Input data for Program Reynolds (*.in)

This file can be created by subroutine **PreBrgdata()** in Reynolds for bearings. It can also be created using any text editor for other purposes to modify the bearing geometry. Reynolds.exe is a general finite element program.

Input description

$ READ ONLY FILE

If the first line starts with '$', the analysis code will skip the **PreBrgData()** function and read all the data from the *.in file, not from the *.LDI file.

** Title*

- Any line starts with a "*" is a title line and will be printed in text output file.
- Use title lines as many as possible to describe the data file you are running.

Example:

* This is a 3-lobe bearing, used in machine ABC
* Reduce clearance for stability

! Comments (Descriptions)

- Any line starts with a "!" is a comment line and will not be printed in text output.
- Comment line is used to describe the data for readability
- The comment line is ignored by the program.

Example:

! Any line started with '*' will be printed in output file as titles.
! Any line started with '!' will be ignored by the program as comments.

COMMANDS (Key Words)

! All commands are UPPER CASE, and only first four characters are read.
! Some commands have additional parameters.

NODE (GEOMETRY DATA)

- Node number, Coor-1, Coor-2, Coor-3, node increment, incremental ratio

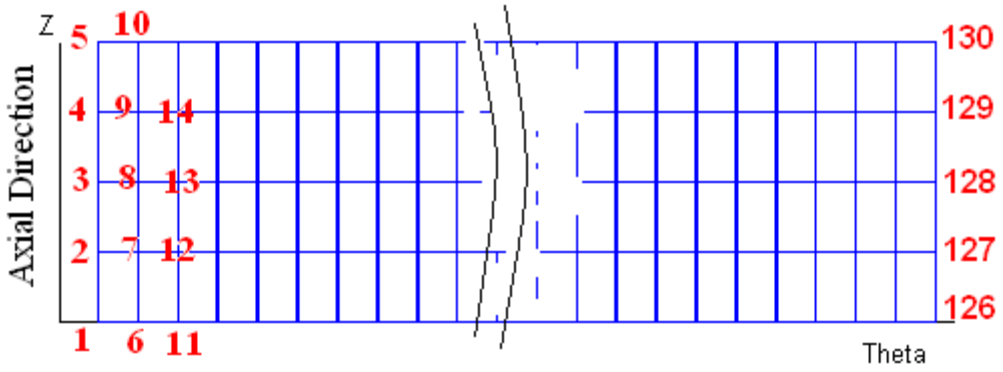
/

The geometric data for the problem under study is specified by Keyword "NODE", all the node data ends with a backslash "/".
The node numbering starts from the axial direction.
Coor-1,2,3 are (x,y,z) in Cartesian Coordinate System and (r,theta,z) in Cylindrical Coordinate System.
Cartesian Coordinates are used in 1D and Plain Stress element for code development checking purposes only.

For bearing analysis, it always uses (r, theta, z) Cylindrical Coordinates.
Coor-1: (Ds/2) Shaft Radius for bearings
Coor-2: theta (radian)

Coor-3: z in the axial length
If all the node's coordinates are specified in the input, then, the node increment and incremental ratio are zero.

Finite Element Numbering Scheme



Example:

```
NODE
     1    3.0000          1.5708          0.0000          0     0
     2    3.0000          1.5708          0.7500          0     0
     3    3.0000          1.5708          1.5000          0     0
     4    3.0000          1.5708          2.2500          0     0
     5    3.0000          1.5708          3.0000          0     0
     6    3.0000          1.8221          0.0000          0     0
     7    3.0000          1.8221          0.7500          0     0
     8    3.0000          1.8221          1.5000          0     0
     9    3.0000          1.8221          2.2500          0     0
    10    3.0000          1.8221          3.0000          0     0
    11    3.0000          2.0735          0.0000          0     0
```

etc……..

