Engineering Mechanics – Statics

University Mechanical Engineering · Vocabulary in context

Word	Example
engineering statics /ˌendʒɪˈnɪərɪŋ ˈstætɪks/	Use **engineering statics** to find the forces holding this shelf.
free-body diagram /friː ˈbɒdi ˈdaɪəgræm/	Draw a **free-body diagram** with an arrow for each force.
force /fɔːs/	You use a **force** to push a door open.
magnitude /ˈmægnɪtjuːd/	The force has a **magnitude** of 20 N. 20 N
direction /daɪˈrekʃn/	State the force's **direction** as 30 degrees above horizontal. 30 degrees
line of action /laɪn ɒv ˈækʃn/	The **line of action** of the weight passes through the centre of gravity.
resultant /rɪˈzʌltənt/	The **resultant** of two forces is the single force that has the same effect as both together.
newtons	A force of ten **newtons** is about the weight of one kilogram.
applied loads	List the **applied loads** with direction and point of application.
reactions	Include the support **reactions** on the beam's free-body diagram.
centre of gravity /ˈsentə ɒv ˈgrævɪti/	A bus tips over if its **centre of gravity** is too high.

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statically determinate /ˈstætɪkli dɪˈtɜːmɪnət/	Equilibrium equations alone determine the reactions in this **statically determinate** model.
• **particle** /ˈpɑːtɪkl/	Modelling the ball as a **particle** means we ignore its size and any rotation.
concurrent /kənˈkʌrənt/	**Concurrent** force lines meet at one point.
moment /ˈməʊmənt/	A long spanner gives a larger **moment**.
moment arm /ˈməʊmənt ɑːm/	Measure the **moment arm** perpendicular to the force's line.
couple /ˈkʌpl/	Your two hands on a steering wheel make a **couple**.
roller /ˈrəʊlə/	A smooth **roller** supplies a force perpendicular to its supporting surface.
pin /pɪn/	A **pin** support allows rotation but prevents horizontal and vertical movement.
fixed support /fɪkst səˈpɔːt/	A **fixed support** resists movement and rotation.
two-force member /tuː fɔːs ˈmembə/	A balanced **two-force member** carries equal, opposite forces along its length.
truss /trʌs/	The roof **truss** uses straight bars joined at pins.
tension /ˈtenʃn/	**Tension** pulls both ends of the member away from its centre.
compression /kəmˈpreʃn/	**Compression** pushes both ends of the member towards its centre.

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method of joints /ˈmeθəd ɒv dʒɔɪnts/	Use the **method of joints** to balance forces at this joint.
method of sections /ˈmeθəd ɒv ˈsekʃnz/	Use the **method of sections** to find forces across this cut.
zero-force members	These **zero-force members** carry no force under the stated loading.
frames and machines /freɪmz ænd məˈʃiːnz/	**Frames and machines** can contain members carrying several forces.
friction /ˈfrɪkʃn/	**Friction** opposes the box's relative sliding along the floor.
coefficient of static friction /ˌkəʊɪˈfɪʃənt ɒv ˈstætɪk ˈfrɪkʃn/	**Coefficient of static friction** limits friction before the block slides.
coefficient of kinetic friction /ˌkəʊɪˈfɪʃənt ɒv kɪˈnetɪk ˈfrɪkʃn/	**Coefficient of kinetic friction** relates sliding friction to normal force.
impending slip /ɪmˈpendɪŋ slɪp/	**Impending slip** occurs when static friction reaches its limiting value.
distributed load /ˈdɪstrɪbjuːtɪd ləʊd/	The beam carries a uniform **distributed load** of 2 kN/m. 2 kN/m
centroid /ˈsentrɔɪd/	Locate the **centroid** of the triangular load diagram.

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