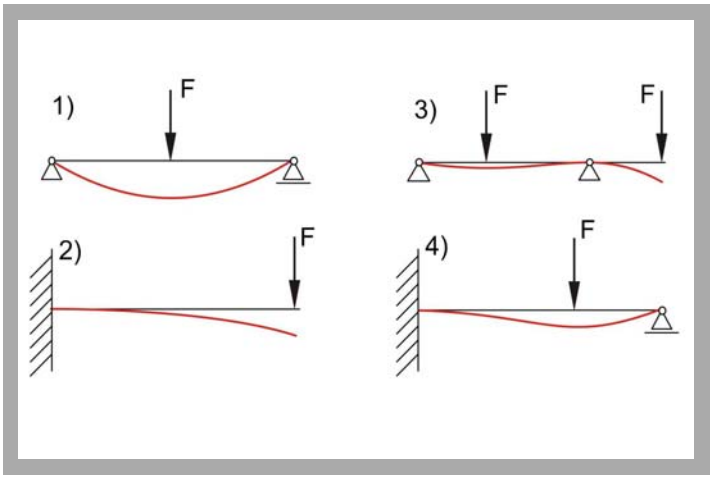
Learning Objectives / Experiments

- investigation of the deflection for statically determinate and statically indeterminate straight beams
  * cantilever beam
  * single-span beam, dual- or triple-span beam
  * formulation of the differential equation for the elastic line
- deflection on a cantilever beam
  * measurement of deflection at the force application point
- deflection of a dual-span beam on three supports
  * measurement of the support reactions
  * measurement of the deformations
- influence of the material (modulus of elasticity) and the beam cross-section (geometry) on the elastic line
- Maxwell-Betti coefficients and law
- application of the principle of virtual work on statically determinate and indeterminate beams
- determination of lines of influence
  * arithmetically
  * qualitatively by way of force method (Müller-Breslau)

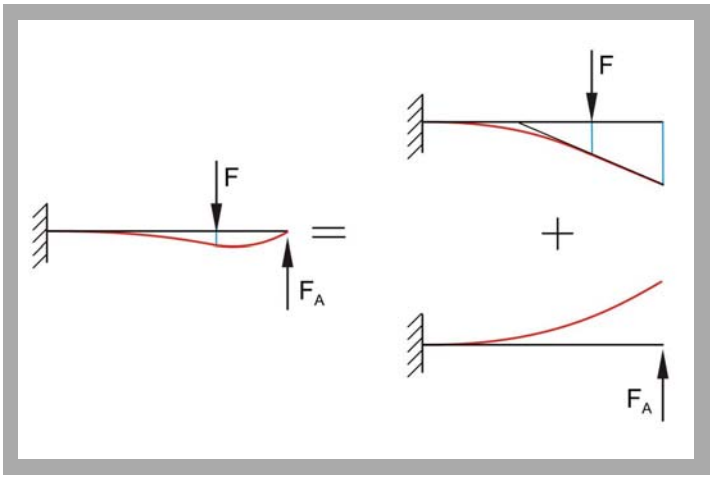
WP 950 Deformation of Straight Beams



1 beam, 2 load, 3 bearing with clamp fixing, 4 bearing with force gauge, 5 dial gauge, 6 adjustable hook



Elastic lines for statically determinate (left) and indeterminate (right) cases:
1 single-span beam with fixed and movable support, 2 cantilever, 3 beam with 2 fixed supports, 4 propped cantilever



Superposition principle: the total elastic line of the statically indeterminate beam (left) is the sum of the deformations of the external force at the support (right)

Specification

[1] elastic lines of statically determinate and indeterminate beams under various clamping conditions
[2] 3 steel beams with different cross-sections
[3] 1 brass and 1 aluminium beam
[4] 3 articulated, height-adjustable supports with force gauge
[5] 1 support with clamp fixing
[6] force gauges can be zeroed
[7] 3 dial gauges to record deformations
[8] loads with adjustable hooks
[9] anodised aluminium section frame housing the experiment
[10] storage system to house the components