/ **! Needs to be ended with a backslash**

MATERIAL (ELEMENT TYPE and MATERIAL PROPERTIES)

- Material Number, Element Type Number
- Prop1, prop2, prop3, prop4, prop5, prop6, prop7, prop8, prop9, prop10

/

For fixed lobes bearings with rigid surface, only one (1) Material is needed.
Therefore,
Material Number = 1,
Element Type Number = 300
Prop1 = Viscosity
Prop2 = Velocity in axial direction (0 for conventional bearing)
Prop3 = Velocity in theta direction (r*omega)
Prop4 = Density

Element Type = 300 indicates the fluid element. For Fluid Element, every element has 4 nodes and every node has 3DOF, that is, p, dp/dx, dp/dy at each node. x is the z (axial) direction and y is the r.theta (circumferential) direction.
For bearings (Element Type = 300), the material properties are referenced only. These properties are calculated from the ***BEARING DATA***.

Example:

```
MATERIAL
1   300
2.16000E-06  0.0000 2473.7  7.79615E-05  0 0 0 0 0 0
/
```

ELEMENT

- Element no., Material no., Element no. increment, Node no. increment
- Node number 1, 2, 3, 4…., n (counter clockwise)

/

Element no., Material no. for this element, Element no. increment and node no. increment are zero for bearing analysis since all the elements are specifying in the input data. For bearing analysis, the element has 4 nodes numbered counterclockwise.

Example:

```
ELEMENT
      1     1     0     0
            1     2     7     6
      2     1     0     0
            2     3     8     7
      3     1     0     0
            3     4     9     8
      4     1     0     0
            4     5    10     9
      5     1     0     0
            6     7    12    11
   etc……
/
```

AUX1

- iNode, Aux1(1), Aux1(2), Aux1(3), 0, 0

/

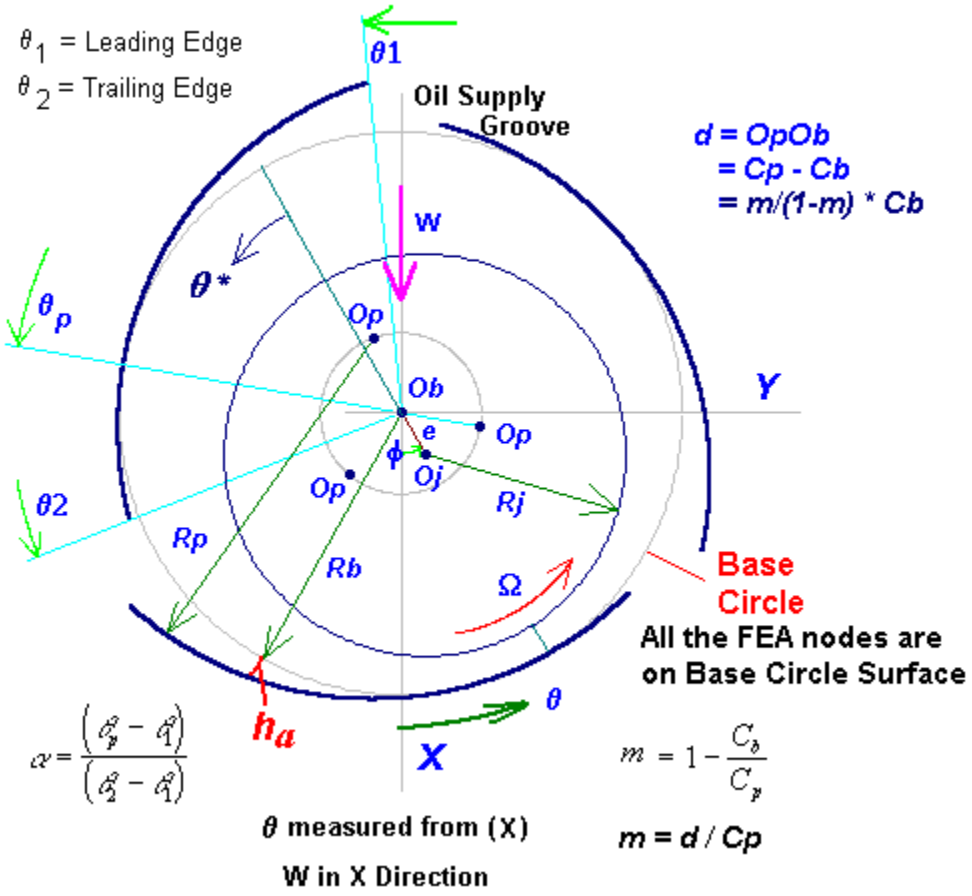
The auxiliary variables Aux1(1), Aux1(2), and Aux1(3) are used by Fluid Element in the Bearing Analysis to describe the embedded portion of the film thickness and it derivatives at each node. For example, it can be used to describe the bearing surface prescribed by the preload and offset, or any grooves, pockets. etc. The default value is zero.

