

# Software Instructions

Instructions for using Mesys Shaft Calculation

V2

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# Instruction

## For using the software Mesys Shaft Calculation

### 1. Initial Setup and System data

- Logon to Electromet
  - Mesys Shaft Calculation is installed on Lab 2 and Lab 4
- Open Mesys Shaft Calculation
  - The icon is located on the desktop

### 2. System Data

Selecting 'System' allows entering general settings and housing material. Selecting the groups 'Shafts' or 'Bearings' gives an result overview and selecting a single shaft or bearings allows its definition.

- On the first page for 'System' in the tree view, you can enter some description and enable the consideration of weight and shear deformations.

For the purpose of the vertical shaft exercise:

- Make sure that the parameters shown in figure 1 are selected.
- Note that we are not interested in the calculation of natural frequencies in the first step, so it can be disabled
- Although your data will not be saved, you can enter a Project Name and Calculation Description if you wish
- You can disregard the section on Lubrication at this stage.

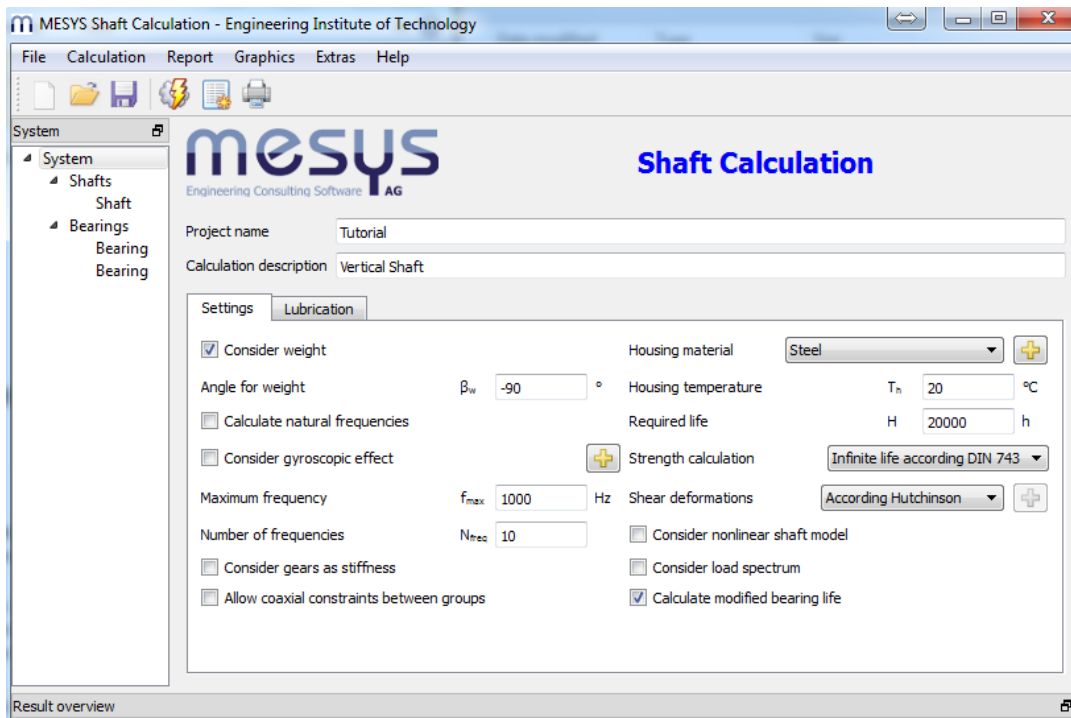


Figure 1

### 3. Defining a shaft

- Select the existing element named 'Shaft' in the tree.
- To add a shafts
  - Right click on "Shafts" in the tree view and select "Add Shaft"
- To define a shaft
  - Select the shaft you want to define from the tree view.
  - In the General section,
    - Give a name to the shaft.
    - Select the appropriate material
    - Enter the appropriate rotation speed.
    - Axial shaft position, material and temperature could be selected on this page too.

