

Outline

- ❖ Hydrodynamic/Journal/Sleeve Bearings
- ❖ Rolling-Element Bearings
 - types
 - selection of roller bearings

Bearings

**all bearings are of course only
necessary evils,**

contributing nothing to the product or function of the machine; and any virtues they can have are only of a **negative order**. Their merits consist in *absorbing as little power as possible, wearing out as slowly as possible, occupying as little space as possible, and costing as little as possible*

(Michell, 1929)

Comparing Rolling to Journal

Selection Factors	Relative rating	
	deep groove ball	full journal
Low starting friction	good	intermediate
Low running friction	good	intermediate
Low noise	good	intermediate
Small diameter ①	good	intermediate
Short length ①	good	intermediate
High accuracy	intermediate	poor
Most available	intermediate	poor
High radial load ②	intermediate	poor
High thrust load ②	intermediate	poor
High dynamic load ②	intermediate	poor
Tolerate misalignment	intermediate	poor
Tolerate dirt	intermediate	poor
Low initial cost	intermediate	poor
High speed	intermediate	poor
High temperature ③	intermediate	poor
Simple lube system	intermediate	poor
High stability ④	intermediate	poor
Easy for designer	intermediate	poor

① with a given load (radial or thr
 ② journal or thrust type ③ restr

④ ap

- ❖ Rolling Bearing are better because:
 - low starting and good operating friction
 - radial and thrust loads
 - no self-excited instabilities
 - less space axially
 - can seal lubricant in bearing
- ❖ Journal Bearings are better because:
 - fatigue failure not a problem
 - less space radially
 - less noise
 - more tolerant to misalignment
 - less expensive, except for oiling system
 - less operating friction