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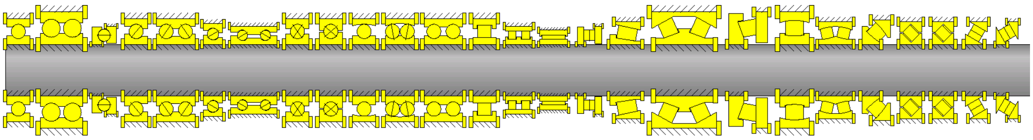
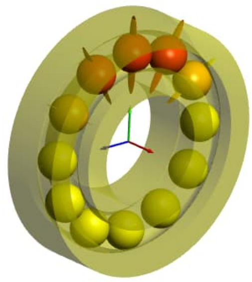
Tutorial Series — Rolling Bearing Calculation - Starter Essential Operation – Settings – Results

Content

This tutorial provides a practical introduction to the key functions of the MESYS Rolling Bearing Calculation software. The goal is to help new users quickly become familiar with the core features and typical workflows. The version used in this guide is MESYS 12-2024.





General

Please refer to the corresponding section of the online manual for detailed information on the settings under the "General" tab.

For the purposes of this tutorial, keep the default settings after launching the rolling bearing calculation module.

Conclusion, Key Takeaway
Call to Actions

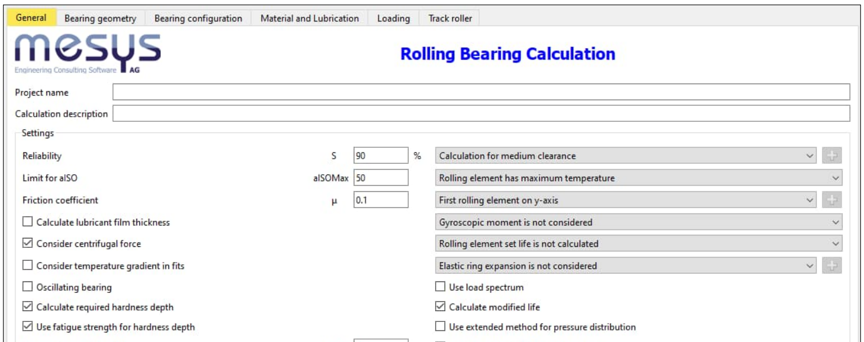
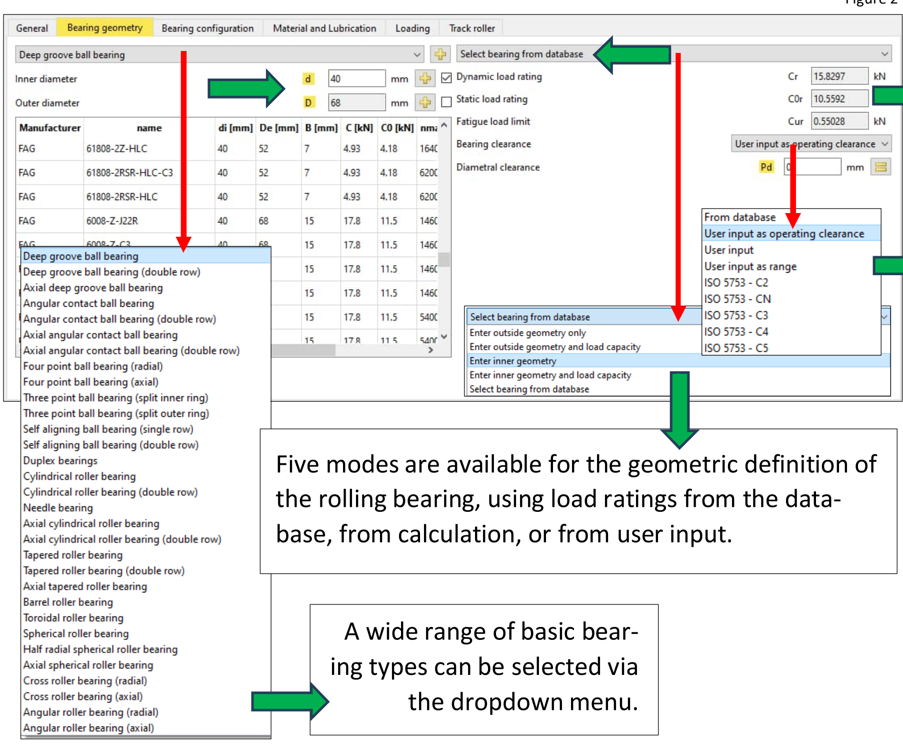


