Experimental units for the field of statics

The engineering mechanics – statics chapter offers examples on the following subject areas:

Forces and moments

- demonstration of forces and graphical resolution of forces
- investigation of lever systems
- planar central force systems and statically defined systems
- bar forces, support forces, equilibrium of forces, equilibrium of moments and equilibrium conditions


TM 115 Forces in a crane jib
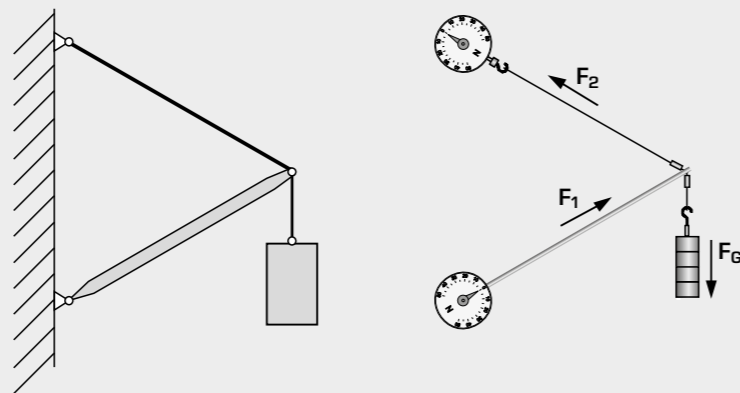
Resolution of forces on the planar central force system

External forces: F_1 and F_2 bar forces and F_G weight

Internal reactions and methods of section

- demonstration of internal reactions
- application of the method of sections
- investigation of normal force, shear force and bending moment diagrams

WP 960 Beam on two supports:
shear force & bending moment diagrams
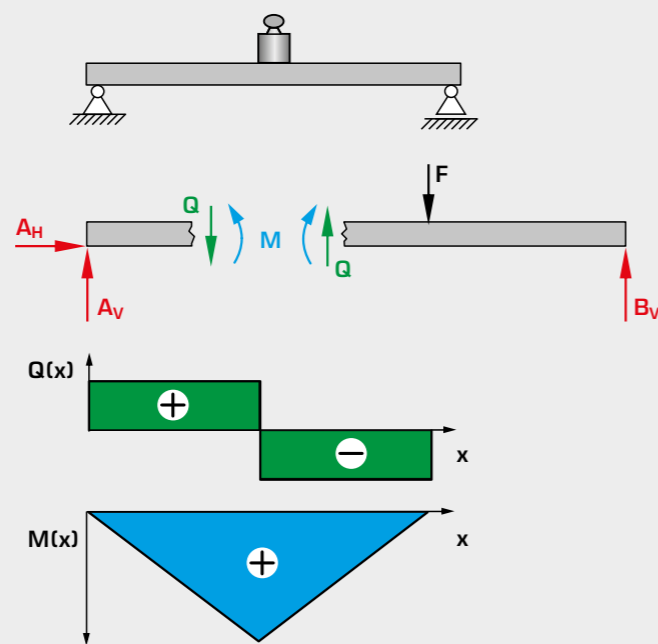
Internal reactions in a beam