Technical Data

Beam
- length: 1000mm
- cross-sections
  3x20mm (steel)
  4x20mm (steel)
  6x20mm (steel, brass, aluminium)

Frame opening: 1320x480mm
Measuring ranges
- force: -50..+50N, graduations: 1N
- travel: 0...20mm, graduations: 0,01mm

Load
- 4x 2,5N (hanger)
- 4x 2,5N
- 16x 5N

Dimensions and Weight

LxWxH: 1400x400x630mm (frame)
Weight: approx. 37kg
LxWxH: 1170x480x178mm (storage system)
Weight: approx. 12kg (storage system)

Scope of Delivery

1 frame
5 beams
4 supports
1 set of loads
3 dial gauges
1 storage system with foam inlay
1 set of instructional material

Order Details

020.95000	WP 950	Deformation of Straight Beams

WP 121 Demonstration of Euler Buckling

*** Demonstration of all buckling cases of Euler buckling**

*** Buckling length clearly visible with various methods of support**

*** Test bars made of spring steel**

*** Set of finely graduated loads**

Technical Description

In stability theory, the four cases of Euler buckling represent the elastic flexural buckling of straight bars. Above a specific load - the buckling load - a loss of stability occurs and the bar increasingly changes shape. The axis of the bar is deflected laterally.

Euler describes four cases for the buckling of an elastic bar with central application of compressive force and various methods of support.

WP 121 demonstrates the four cases of Euler buckling. Depending on the end conditions, different loads are required until the buckling load is reached and the axes of the bars are laterally deflected. The buckling length is clearly visible against the white backing wall with the grid patterning.

The test bars are made of stainless spring steel, and remain within the elastic range during the experiment. The test bars are either fixed or pinned (free to rotate), depending on the chosen support method. This enables all buckling cases according to Euler to be set up with the various support conditions. Mounts are provided in the top supports to hold the loads.

Load is gradually applied to the test bars in small increments. This enables the sudden loss of stability - the buckling - to be clearly shown.

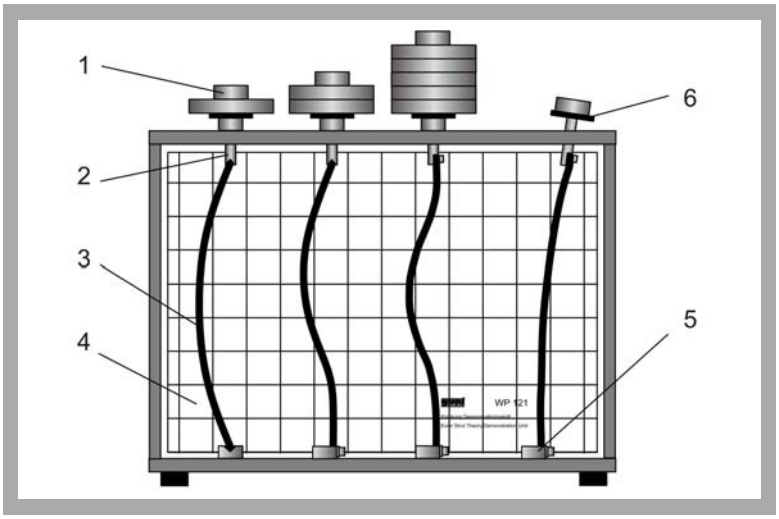
The various elements of the experiment are clearly laid-out and housed securely in a storage system.