Figure 1

Bearing geometry

Here you have the option to select a rolling bearing directly from the software's internal database, using filters for bearing type and diameter.

Figure 2



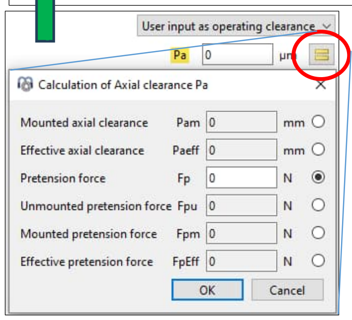
If no user input is provided, the load ratings are calculated automatically according to ISO 281 and ISO 76.

The radial clearance (Pd) can be entered manually or selected as a clearance class according to ISO 5753.

For bearings with contact angle or axial bearings, you can define either an axial clearance (Pa) or apply a preload (Fp).

Five modes are available for the geometric definition of the rolling bearing, using load ratings from the database, from calculation, or from user input.

A wide range of basic bearing types can be selected via the dropdown menu.



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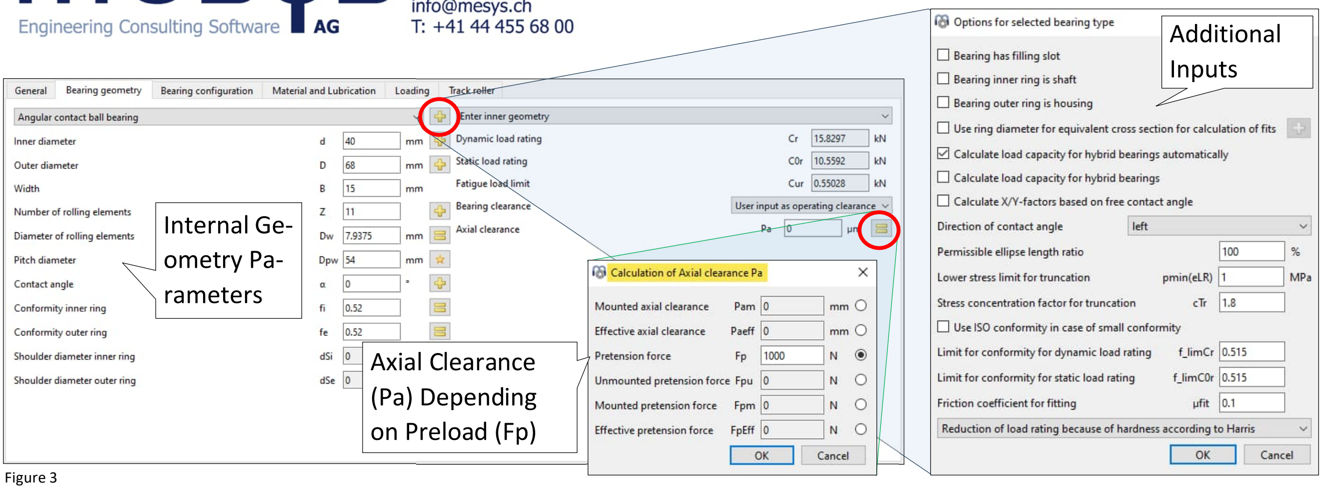