Aux1(1): h_a, the distance from the node (described by the bearing diameter, also known as the base circle) to the bearing surface in r direction.

Aux1(2): $\frac{\partial h_a}{\partial z}$, the derivative of Aux1(1) with respect to z (axial direction)

Aux1(3): $\frac{\partial h_a}{\partial \theta}$, the derivative of Aux1(1) with respect to θ (circumferential direction)

For preloaded bearings:



Film thickness

$$
\begin{aligned}
h &= C_b + h_a \\
&= C_p + e_p \cos\theta^* \\
&= C_p + e_p \cos(\theta + \pi - \phi_p) \\
&= C_p - e_p \cos(\theta - \phi_p)
\end{aligned}
$$

For the concentric journal and bearing centers, $O_j = O_b$

$$e_p = d = C_p - C_b, \qquad C_p = C_b + d, \qquad \phi_p = \theta_p, \quad \theta_p = \theta_1 + \alpha(\theta_2 - \theta_1)$$

Therefore,

$$h = C_b + d - d\cos(\theta - \theta_p)$$
$$h_a = h - C_b = d - d\cos(\theta - \theta_p)$$

Also

$$d = \left(\frac{m}{1-m}\right) \cdot C_b = m \cdot C_p$$

Derivatives

$$\frac{\partial h}{\partial \theta} = \frac{\partial h_a}{\partial \theta} = d\sin(\theta - \theta_p)$$

$$\frac{\partial h}{\partial z} = \frac{\partial h_a}{\partial z} = 0$$

If there is an additional depth in the lobe, such as pressure dam bearings, then

```
Aux1(1,iNode)= Aux1(1,iNode) + PocketDepth(iLobe)
```

Example:

AUX1

```
      1   0.0000        0.0000        0.0000       0    0
      2   0.0000        0.0000        0.0000       0    0
      3  4.98206E-03    0.0000     -1.34793E-03    0    0
      4  4.98206E-03    0.0000     -1.34793E-03    0    0
      5  4.98206E-03    0.0000     -1.34793E-03    0    0
      6  4.98206E-03    0.0000     -1.34793E-03    0    0
```

/

BOUNDARY (CONDITIONS)

- iNode, dof 1, dof 2, ..., dof n, node no. increment

/

For Fluid Element, every node has 3 DOF, Pressure and Pressure Gradients in z and theta directions (p, dp/dx, dp/dy). Therefore, dof 1 = P, dof 2 = dP/dx (z –axial direction), dof 3 = dP/dy (theta direction). The node no. increment = 0 in bearing analysis.

- dof = 0, default value and indicates that dof has NO specified boundary value
- dof = -1, this dof is a prescribed (fixed) boundary,
  the non-zero value of this dof is specified in the LOAD command.
  If zero, LOAD command is not needed.

- dof = Positive integer, it indicates that this dof is a "slave" dof and the positive number dof is the "master" dof. This slave dof is rigidly linked to the master dof. (commonly used in cyclic BC)

1. Axial direction (x-direction, or z direction)
   at x(z) = 0 ==> p = P1, dp/dy = 0 P1, P2 = Side pressures
   x(z) = L ==> p = P2, dp/dy = 0 Full Bearing Model, L = bearing length
   x(z) = L/2 => dp/dx = 0 Half Bearing Model
   (if bearing is symmetric with respect to the centerline, symmetric pressure)

2. Circumferential direction (theta, or y direction)
   Case 1 = if supply pressure exists at the groove
   at y(r.theta) = r.theta1 ==> p = Ps leading edge
   y(r.theta) = r.theta2 ==> p = Ps trailing edge
   Case 2, the leading and trailing edges for the incompressible fluid must be determined by BC iterations.

