Machine Design

University Mechanical Engineering · Vocabulary in context

Word	Example
machine design	**Machine design** turns loads into parts that survive them.
assembly drawing	The **assembly drawing** shows how the parts go together.
exploded view	An **exploded view** pulls the parts apart along the shaft axis.
balloons	**Balloons** link each part in the view to the parts list.
bill of materials	Keys, seals and bolts belong in the **bill of materials** too.
parametric modelling	**Parametric modelling** stores sizes as named, linked parameters.
design intent	**Design intent** decides which sizes drive and which follow.
revision control	**Revision control** gives every released drawing a letter.
load path	Trace the **load path** from the motor to the floor.
factor of safety	A **factor of safety** of 1.52 covers load, strength and model errors.
fatigue /fə'ti:g/	Metal **fatigue** makes a part crack after it bends many times.
distortion energy	Use the **distortion energy** criterion for ductile steel.

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Coulomb–Mohr	**Coulomb–Mohr** suits brittle cast iron.
S-N curve	The **S-N curve** shows strength falling with the number of cycles.
endurance limit	The shaft's **endurance limit** is 222 MPa after Marin factors. 222 MPa
Goodman line	The **Goodman line** combines alternating and mean stress.
Marin factors	**Marin factors** reduce the test-bar limit for surface and size.
rolling bearings	**Rolling bearings** are chosen from catalogue load ratings.
basic dynamic load rating	The 6206 has a **basic dynamic load rating** of 19.5 kN. 6206 19.5 kN
L10 life	The **L10 life** is the life that 90% of bearings reach. 90%
bolted joint	A preloaded **bolted joint** shares the load by stiffness.
preload	Tighten the M10 bolt to a **preload** of 26.1 kN. M10 26.1 kN
spur gear	A **spur gear** has straight teeth parallel to the shaft.
line of action /laɪn ɒv ˈækʃn/	The tooth force acts along the **line of action**.
pressure angle	A **pressure angle** of 20° gives a radial force component. 20°
module /ˈmɒdjuːl/	The **module** is the pitch diameter divided by the number of teeth.

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Lewis form factor	The **Lewis form factor** carries the tooth shape into the stress.
design spiral	Each turn of the **design spiral** repeats the checks with better numbers.
weighted decision matrix	Fix the weights before scoring the **weighted decision matrix**.

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