F external force, A_V, A_H, B_V support forces, Q shear force, M bending moment

Forces in a truss

- bar forces in statically determinate and indeterminate trusses
- dependence of bar forces on external forces
- method of sections: method of joints and Ritter's method
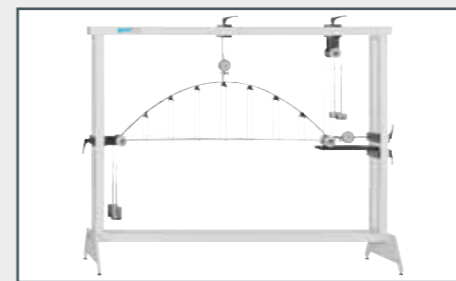- graphical method: Cremona diagram
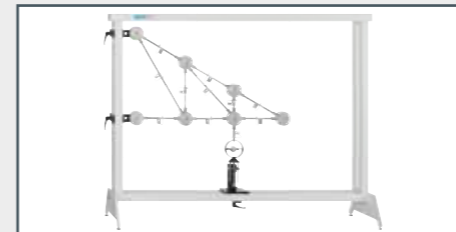
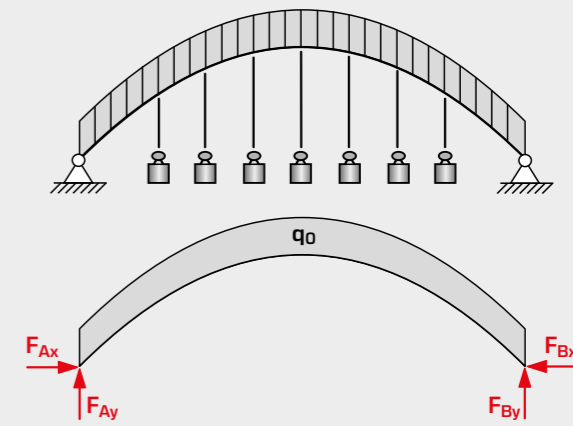SE 110.21 Forces in various single plane trusses
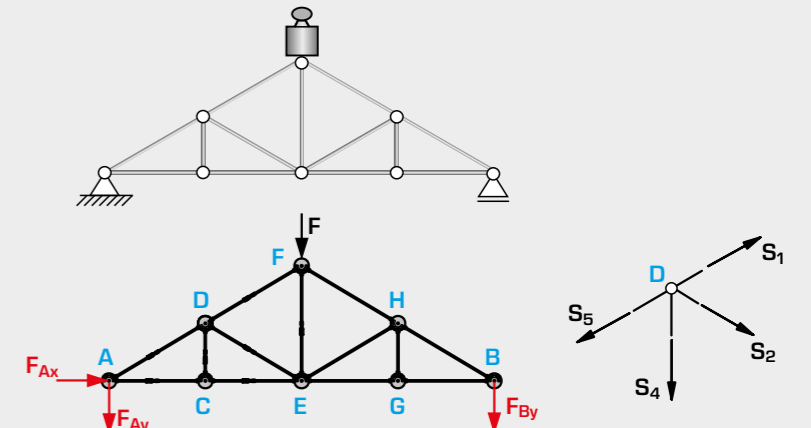
Method of joints to determining the forces on a truss

F force, F_{Ax}, F_{Ay}, F_{By} support forces, S bar forces, A-H joints

Bridges, beams, arches and cables

- calculation of support forces
- determining internal reactions
- different load cases: point load, line load and moving load
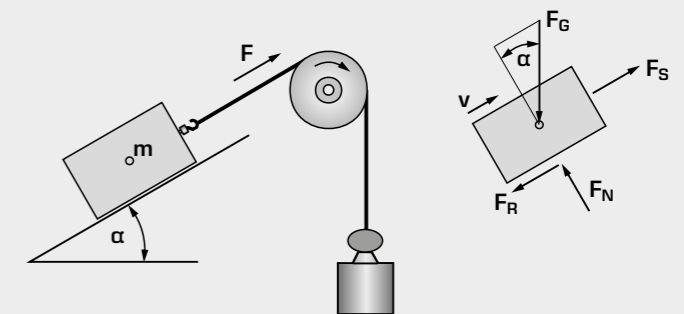

SE 110.16 Parabolic arch

Line load and support reactions on an arch

F_{Ax}, F_{Ay}, F_{Bx}, F_{By} support forces, q_0 line load

Static and kinetic friction

- static and dynamic friction
- demonstration of frictional forces
- determining the coefficients of friction

TM 225 Friction on the inclined plane

Friction on the inclined plane

F_G weight, F_S external force, F_N normal force, F_R dynamic friction force, v velocity, α angle of inclination, m mass