Figure 3

Bearing configuration

A generic angular contact ball bearing 7308B is to be paired or considered as a double-row bearing of the same type:

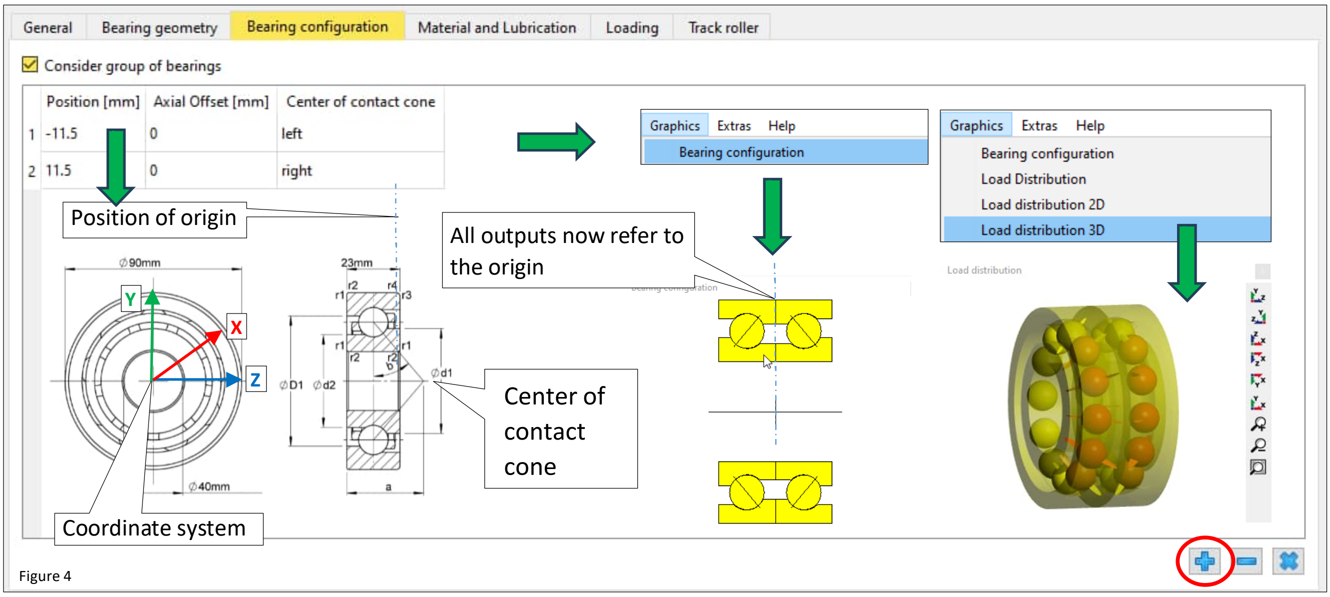


Figure 4

Select the generic 7308B and activate 'Consider bearing set'. Define the Positions and orientations of contact cone Centers by adding rows using the button, as shown in Figure 4.