3. Cyclic Boundary Condition

Example for a plain cylindrical journal bearing, as shown in Figure 1. Note 126, 127, 128, 129, 130 are slaves of Nodes 1, 2, 3, 4, 5, respectively. This is for cyclic boundary conditions.

Example:

```
BOUNDARY
  1    -1     0    -1     0
  5     0    -1     0     0
  6    -1     0    -1     0
 10     0    -1     0     0
 11    -1     0    -1     0
 15     0    -1     0     0

 etc……..

120     0    -1     0     0
121    -1     0    -1     0
125     0    -1     0     0
126    -1     1    -1     0
127     2     2     2     0
128     3     3     3     0
129     4     4     4     0
130     5    -1     5     0
/
```

LOAD (External Load / Prescribed BC Value)

- iNode, value 1, value 2, value 3, ..., value n, node no. increment, ratio

/

Load Value can be the external applied load (nodal force) for the free dof or the prescribed BC value for the fixed dof. For Fluid Element, the three values correspond to the dof 1, dof 2, dof 3.

If dof = 0, free dof from BC, then the value is the external load applied at this dof.
dof = -1, fixed dof by BC, then this value is the prescribed BC value.
dof = positive number, then this value is ignored since this dof is a slave dof.

AINITIAL (Initial guess values for the non-linear problem-Compressible Fluid)

- iNode, Dof 1, Dof 2, ..., Dof n, Node increment (*k*), ratio (*r*)
- jNode, Dof 1, Dof 2, ..., Dof n, 0, 0

/

Initial guess values. If *k* is not zero, additional nodes will be automatically filled between iNode and jNode with the node number increment *k*. Note for Fluid Element, each node has 3 DOF.

Example for Gas Bearing

```
AINITIAL
   1   14.700       0.0000       0.0000     1   1.0000
 130   14.700       0.0000       0.0000     0   0.0
/
```

This means that nodes from node 1 to 130 with an increment of 1 are filled with P=14.7 and dP/dx=0, dP/dy=0.

Example for Conventional Fluid Film Bearing

```
AINITIAL
     1   0.0000     0.0000       0.0000     1   1.0000
   441   0.0000     0.0000       0.0000     0   0.0
/
```

BEARING DATA (For Bearings only)

- iBrgType, LCompressible, LHalfModel, LTurbulent, LHeatBalance, LEquilibriumPosition, iBoundaryTypes, nLobe, NumElemLength, iCoorSystem, iUnitSystem

- ClrCb, EccRatio, EccAngle, PressAmb, BrgWx, BrgWy, BrgRad, veloy, AngleKC, AngLoad

- BrgLength, BrgDia, ClrCp, Viscosity, ClrCb, Density, Wload(1), Wload(2), Wload(3), SpeedRange(1), SpeedRange(2), SpeedRange(3)

  do iLobe = 1, nLobe

- read (iInput, *, err = 101)
  Theta1(iLobe), Theta2(iLobe), Preload(iLobe), Offset(iLobe), PocketArc(iLobe), PocketDepth(iLobe), PocketAxLength(iLobe), ReliefTrack(iLobe),

iElem1(iLobe), iElem2(iLobe), NumElemCircum(iLobe)
end do
/

Note that some bearing data are repeated in the inputs, such as ClrCb, BrgWx, BrgWy, BrgRad, veloy in line 2 of the BEARING DATA, these data will be overwritten by line 3. They are here mainly for the version compatibility.

iBrgType

-1 ==> Non-Bearing problem (default)
0 ==> Plain cyindrical (cylic BC)
0-99 ==> Rigid Surface Bearing (Fixed Lobe/Profile Bearings)

Important for Pressure Dam Bearings
iBrgType = 8 Always use LHalfBearing Model for this type of bearing
For Lobe with Pocket or the lobe without relief track,
use half of the axial length.
For Lobe with relief track, only 1/4 of the axial length is needed

LCompressible

True, -1, 1 ==> Compressible Gas Bearings
False, 0 ==> Incompressible Fluid Film Bearings

