Features

- 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

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.

Tesca Buckling Behavior of Bars investigates the buckling behavior of bars under various influences. All relevant buckling problems are demonstrated by way of experimentation.

For this 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 a 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 Tesca Buckling Behavior of Bars. The various elements of the experiment are clearly laid-out and housed securely in a storage system.

Specifications

- Investigation and testing of all relevant buckling cases
- Verification of the Euler Theory of buckling
- Experiments in horizontal or vertical orientation
- Test bars in various lengths and materials
- Test bar ends pinned or fixed
- Spindle to apply forces
- Transverse load application device generates shear forces
- Force measurement using a hydraulic load cell
- Measurement of lateral deflection by dial gauge
- Additional experiments with supplementary set
- Storage system to house the components

Note: Specifications are subject to change.

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Technical Specifications

- Test bars
  - Quantity: 11
  - Bar length: 350...700mm (max.)
  - Material: aluminum, 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 weights for transverse load: max. 20N
  - 3x 5N, 1x 5N (hanger)

Experiments

- Investigation of buckling behavior 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
- Investigation of buckling behavior under the influence of
  - Various cross-sectional shapes
  - Eccentric application of force
  - Additional transverse loading

Scope of Delivery

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

Note: Specifications are subject to change.

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