Material and Lubrication

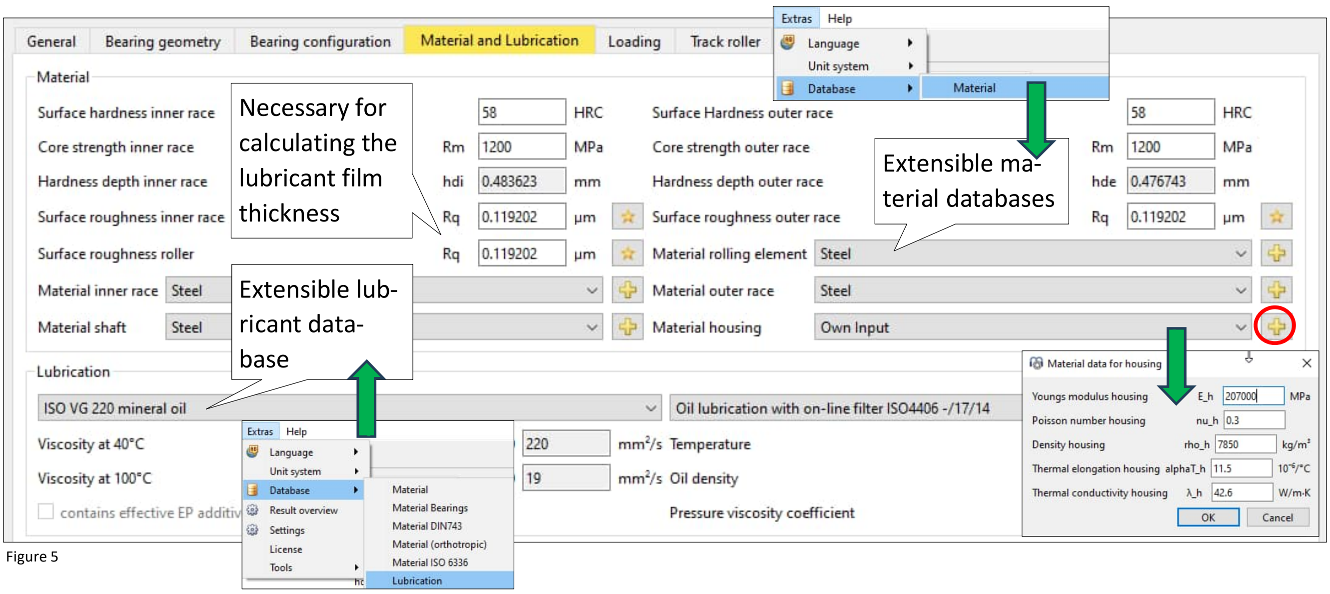
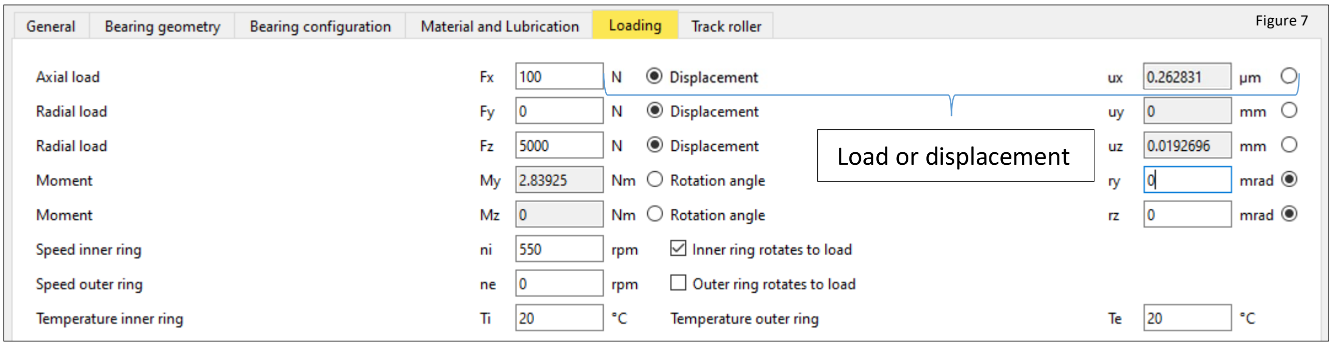


Figure 5

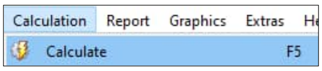
Loading

- For each coordinate direction, either a force or a displacement (ux) can be specified as needed (see Figure 6). If the ring used to apply preload on our angular contact bearing is assumed to be fixed, the axial displacement (ux) can be set to zero, and the resulting reaction force in the axial direction (Fx) will be calculated.
- A moment load or a tilt can only be defined in two directions, since rotation around the bearing axis (X) cannot be constrained.

