

Improvements for Ver 20.00

November 23, 2017

- Add new features in BePerf for fixed-lobe and tilting pad journal bearing design: 1) Parametric study 2) Design Comparison. **See Ver_20_ReleaseNotes.pdf.**
- Add option to add/modify more lubricants into the oil library. Note that the first 33 lubricants cannot be changed. But users can add more lubricants into the library. **See Ver_20_ReleaseNotes.pdf.**
- ThrustBrg: to be consistent with BePerf, the Case number in ThrustBrg starts from 1 instead of 0.
- ThrustBrg: Fixed a bug in the pressure plot color legend, also add numeric scale on the legend.
- In Rotor, add capability for the rotating bearings (mainly for turbochargers, see example Ch_6_FRB_4DOF_Non-Circular_Inner_Film.rot), or rocking bearings (for ship applications, see example V20_sund_ship.rot and Ship_Rocking_Animation....gif animation files).
- Transient Analysis in Frequency domain, the initial condition for the high speed point uses the final condition from the previous speed point.
- In the Transient Analysis, the integration time and time step are important for the FFT plot, therefore, add “Suggested Time Step” feature for the integration time and time step. In some highly non-linear cases, if the suggested time step could not converge, then use smaller time step. Try new time step = old time step / 2.
- Add velocity and acceleration in the FFT displays.
- Improve Whirl Speed and Stability Maps – Magenta color for the forward modes, Green color for the Backward modes, Blue color for the mixed modes. Also add the option to plot the forward and mixed (if exists) modes only. Since the forward modes in most cases are the concerns, not the backward modes.
- Add damping factor vs. frequency ratio (API 610) in the PostProcessor for the Whirl Speed and Stability Analysis.
- Add Bearing Type 15 in Rotor. This option allows the Rotor and BePerf be fully integrated. This is for the linear analysis only. For Non-Linear analysis, use Type 13. Using Type 15, the unit system between rotor file (rot) and bearing file (LDI, or TDI) can be different, although consistent unit system is recommended. But they can be different.
- In Rotor Program, any files associated with the ROT file, such as the bearing files, foundation file, and torsional excitation torque files, if they have the same path name with the rot file (i.e., they are located in the same folder with rot file), the path name will be removed for simplicity and easy portability. The Rotor program will also double check the existence of these associated files. If they are not found under their specified path, then the rot path name will be used for another try.
- Add new analysis types 12, 15, 16, 17, 18, 19, and 20.
- Add Design Comparison in Rotor – Compare different designs.
 1. Compare two different (.rot) files
 2. Same rot file, but different bearing files
 3. Same rot and bearing files, but different bearing variables
- For more information and examples, **See Ver_20_ReleaseNotes.pdf.**

Improvements for Ver 19.02

May 9, 2017

- Improve the Text Output Format (*.OU2 and *.OU4).
- Correct some spelling errors.
- Fix a bug existed in Ver 19.01 in the heat balance calculation for the Fixed Lobe Bearing Type with Advanced Features ON.
- Fix a graphic error in the torsional mode shape plot when Rigid Link in the Shaft Elements tab is checked to connect two shafts.
- Batch mode examples for verifications and future expansion – see BatchRunRotor.bat, BatchBePerfTpj.bat, BatchRunLobeDNF.bat, BatchRunReynolds.bat, and BatchRunExample.bat

Improvements for Ver 19.01

January 7, 2017

- Use the latest Safenet (Software Protection Software) drivers.

Improvements for Ver 19.00

January 1, 2017

- Allows dot (“.”) and white space (“ “) in the file and path name.
- Speed dependent bearing coefficients can be either spline interpolation or linear interpolation in the Rotor program. Spline function was used before Ver 19. The Bearing coefficients after the interpolation are printed in the text output file.
- Critical Speed Analysis – for speed dependent bearing coefficients, the stiffness at the last speed point was used. Now, the speed point can be specified. If not specified (i.e., zero value), then the last speed point is used as before. The damping effect can also be included if the bearing dynamic stiffness is desired. If the specified rotor speed is close to the critical speed, the result and mode shape will be more accurate.
- Add more model checking features to avoid any mistakes in building the rotor model. An element L/D checking feature can be pre-specified in the Preference Settings – Model Display Settings.
- Model Flipping (Reversing) – allows to flip the rotor model (left to right)
- Models Combining (Merging or Appending) – allows to combine tow model files into a single file. This allows users to build the complicated model with multiple rotors one rotor at a time.
- Fixed the Rotor Rigid Link feature for the torsional and axial analysis. It was initially designed for the lateral vibration only.
- Whenever possible, the formats for the number printout on the plots can be specified under Option – Settings, or pre-defined in the Preference Settings – Post Processor Graphic Settings. Also, the color for the text printout on the plots can be associated with the curve color.
- Add more graphs in program – RotorBal – Tools.
- Add minimize and maximize screen options for the main menu in RotorBal and GearLoad.

- Add leakage calculation for carbon ring seals – Rotor – Tools – Estimate Carbon Ring Seal Leakage.
- Add calculation for the maximum allowable residual unbalance per API and ISO specifications.

For more details on these enhancements, see pdf document – “Ver 19_Examples.pdf”.

Improvements for Ver 18.30

October 1, 2016

- Add Steady State Harmonic Response Analysis for Coupled Lateral-Torsional-Axial Vibration.
- Add descriptions for the probes and Speeds in the Rotor Balancing Program.
- Add LabySeal option in the new Main Menu
- Rewrite the Print to File for the figures and Animation files

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 Herrinbone 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 (θ , $\dot{\theta}$) 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 & Bepperf 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.