The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

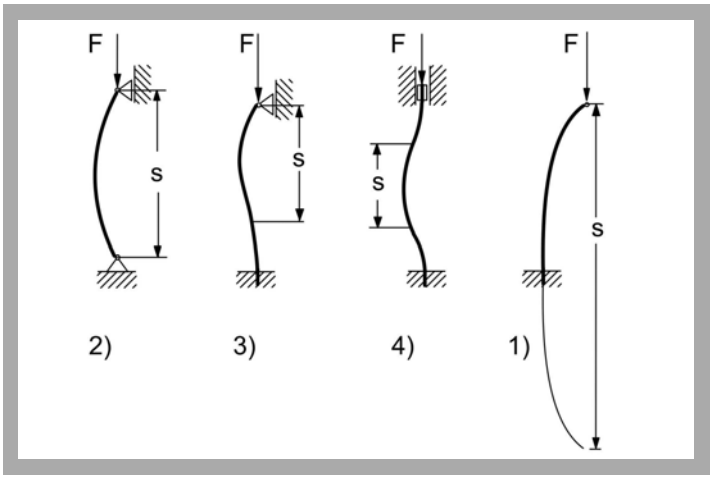
Learning Objectives / Experiments

- demonstration of various buckling problems
  * Euler case 1 - fixed-free bar
  * Euler case 2 - pinned-pinned bar
  * Euler case 3 - fixed-pinned bar
  * Euler case 4 - fixed-fixed bar
- familiarisation with the correlation between buckling length, buckling load and various methods of support

WP 121 Demonstration of Euler Buckling



1 load, 2 pinned support, 3 bar, 4 backing wall with grid pattern, 5 fixed support, 6 mount for loads



Buckling length dependent on end conditions of bars:
1) Euler case 1: fixed-free bar
2) Euler case 2: pinned-pinned bar
3) Euler case 3: fixed-pinned bar (pinned at the top)
4) Euler case 4: fixed-fixed bar;
F applied buckling load, s buckling length

Storage system

Specification

[1] demonstration of elastic buckling
[2] representation of all cases of Euler buckling
[3] 4 steel test bars
[4] loading of test bars with loads
[5] test bars cannot be overloaded
[6] white backing wall with grid patterning
[7] storage system to house the components

Technical Data

Test bars
- quantity: 4
- bar length: 180mm
- bar cross-section: 0,5x12mm
- material: steel 1.4310 cold-worked
- buckling loads: approx. 2...32N

Load
- 10x 5N
- 5x 1N

Dimensions and Weight

LxWxH: 380x110x270mm
Weight: approx. 10kg
LxWxH: 720x480x178mm (storage system)
Weight: approx. 10kg (storage system)

Scope of Delivery

1 experimental unit
4 test bars
1 set of loads
1 storage system with foam inlay
1 set of instructional material

Order Details

020.12100	WP 121	Demonstration of Euler Buckling

WP 120 Buckling Behaviour of Bars

*** Investigation of all relevant buckling problems**

*** Verification of the Euler Theory of buckling**

*** Methods of force and deflection measurement**

*** Supplementary set for experiments with eccentric application of force and transverse loading**

*** Comprehensive instructional material**

Technical Description

In technical mechanics, loss of stability is known as buckling. Under the effects of compressive forces, and under increasing load, the axis of the bar deflects laterally until it suddenly and violently fails (collapses), even before the fracture point is reached. The stresses in the bar often remain within the elastic range during this process.

WP 120 investigates the buckling behaviour of bars under various influences. All relevant buckling problems are demonstrated by way of experimentation.

For the purpose, one end of a bar is fixed or pinned, depending on the buckling case. A height-adjustable load-carrying cross-arm and a hand-operated spindle are used to apply compressive force to the bar. An axial bearing between the spindle and the bar support prevents torsional loading of the test bar. A hydraulic load cell measures the applied force and indicates it on a pressure gauge. The lateral deflection of the bar is indicated on a dial gauge.

Experiments demonstrate various influences, such as bar lengths, materials and methods of support. A transverse load application device can be used to generate additional shear forces on the test bar.

The experimental unit can be operated vertically or horizontally. The load gauge can be rotated 90° to adjust to the chosen option. A supplementary set extends the scope of experimentation offered by WP 120.