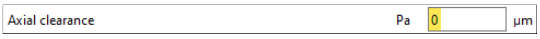


Calculation

The calculation can be started using the button, the F5 key, or the correspon-ding menu item.



- Please always check the icon in the bottom right corner, which confirms that the calculation has been executed and is up to date.
- Apply the loads as shown in Figure 6 and start the calculation with an axial clearance Pa = 0 mm.

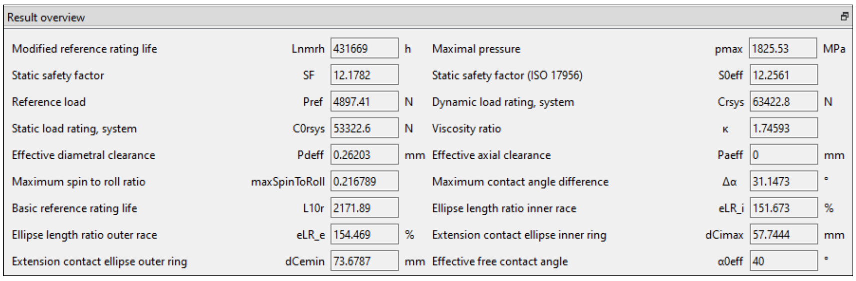


Results

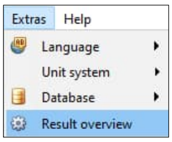
Result overview

This overview provides various details about the bearing condition at the bottom of the user interface.

Figure 7



- The contents can be edited via the 'Extras' menu.



Graphics

- Various graphical representations can be loaded via the 'Graphics' menu.
- Open the graphics for load distribution 3D, Contact Stress, Subsurface stress, and Reliability as shown in Figure 9.