LHalfModel

True, -1, 1 ==> Use half bearing model, i.e. dp/dx = 0 at x = L/2
Use this only when the brg is symmetric w.r.t. the half line
False, 0 ==> Use full bearing model, i.e., p = Pa at x = L

LTurbulent

True, -1, 1 ==> Turbulent flow
False, 0 ==> Laminar flow

LHeatBalance

True, -1, 1 ==> Heat Balance calculation
False, 0 ==> Constant Viscosity

LEquilibriumPosition

True, -1, 1 ==> Equilibrium position search
False, 0 ==> No search
Equilibrium position search, use the given Eccentricity and Attitude angle as the initial guess values to search for the equilibrium position. At equilibrium,
Fluid Force in X direction + BrgWx = 0
Fluid Force in Y direction + BrgWy = 0
If no search is required, then, use the given Eccentricity and Attitude angle to calculate the fluid forces.
Mainly used in the transient analysis. BrgWx and BrgWy are ignored.

iBoundaryTypes

This parameter is used only when LCompressible is .FALSE.
that is, this variable is used only when solving the incompressible Reynold's equation for oil lubricated bearings to locate the free boundary.

0 ==> Reynolds (Swift-Stieber) B.C. This is the realistic B.C.
The pressure starts before the max. film thickness and ends after the min. film thickness with pressure and gradients to zero.
Both boundaries must be determined by iterations. Should always use this option for real problem.

1 ==> Half Sommerfeld Condition, or Gumbel Condition
Negative pressure set to zero, however, this does not satisfy the continuity of flow. This is widely used due to it's simplicity,
See Someya's pp. 234 explanation.

2 ==> Full Sommerfeld Condition
This allows negative pressure. Unrealistic BC. Fluid can not stand large and continuous negative pressure without rupture.

nLobe

Number of lobes (pads).

NumElemLength

Number of elements in axial direction (L for full bearing or L/2 for half bearing model).
Always use even number in order to get the centerline for the full brg model

iCoorSystem

0 ==> Lund Coordinate System. Theta from (-X) axis.
W and X are in the same direction.

1 ==> Standard Cartesian Coordinate System. Theta from (X) axis.
W can be in any direction from (X) axis by specifying a Load Angle.

iUnitSystem

0 ==> English units

1 ==> Metric units

ClrCb

Bearing assembled radial clearance, Cb = (Db - Ds) / 2,
where Ds = shaft diameter

EccRatio, EccAngle

Eccentricity ratio, *e/Cb*, and Attitude Angle (in degrees).
Initial guess for equilibrium position search.

PressAmb

Ambient pressure, Pa, for gas bearings.

BrgWx, BrgWy

Bearing forces in X and Y direction, note that in our analysis, we transform the coordinates such that X -axis is the Load direction, therefore, BrgWy = 0.

BrgRad
Bearing radius (r = Db/2), used in surface velocity calculation

veloy
Journal surface velocity (r * omega)

AngleKC
Stiffness and damping output coordinates (x, y) angle from the geometry coordinates (X,Y)

AngLoad
Load vector angle from the X axis

BrgLength
Bearing axial length (L)

BrgDia
Bearing diameter (Db)

ClrCp
Bearing lobe (pad) radial clearance (Cp),
Given Cb, and preload *m*, Cp can be calculated.

Viscosity
Viscosity

ClrCb
Bearing assembled radial clearance (Cb)

Density
Lubricant viscosity

Wload(1), Wload(2), Wload(3)
Bearing load, BrgWx = W(1) + W(2)*rpm + W(3)* rpm^2, BrgWy = 0

SpeedRange(1), SpeedRange(2), SpeedRange(3)
Rotor speed (rpm), starting, ending, and incremental speed.

do iLobe = 1, nLobe ! Following data are for the ith lobe

Theta1(iLobe): θ_1**,** Leading edge angle

Theta2(iLobe): θ_2**,** Trailing edge angle

Preload(iLobe): $m = 1 - \dfrac{C_b}{C_p}$

Offset(iLobe): $\alpha = \dfrac{\theta_p - \theta_1}{\theta_2 - \theta_1} = \dfrac{\text{Converging Arc Length}}{\text{Lobe Arc Length}}$

PocketArc(iLobe): θ_d Angle from leading edge to the end of the pressure dam (pocket).