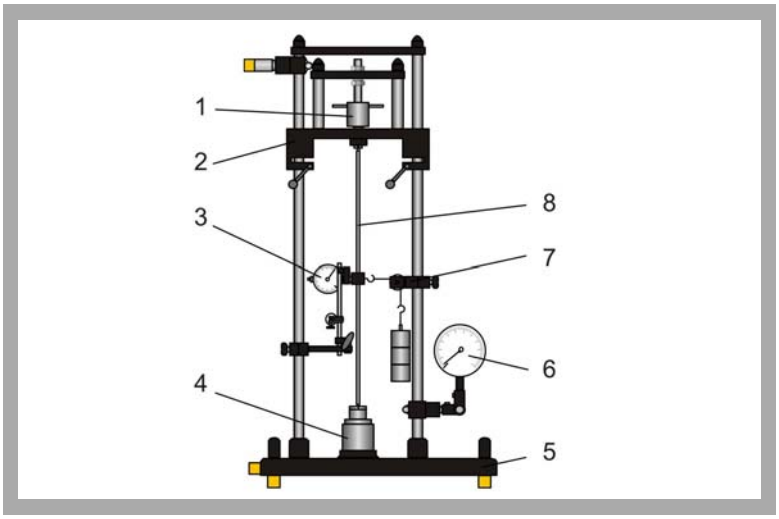
The various elements of the experiment are clearly laid-out and housed securely in a storage system.

Learning Objectives / Experiments

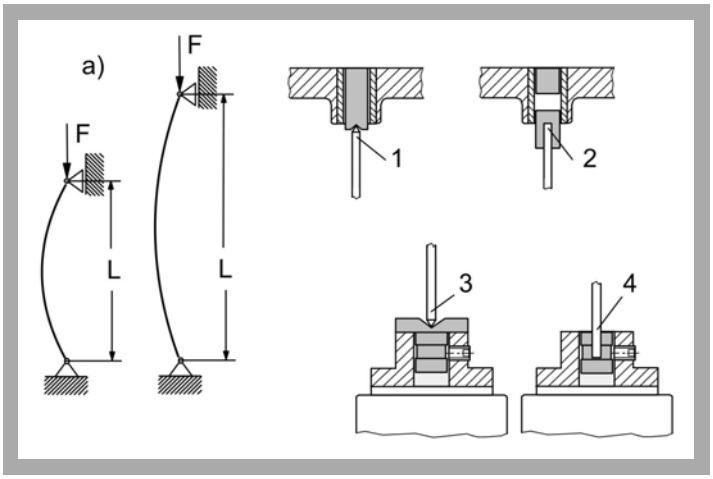
- investigation of buckling behaviour under the influence of
  * various methods of support
  * various bar lengths, cross-sections
  * various materials
- verification of the Euler Theory: buckling on elastic bars
- determination of the modulus of elasticity for an unknown material (GRP)
- measurement of force and deflection
- calculation of the expected buckling force by the Euler formula
- graphical evaluation of deflection and force

With supplementary set WP 120.01
- investigation of buckling behaviour under the influence of
  * various cross-sectional shapes
  * eccentric application of force
  * additional transverse loading

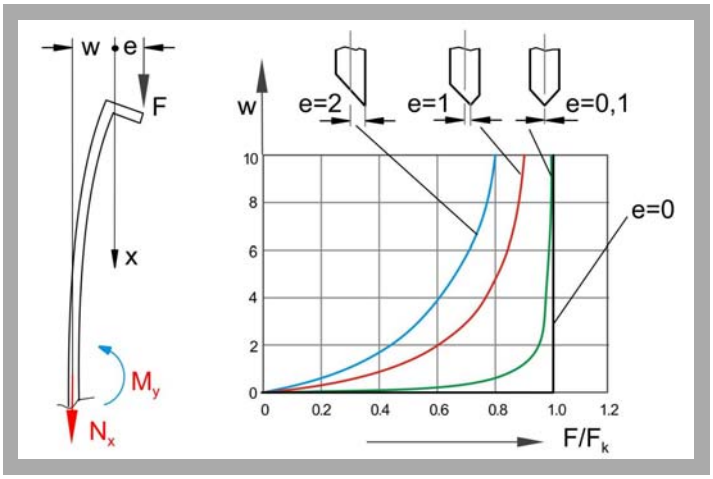
WP 120 Buckling Behaviour of Bars



1 spindle, 2 height-adjustable load-carrying cross-arm, 3 dial gauge for lateral deflection of test bar, 4 load cell, 5 frame, 6 pressure gauge, 7 device to generate a transverse load, 8 test bar



