

### Improvements for Ver 18.20

January 1, 2016

- Add water properties into the lubricant library for bearing programs BePerf and ThrustBrg.
- Add hydrostatic thrust bearing into ThrustBrg.
- Add circular pad thrust bearing into ThrustBrg.
- Add summary results in the graphic output into ThrustBrg.
- For Floating Ring Bearing in Heat Balance Calculation, allow different Inlet Temperatures and Heat Carry Away Factors for the inner and outer films.
- Increase Stack Size for large rotor models.
- Add Herringbone Gears (double - helix) and many other options in GearLoad.

### Improvements for Ver 18.10

July 1, 2015

- Allows for different single pad properties, such as preload, offset, arc length, and pivot location for each pad in tilting pad bearings.
- Add inputs & outputs summary in thrust bearing graphic outputs.
- Fixed bug in thrust bearing graphics for multiple runs
- Add Reset button in the critical speed map plot to enter the bearing stiffness manually
- Add more general motor driving torque for the torsional startup analysis
$$T_d = T_{rated} \left[ T_{avg} + T_1 \sin(\omega_1 t + \phi_1) + T_2 \sin(\omega_2 t + \phi_2) \right]$$

### Improvements for Ver 18.00

November 15, 2014

- Add Thrust Bearing and Spiral Face Seal modules
- Add more features for the Floating Ring Bearing in both Rotor & BePerf
- Improve computational efficiency, including x64

### Improvements for Ver 17.10

July 15, 2014

- Add engine misfire feature for the torsional reciprocating steady state response
- Add initial conditions (theta, theta dot) for the torsional time transient analysis

### Improvements for Ver 17.00

May 15, 2014

- Add Lateral-Torsional-Axial coupled vibration through gear meshes and thrust collars (Rider Rings).
- Add Catenary Curve Analysis using optimization technique.
- Allows for the next shaft starting station number equal to the previous shaft last station number, if they have the same speed. Like rigid link between two shafts.
- Improve computational efficiency
- Add direction of rotation in the graph
- Bearing can be plotted like inter-shaft bearing with a rectangle if Brglength = -1

- Many Rotor & Beperf graphics improvements.
- Improve the GearLoad program, more options and more graphics
- Improve the tilting pad bearing calculation when the eccentricity ratio is very high

**Improvements for Ver 16.20**

**January 15, 2013**

- Add torsional damped natural frequency interference diagram.
- Improve torsional time transient analysis postprocessor graphic speed
- Add hole split in the balancing program

**Improvements for Ver 16.10**

**October 20, 2012**

- Add reciprocating torsional excitation.
- Add curve fitting selection in the torsional driving torque input
- Add more checking features in the data input

**Improvements for Ver 16.00**

**July 1, 2012**

- Add engine torsional excitation.
- Add hydrostatic-hybrid bearing analysis.
- Add axial stiffness for the thrust bearing analysis.
- Add speed dependent viscosities and speed ratios for the floating ring bearing.
- Add weighting factors for probes and speeds in the balancing calculation.
- Add PNG, JPEG, GIF, BMP graphic formats.

**Improvements for Ver 15.10**

**September 3, 2011**

- Add more numerical integration methods and control parameters.
- Add Phase Data for the bearing/support force.
- Add bearing/seal mass coefficients in bearing type 1 (speed dependent bearing) and 2 (bearing from data file).
- Add Frequency Dependent Damping (Dynamic Magnifier) in the torsional analysis.
- Add backlash in the torsional non-linear connection/coupling.