PocketDepth(iLobe): h_d pressure dam (pocket) depth

PocketAxLength(iLobe): L_d pressure dam (pocket) axial length.

ReliefTrack(iLobe): L_r relief track axial length

The above 4 variables are for pressure dam/multi pocket bearings. The pocket is in the center. Positive Relief Track ($L_r > 0$) indicates the track is in the center. Negative Relief Track ($L_r < 0$) indicates the tracks are at both sides with length of $L_r/2$.

iElem1(iLobe): starting element number (not node number)
iElem2(iLobe): ending element number
NumElemCircum(iLobe): number of elements in the circumferential (theta) direction
end do

Example:

```
BEARING
    9      0     -1     -1     -1     -1      0      3      6      1      0
 0.30000000E-02   0.11631100        79.821800        0.0000000        75.000000
0.0000000       0.94490000        2473.7424        0.0000000        270.00000
  1.3000000        1.8898000       0.30000000E-02   0.30000000E-02   0.21600000E-05
0.77961498E-04    75.000000        0.0000000        0.0000000        25000.000
25000.000        1000.0000
  190.00       290.00       0.0000       0.0000       60.050      0.94530
0.77000E-02  -10.000      0.90500           1   120    25
  310.00       410.00       0.0000       0.0000       60.050      0.94530
0.77000E-02  -10.000      0.90500          121   240    25
  70.000       170.00       0.0000       0.0000       60.050      0.94530
0.77000E-02  -10.000      0.90500          241   285    10
/
```

OILPRO (Required only when Heat Balance is selected)

```
read (iInput, *, err = 101)  NOIL, Tsupply, CarryH
read (iInput, '(a128)', err = 101) TitleOil
read (iInput, *, err = 101) SPGR60, CALPHA
read (iInput, *, err = 101) OILT(1),OILCST(1),OILT(2),OILCST(2)
read (iInput, *, err = 101) OILCP(1),OILCP(2),OILCP(3),OILCP(4)

IF ( NOIL .NE. 32 )  THEN ! Typical Oil ! Oil Properties
      CALL OILAB ( OILT, OILCST, OILA, OILB )
ELSE                  ! Water
         CALL WATERDATA      ! C *** Water Properties (NOIL = 32)
ENDIF
CarryH = CarryH / 100.0d0                  ! Convert from % to number
```

NOIL = Oil Number from BePerf Oil Library, NOIL = 32 for water
Tsupply = Oil Inlet Temperature
CarryH = Heat Carry Away Factor (%), Typical 80%
TitleOil = Description for the oil
SPGR60 = Specific Gravity at 60 deg F
CALPHA = Coefficient of thermal expansion

OILT(1) = First temperature point
OILCST(1) = Lubricant Viscosity in centistokes at OILT(1)
OILT(2) = Second temperature point
OILCST(2) = Lubricant Viscosity in centistokes at OILT(2)
Oil Specific Heat = OILCP(1) +OILCP(2) * T + OILCP(3) * T^2+ OILCP(4) * T ^3

Example:

```
OILPRO
 0 120 80 0 0 0
Amokon ISO-VG 32
 0.863 0.000437764 0 0 0
 104 32.6 212 5.61 0
 0.417851 0.000484621 0 0 0
/
```

ISOLVER, *iSolve* (optional)

The value of *iSolve* determines the method to be used in the KX=F calculation.
Default value is Profile Solver (2)

iSolve = 0 ! Full Matrix Solver (time consuming), used for bearing analysis.
iSolve = 1 ! Skyline Solver - Symmetric Matrix, used for structure analysis only.
iSolve = 2 ! Profile Solver - Non-Symmetric Matrix but sparse matrix.

For structure problem, Skyline (1) is commonly used
For compressible bearings, Profile (2) must be used
For incompressible bearings, Skyline (1) can be used since the K is symmetric
The method selection depends upon the problem to be solved

NITERATION, *MaxIterFem* (required only for the Non-Linear Problem)

Default value is 1 - For the Linear problems
For Non-Linear Problems, Newton-Raphon iteration scheme is used,
then the *MaxIterFem* will be the max number of iterations allowed.
The actual number of iteration can be smaller if the problem converges easily.

