KISSSOFT
Calculation programs for machine design

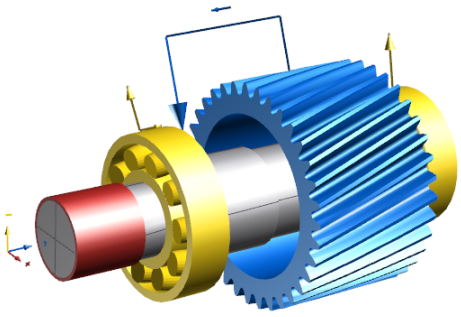
KISSsoft: Shafts and Bearings

The shaft and bearing calculations are run to determine the shaft strength and the rating life for roller bearings, and to analyze hydrodynamic plain bearings according to the various standard and extended methods.

Graphical shaft editor

- Definition of shaft geometry
- Customized load implementation
- Export to a variety of 3D CAD systems

You can use the graphical shaft editor to define a shaft's geometry, including the notches, supports and loads. You can either enter the loads in the "traditional" manner, by inputting the forces and torques, or directly, via force elements such as toothing (cylindrical gears, bevel gears etc.).



Individual load spectra can be assigned to every force element. The shaft geometry can then be exported to a range of 3D CAD systems for further processing.

Strength analysis

The strength calculation defined in DIN 743 "Tragfähigkeit von Wellen und Achsen" (load capacity of shafts and axes) is a simple, but widely applicable method, and is very often used in mechanical engineering.
The FKM Guideline (Strength verification, 6th Edition) is the most comprehensive calculation method, and is often used for certification purposes.

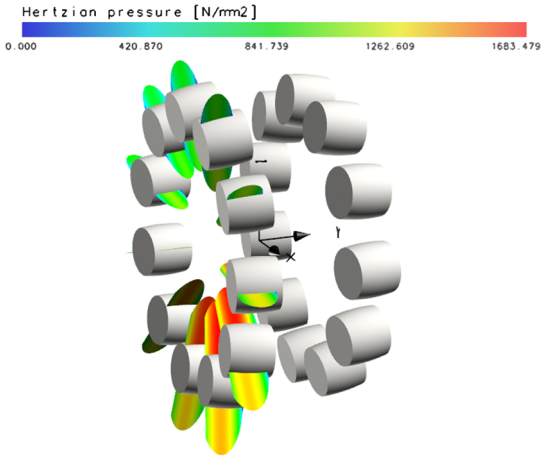
The calculation according to the FKM Guideline can be used to perform strength analysis with load spectra. The latest edition of DIN 743 (2012) also includes the calculation of strength analysis in the fatigue strength range and with load spectra.

The shaft strength calculation method according to AGMA 6101-E08/6001-E08 has now also been implemented, and includes both a static and dynamic proof. The static proof takes into account peak loads, depending on a range of different toothing types. The dynamic proof takes different notch factors into account and uses the shape modification hypothesis method (von Mises) to perform the evaluation. The material properties are generally derived from the material core hardness.

Shaft calculation

- 3D display with bearing forces/loads
- Animation of rotation and bending
- Improved calculation core

A series of new graphics have been added to the shaft calculation process. These provide a clear 3D view of shafts and bearings, along with the bearing forces and loads. These graphics can also be animated to illustrate rotation and bending, making even the most complex shaft systems easy to display and to understand.



The shaft calculation was reprogrammed in its calculation core. This not only improves stability considering calculation convergence, but also makes errors easier to identify and resolve.

Tooth trace modification

Tooth trace modifications (crowning, helix angle) are usually applied to optimize meshing, and to compensate for shaft deformations. These modifications can be performed quickly and easily with KISSsoft. The absolute helix angle (i.e. the one that is to be manufactured) and the crowning data are output in a single, separate report.

Gear body

- Parametrized geometry
- FE calculation of deformation
- Influence on tooth trace deformation

Deformation occurs in three dimensions on the gear rims of webbed gears and therefore cannot be calculated using the one-dimensional approach used in the shaft calculation. This becomes even more complex if the web is displaced to the side and, as a consequence, the gear body is asymmetrical. This influences the tooth trace under load. The new DPK module in KISSsoft 03/2016 can be utilized to define the gear body geometry parametrically. The Code_Aster FE software can then be used to run a FE calculation and determine the influence matrix.

Campbell diagram

The eigenfrequencies of a rotating shaft differ according to whether the vibration occurs in the same direction, or in the opposite direction. The calculation also takes spinning effects into consideration. The eigenfrequencies of the rotating shaft are then finally displayed in a graphic.

Roller bearing calculation

- Takes internal geometry into account
- Pressure on the rolling body
- Determines bearing power loss

The bearing calculation software is also available as a separate KISSsoft module, in which you can input the load and tilting values directly. Alternatively, these values can also be fetched from the shaft calculation.

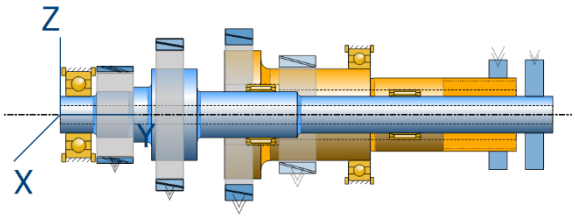
The calculation basis specified in ISO/TS 16281 (2008), which takes into account the bearing's internal geometry, and determines the pressure on the rolling body, can be implemented as an alternative to the classic calculation method.

In addition, bearing power loss can be calculated either according to SKF 1994, SKF 2013 or Schaeffler catalogue 2014 (INA, FAG) for every bearing type, for example, when a gear unit efficiency analysis is performed. The oil level for inclined shafts can also be taken into account, so that bearings can be subjected to different infeed factors.

As an alternative to calculating a logarithmic roller profile as defined in the standards, you can also input a roller profile you have defined yourself. This functionality now makes it possible to also calculate the progression of Hertzian pressure with special profilings.

Database with a selection of bearings

You can select the required roller bearing from a database of more than 20 bearing types from a wide range of manufacturers, making it easy to define multiple bearings.



KISSsoft's useful sizing wizard searches the bearings database to find bearings with a suitable geometry. It then calculates the service life, and the static safety, and displays the results in a table together, with the geometry data (width and diameter). And all at the touch of a button!

If you are interested in acquiring a test license, simply send an e-mail to info@KISSsoft.AG