a) experiment investigating the influence of bar length on buckling behaviour: F applied force, L bar length; 1 pinned end, top, 2 fixed end, top, 3 pinned end, bottom, 4 fixed end, bottom



Experiment with eccentric application of force (WP 120.01): F applied force, e eccentricity, w deflection, M_y bending moment, F/F_k compressive force referred to critical compressive force;
diagram: deflection of test bar for various eccentricities

Specification

[1] investigation and testing of all relevant buckling cases
[2] verification of the Euler Theory of buckling
[3] experiments in horizontal or vertical orientation
[4] test bars in various lengths and materials
[5] test bar ends pinned or fixed
[6] spindle to apply forces
[7] transverse load application device generates shear forces
[8] force measurement using a hydraulic load cell
[9] measurement of lateral deflection by dial gauge
[10] additional experiments with supplementary set WP 120.01
[11] storage system to house the components

Technical Data

Test bars
- quantity: 11
- bar length: 350...700mm (max.)
- materials: aluminium, copper, brass, steel, GRP
- cross-sections: 10x4mm, 25x6mm, 25x10mm

Load application spindle
- force: max. 2000N
- stroke: max. 10mm

Lateral deflection: max. 20mm
Specimen holder bore: d=20mm
Measuring ranges
- force: 0...2500N, graduations: 50N
- deflection: 0...20mm, graduations: 0,01mm

Set of loads for transverse load: max. 20N
- 3x 5N, 1x 5N (hanger)

Dimensions and Weight

LxWxH: 620x450x1150mm
Weight: approx. 63kg
LxWxH: 1170x480x178mm (storage system)
Weight: approx. 12kg (storage system)

Scope of Delivery

1 experimental unit
11 test bars
1 dial gauge with bracket
1 storage system with foam inlay
1 set of instructional material

Order Details

020.12000 WP 120 Buckling Behaviour of Bars

WP 120 Buckling Behaviour of Bars

WP 120 Buckling Behaviour of Bars

WP 120 includes the following test bars:

- 350x20x4mm, steel, pinned end /pinned end
- 500x20x4mm, steel, pinned end /pinned end
- 600x20x4mm, steel, pinned end /pinned end
- 650x20x4mm, steel, pinned end /pinned end
- 700x20x4mm, steel, pinned end /pinned end
- 650x20x4mm, steel, fixed end/pinned end
- 650x20x4mm, steel, fixed end/fixed end
- 600x25x6mm, aluminium, pinned end /pinned end
- 600x25x6mm, brass, pinned end /pinned end
- 600x25x6mm, copper, pinned end /pinned end
- 600x25x10mm, GRP, pinned end /pinned end

Available accessories and options:

Item no.	**Description**
020.12001	WP 120.01 Supplementary Set, 10 Test Bars

WP 120.01 includes the following test bars:

- 500x25x6mm, aluminium, pinned end/pinned end, eccentricity 0mm
- 500x25x6mm, aluminium, pinned end/pinned end, eccentricity 1mm
- 500x25x6mm, aluminium, pinned end/pinned end, eccentricity 3mm
- 500x40x6mm, aluminium, pinned end/pinned end
- 700x25x10mm, GRP, pinned end/pinned end
- D=16x2mm, L=400mm, PVC, pinned end/pinned end
- D=20x1.5mm, L=400mm, PVC, pinned end/pinned end
- 700x10x2mm, aluminium, pinned end/pinned end
- D=15x2mm, L=700mm, aluminium, pinned end/pinned end
- D=14mm, L=700mm, aluminium, pinned end/pinned end