For the purpose of the vertical shaft exercise, refer to figure 2 for an example of what parameters are needed.

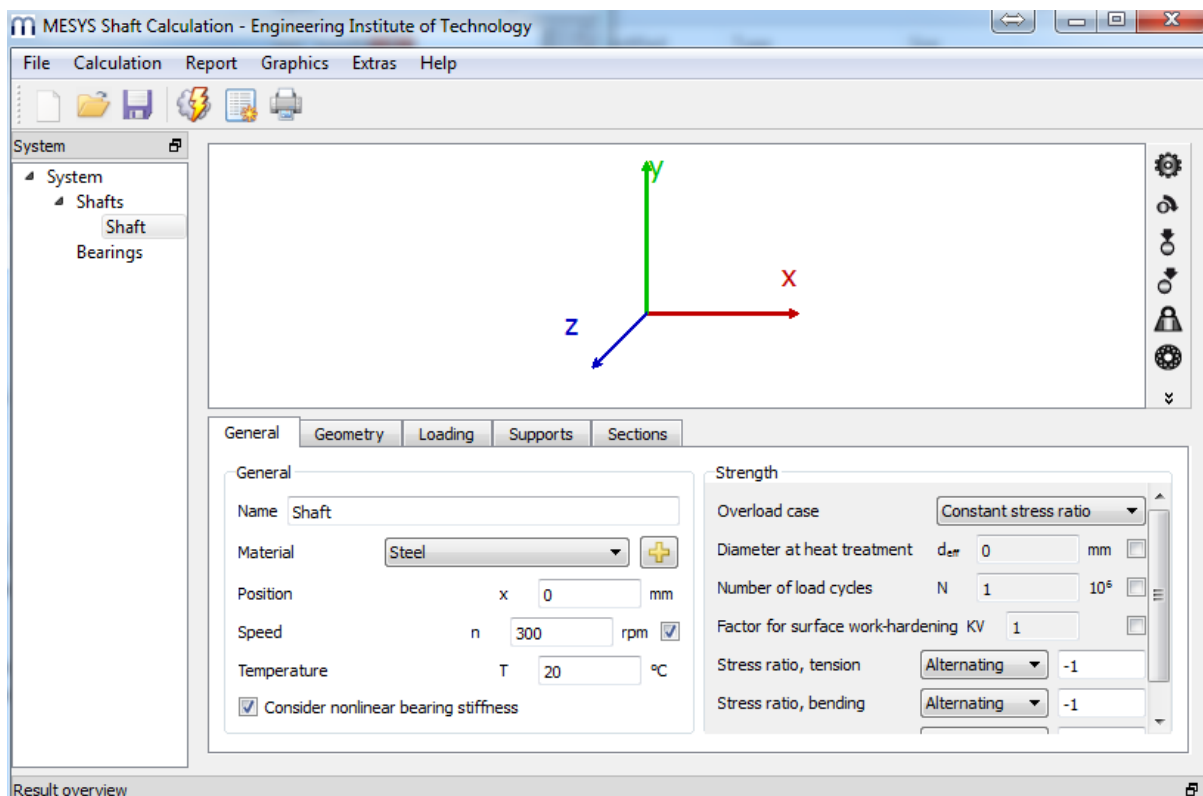


Figure 2

#### 1. Shaft geometry

- Select the 'Geometry' tab and define the outer and inner geometry of the shaft.
  - Add rows to define the different section of a shaft
  - Additional rows can be added using the '+'-button.
  - The '-' button removes the selected row and 'x' clears the table.
  - See figure 3 for a shaft design example.

Note: for a cylinder only diameter 1 has to be entered, a cone can be defined using both diameters.