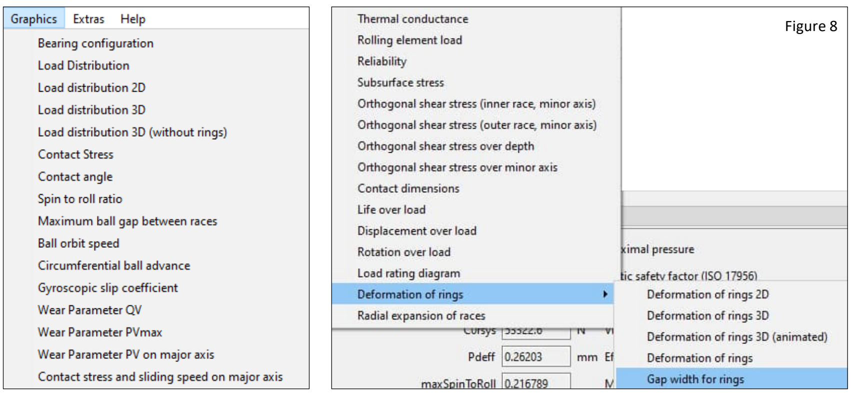


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Figure 9

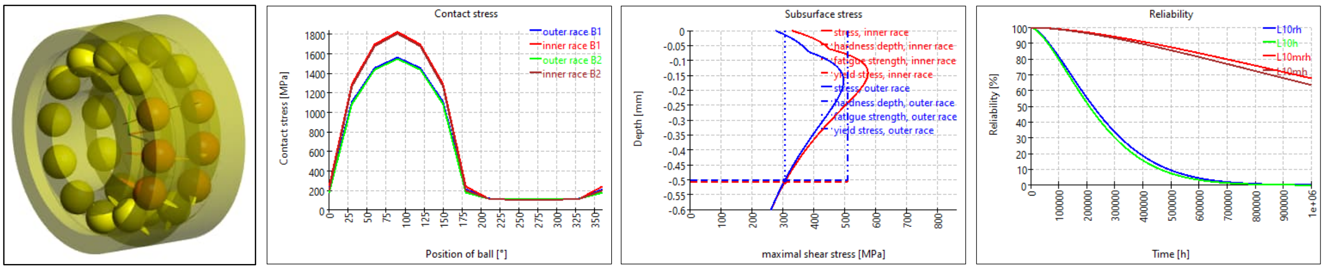
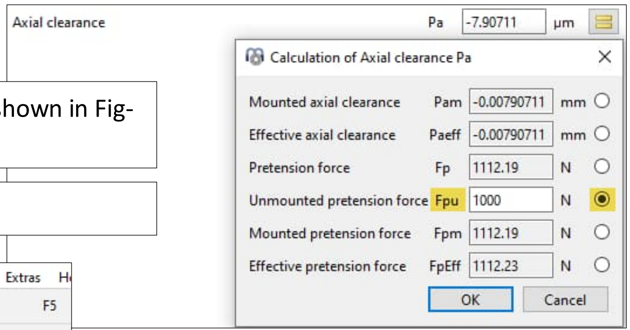
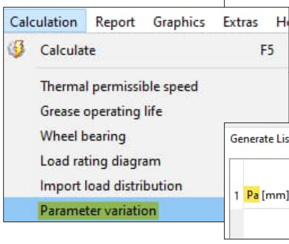


Figure 10



Now enter an unmounted preload Fpu of 1000 N as shown in Figure 10.

Compare the results prior to and after the change.



Parameter variation

Mittels der Parametervariation kann beispielsweise bewertet werden, welches Axialspiel dem Optimum in spezifischer Anwendung entspricht.

Figure 11

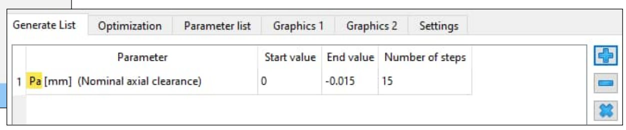
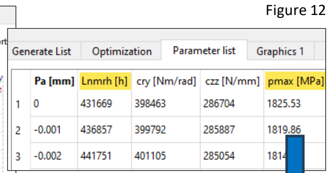
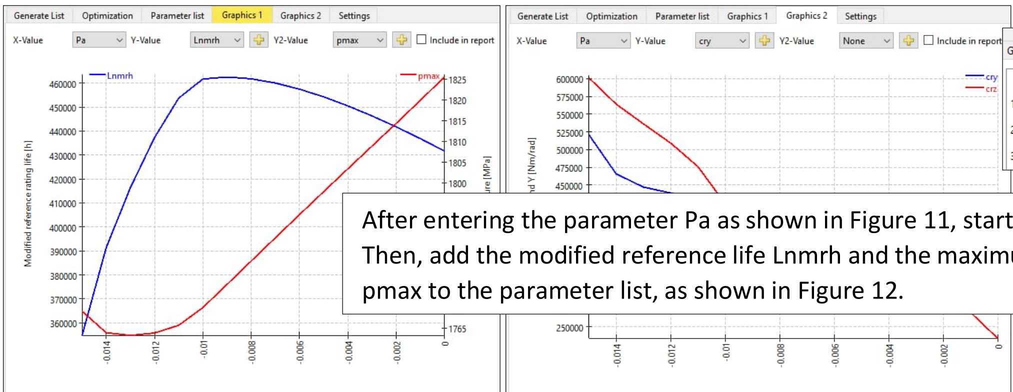


