

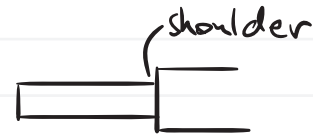
Shafts + shaft components: Layout

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Machine elements that typically attach to a shaft include
gears,
bearings,
pulleys, and
sprockets.

The **layout** of these components on a shaft depends on the application. It should be determined **early** in the design process because the stress and deflection analyses depend on it.

The elements are often positioned axially by machining **shoulders** into the shaft.



It is best to place bearings on each side of load-bearing elements. This is not always possible (e.g. pulleys and sprockets). If a load-bearing element is cantilevered, keep the cantilever as short as possible to minimize deflection.

Try to use only two bearings on a shaft in order to reduce alignment issues.

Torque transmission is achieved by one of the following means.
keys/grooves (high torque, low cost, most common),
splines (high torque, higher cost, less common),
pins (low torque),
set screws (low torque),
tapered fits (low torque), and
press fits (low torque).



Finally, don't forget that someone has to assemble and disassemble your shaft assembly.