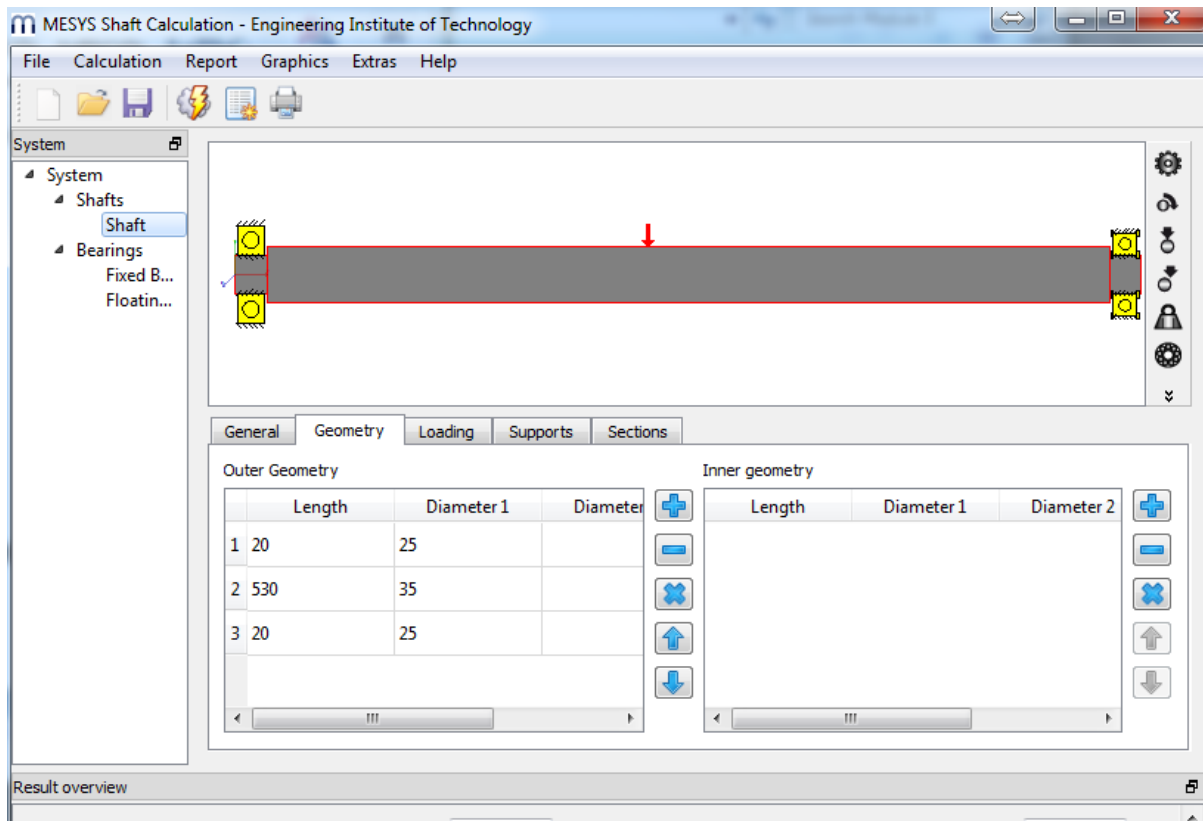


Figure 3

## 2. Shaft supports

- Select the 'Supports' tab to define the bearings supporting bearings of the shaft.
  - Click on the '+'-button to add bearings.
  - The '-' button removes the selected row and 'x' clears the table
  - Expand the "Support" menu to select the type of support. Then enter the necessary information.

For the purpose of the vertical shaft exercise,

- Insert two 'Roller bearing'.
- Place both bearing at positions  $x = 10$  and  $x = 560$  respectively. The right bearing is axially and radially fixed; the left bearing is only radially fixed. Select the appropriate option accordingly and name each bearing.
- Select the bearing specification by clicking on the "+" next to Deep Grove ball bearing. Select deep groove ball bearing 6305 for the first bearing and deep groove ball bearing 6205 for the second bearing. Refer to figure 4 & 5 for more details.