Figure 12



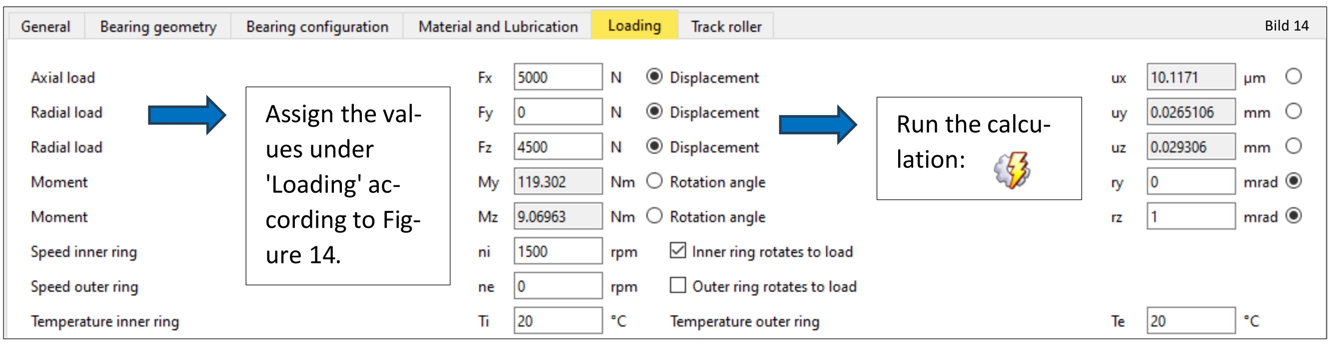


After entering the parameter Pa as shown in Figure 11, start the parameter variation. Then, add the modified reference life Lnmrh and the maximum contact pressure pmax to the parameter list, as shown in Figure 12.

Figure 13

Deactivate the checkbox for 'Consider bearing set' (see Figure 4).

Bild 14



Assign the values under 'Loading' according to Figure 14.

Run the calculation:

Drag the graphics to the lower area next to the results overview, as shown in Figure 15.

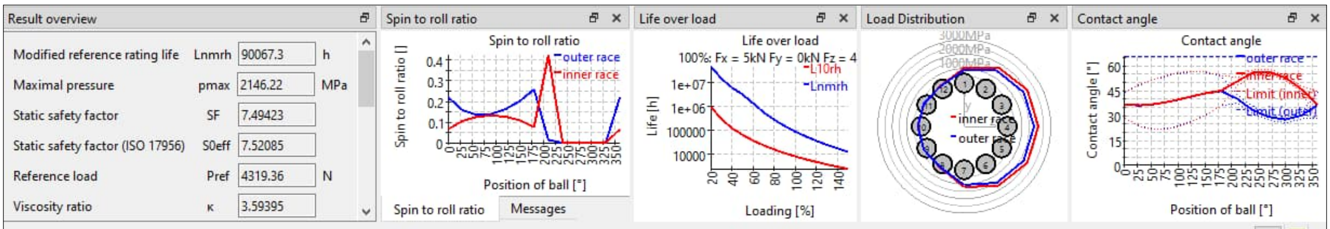


Figure 15

Modify the inputs under 'Loads' and observe the changes in the graphics.

Activate the load spectrum and check the corresponding box under the 'General' tab (see Figure 1).

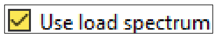
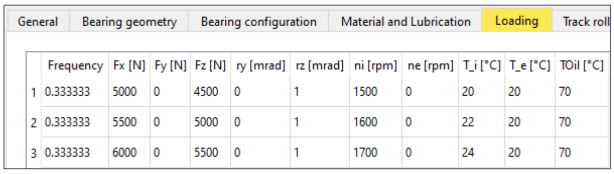


Figure 16



	Frequency	Fx [N]	Fy [N]	Fz [N]	ry [mrad]	rz [mrad]	ni [rpm]	ne [rpm]	T_i [°C]	T_e [°C]	TOil [°C]
1	0.333333	5000	0	4500	0	1	1500	0	20	20	70
2	0.333333	5500	0	5000	0	1	1600	0	22	20	70
3	0.333333	6000	0	5500	0	1	1700	0	24	20	70

Enter a load spectrum as shown in Figure 16 by adding entries using the button.

Compare the results in the results overview and in the graphics for the three load spectrum elements.

MESYS wishes you an instructive and profitable experience with our tutorials. If you have any queries, suggestions or questions, please do not hesitate to contact info@mesys.ch .