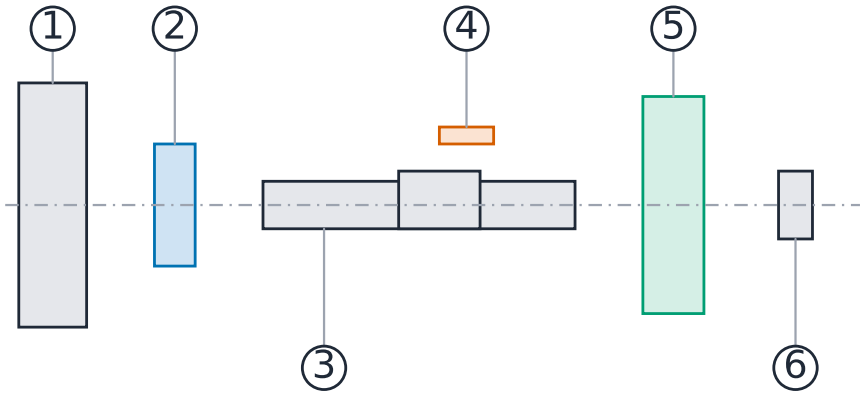
Exercise walk-through

9.1
Design communication and CAD

University Mechanical Engineering

Exploded view, balloons, parts list

exploded along the axis: assembly order, left to right



parts list (rev B)

1 housing GJL-250
2 bearing 6206
3 shaft C45, Ø30
4 key 8×7×40
5 gear 136 T, m 3
6 nut M30 lock

Six parts from three suppliers stay consistent only through one BOM, one revision letter and dimensions driven by the bearing bore.

Design intent in one change

1. **Fixed key** Key drawn at 40 mm; hub shortened from 45 to 36 mm - the key is now longer than its hub.
2. **Related key** $L_{key} = L_{hub} - 5$ gives a 31 mm key automatically.
3. **Bearing change** 6206 $\rightarrow$ 6207 (30 $\rightarrow$ 35 mm bore) updates seat, shoulder (36 $\rightarrow$ 42 mm) and gear bore from one parameter.

Decision

Choose the driving dimensions by function, then let the rest follow.

Exercises 2.1·2.2

2.1 An assembly has one shaft, two bearings, one gear, one key, two circlips and four M8 bolts. Write its bill of materials as a table with item, part and quantity, and give the total number of parts. [3]

2.2 The design is changed to a 6208 bearing (40 mm bore, 47 mm abutment). Which three sizes should follow automatically, and to what values? [3]

Exercises 2.1·2.2

2.1 An assembly has one shaft, two bearings, one gear, one key, two circlips and four M8 bolts. Write its bill of materials as a table with item, part and quantity, and give the total number of parts. [3]

2.1

- A table with one row per part type: shaft 1, bearing 2, gear 1, key 1, circlip 2, M8 bolt 4.
- Total $1 + 2 + 1 + 1 + 2 + 4 = \mathbf{11}$ parts.

2.2 The design is changed to a 6208 bearing (40 mm bore, 47 mm abutment). Which three sizes should follow automatically, and to what values? [3]

2.2

- Bearing seats **40** mm; shoulder **47** mm; gear bore **40** mm (it follows the seat).

Exercise 2.3

2.3 In the model the gear bore was typed as “30” instead of being linked to the seat parameter. Describe what happens after the change of 2.2, and when the error would be found. [2]

Exercise 2.3

2.3 In the model the gear bore was typed as “30” instead of being linked to the seat parameter. Describe what happens after the change of 2.2, and when the error would be found. [2]

2.3

- The seat grows to 40 mm but the gear bore stays at 30 mm, so the model no longer fits together.
- Nothing warns the designer; it is found at assembly or inspection, the most expensive point.

Exercise 3.1

3.1 The supplier asks to widen the gear face from 30 to 34 mm. Write the change note: the reason, the parts affected (at least three), two checks that must be repeated and why, and the revision action on the drawings. [6]

Exercise 3.1

3.1 The supplier asks to widen the gear face from 30 to 34 mm. Write the change note: the reason, the parts affected (at least three), two checks that must be repeated and why, and the revision action on the drawings. [6]

3.1

- Reason: supplier tooling, face 30 → 34 mm.
- Parts: gear, key (longer engagement), spacer or shaft step length.
- Checks: gear bending stress (it falls with the wider face) and the shaft span and bearing reactions, which change if the gear moves.
- New revision letter on every affected drawing, with the old ones withdrawn.