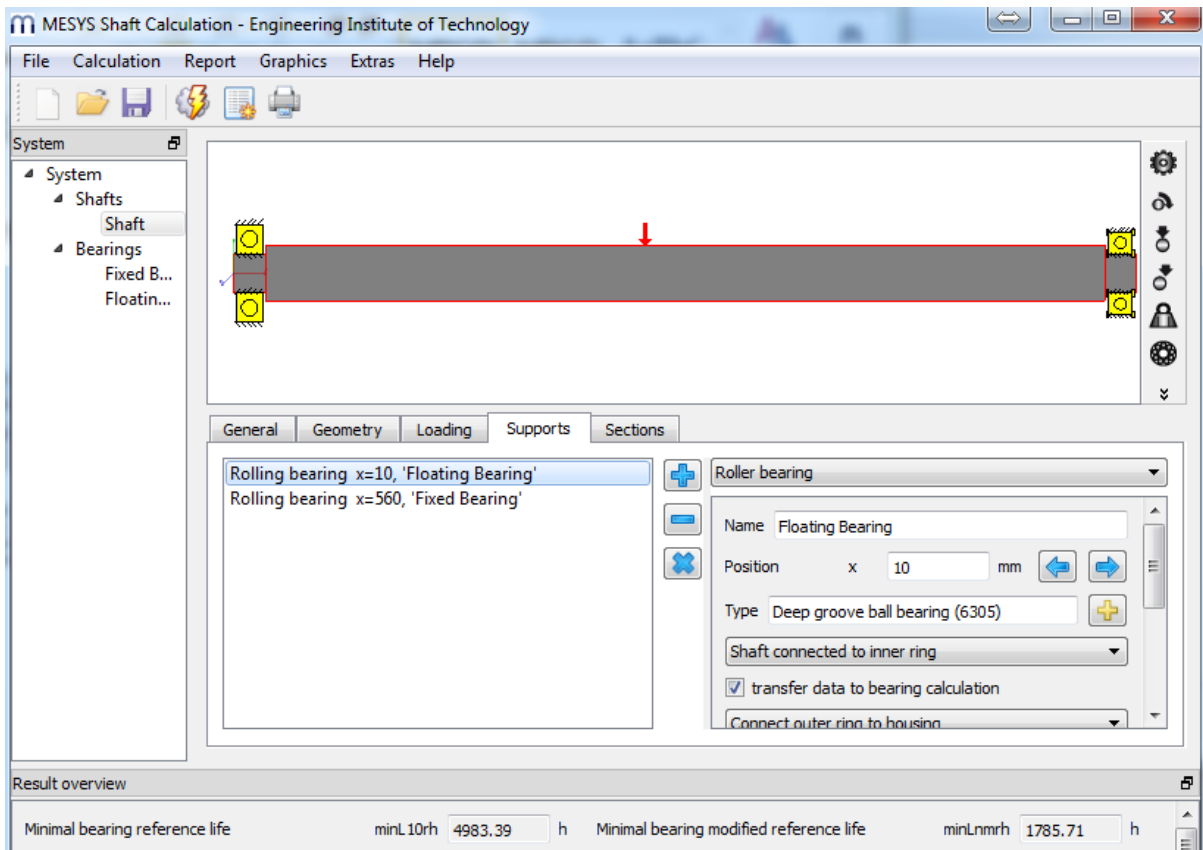


Figure 4

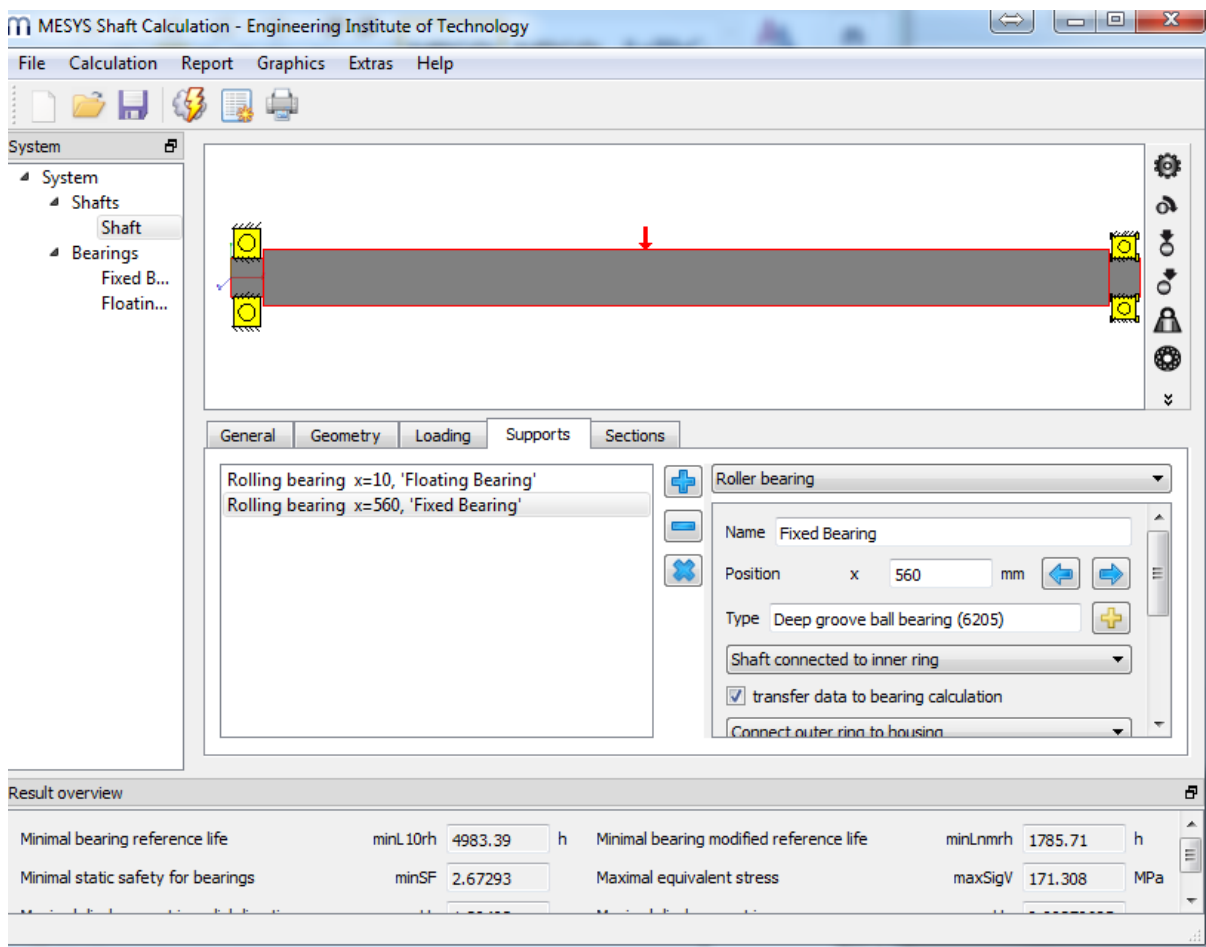


Figure 5

### 3. Shaft Loading

- Select the 'loading' tab to define the load. Several load elements are available. A generic 'Force', a 'Coupling', a 'Helical Gear' and a 'Mass' element. Coordinates are relative to the start of the shaft.
- Similarly to the previous section, to add a load:
  - Click on the '+'-button to add a load.
  - The '-' button removes the selected row and 'x' clears the table
  - Expand the "Support" menu to select the type of load. Then enter the necessary information.

For the vertical shaft exercise, we define a Radial force of  $F_y = 5400\text{N}$  and an axial force of  $F_x = 900\text{N}$  at position 260 as shown in figure 6 and 7.

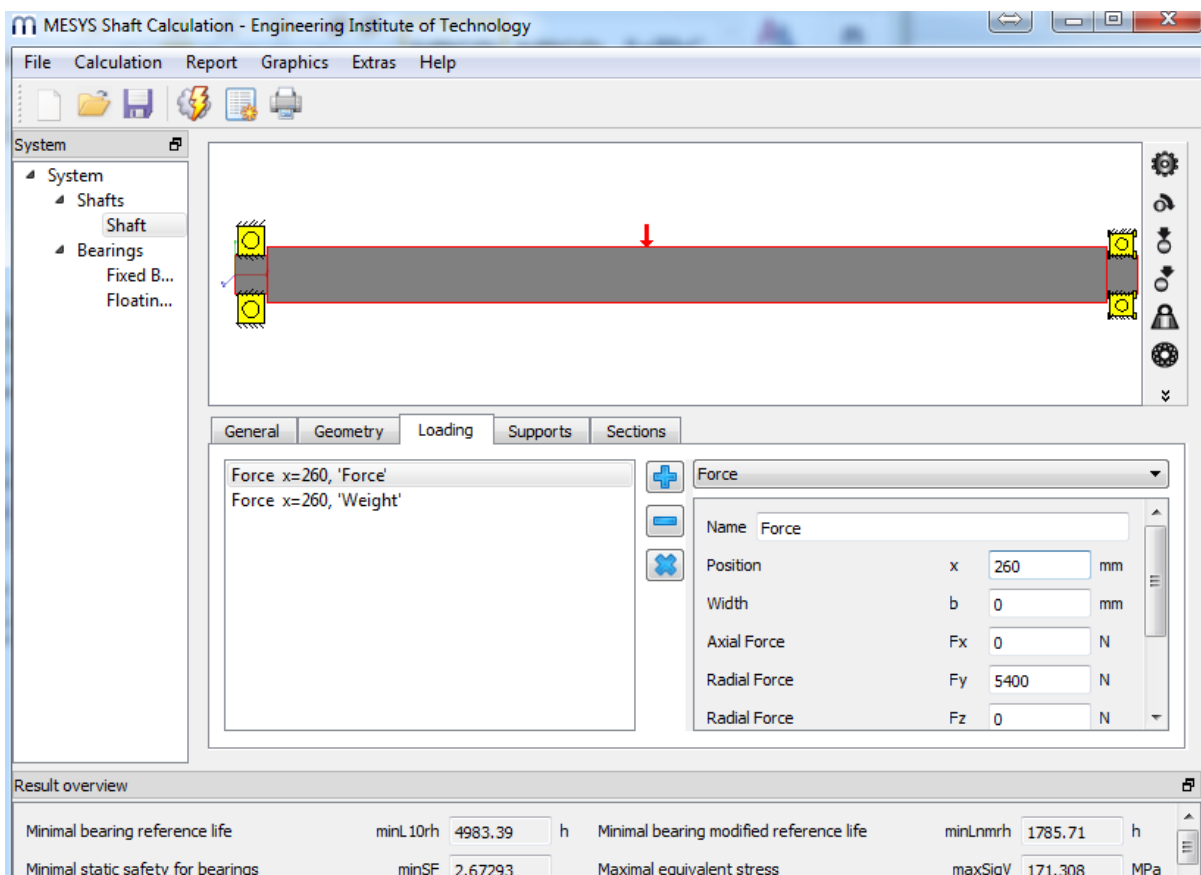


Figure 6

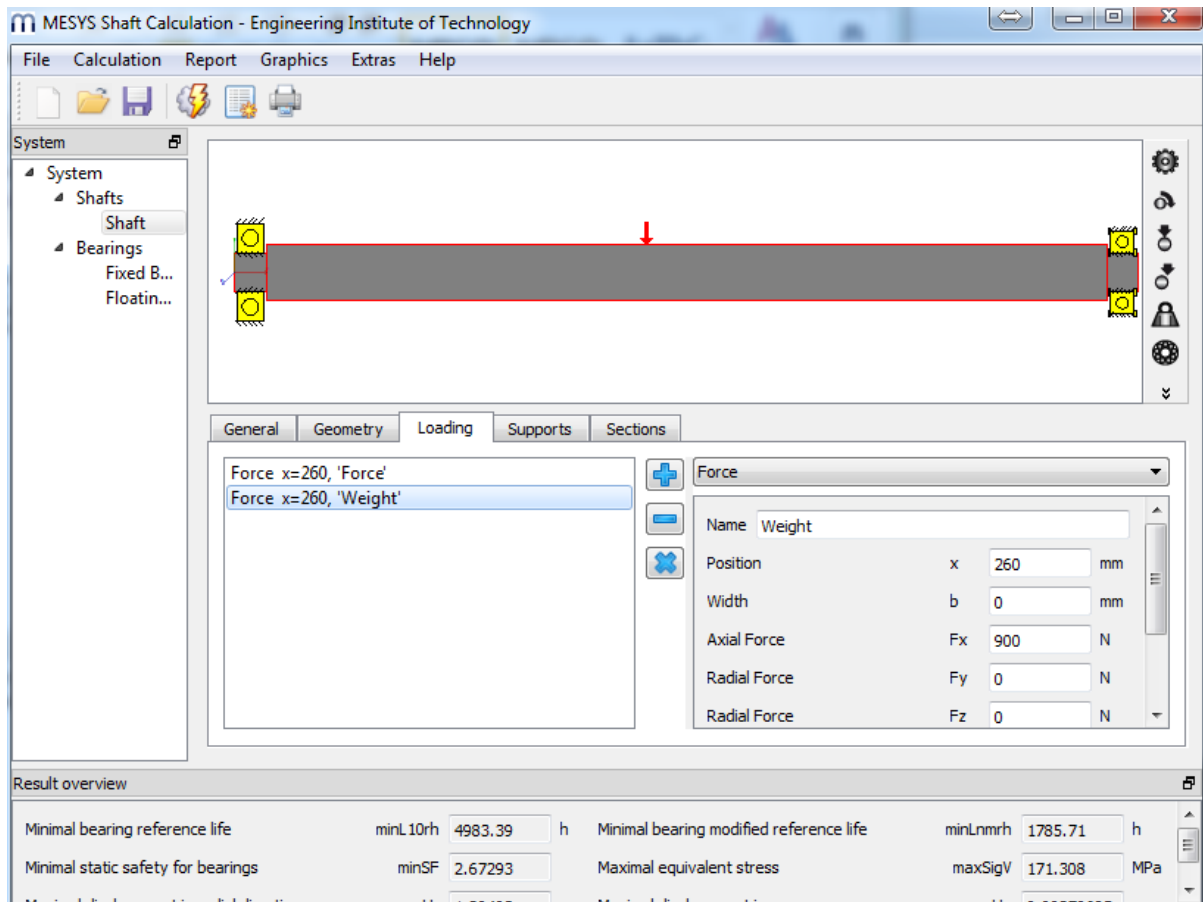


Figure 7

#### 4. Analysis

- Now the shaft is defined, we can run the calculation using 'fx'-button on the toolbar. No error message should be shown.
- Select Graphics then Forces on the top menu to obtain a graph showing the distribution of the forces in the shaft.
- You can obtain a full report by clicking Report on the top menu. The specification of the bearings can be found on page 2.
- Stress analysis for bearing A:
  - Open the load distribution and contact stress for bearing A. To do this select Graphics, bearing, Floating Bearing (name of bearing A) then Load Distribution.
  - Repeat for the contact stress graph
- Follow similar steps to obtain the necessary information for bearing B.