TOLERANCE, *TolFem* (required only for the Non-Linear Problem)

Convergence Tolerance, Default is 1.0E-06
The input data is required only for the Non-Linear Iteration scheme to check the convergence criteria.

NEWTON

Required only when Compressible Fluid Elements (gas bearings) exist.

SOLVE (or EQUILIBRIUM POSITION)

The FEM solver is activated by this COMMAND
SOLVE: Solve the current FEA case

SOLVE STRUCTURE: Solve the structural case
SOLVE FLUID: Solve the fluid case
SOLVE COUPLE: Solve the coupled case
If the problem to be solved has only one type of element, for example:
Structure element: 1D bar, 1D beam, 2D Plain Stress...., or,
Fluid element: bearings without structural element (rigid surface),
then ***SOLVE*** means ***SOLVE STRUCTURE*** for structural case and ***SOLVE FLUID*** for the rigid bearing case.
SOLVE STRUCTURE, ***SOLVE FLUID***, ***SOLVE COUPLE*** are only used for the bearings with flexible structural supports.

EQUILIBRIUM POSITION

For bearings with rigid surface, use ***EQUILIBRIUM POSITION*** to replace ***SOLVE***. It will solve the equilibrium position and calculate the dynamic coefficients.

LIST parameter

Use this command to output the input and calculated data.
The available parameter can be:

INPUTS

NODE	Nodal data
ELEMENT	Element data
MATERIAL	Material data
LOAD	Load data
BOUNDARY	Boundary data
BODY	Body force data
INITIAL	Initial guess values
AUX1	Auxiliary data

etc…

OUTPUTS

DISPLACEMENT	Displacement and/or slope for structural problem and Pressure and/or pressure gradient for bearing problem
FORCE:	Fluid film forces - bearing problem only
CLEARANCE	Bearing Clearance - bearing problem only
COUPLE	List Results from the Couple Solution Displacements for Structural Solution Pressures for Fluid Solution
STRESS	Stress – structure problem
STRAIN	Strain – structure problem

STOP

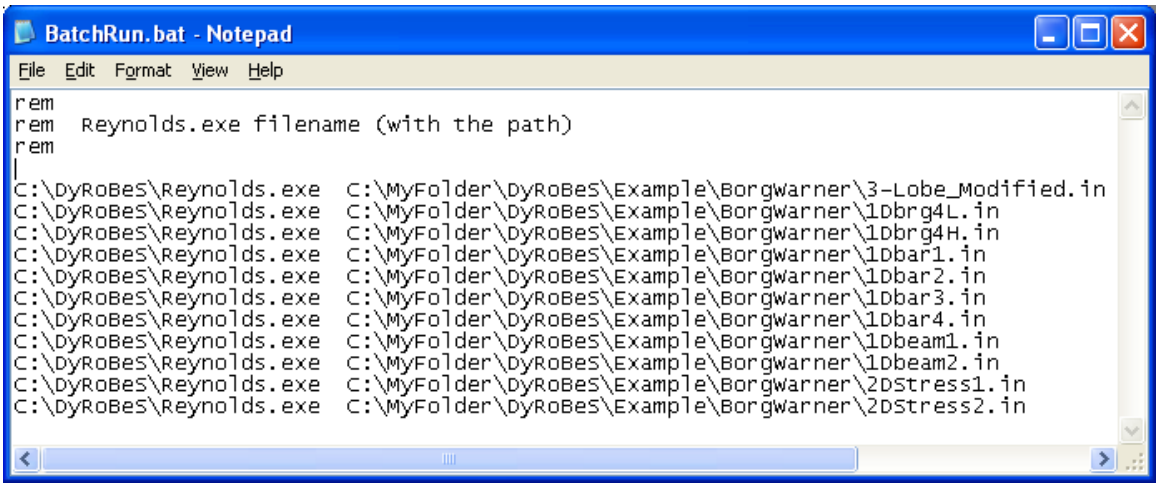
The program stops

Examples to use *.in file

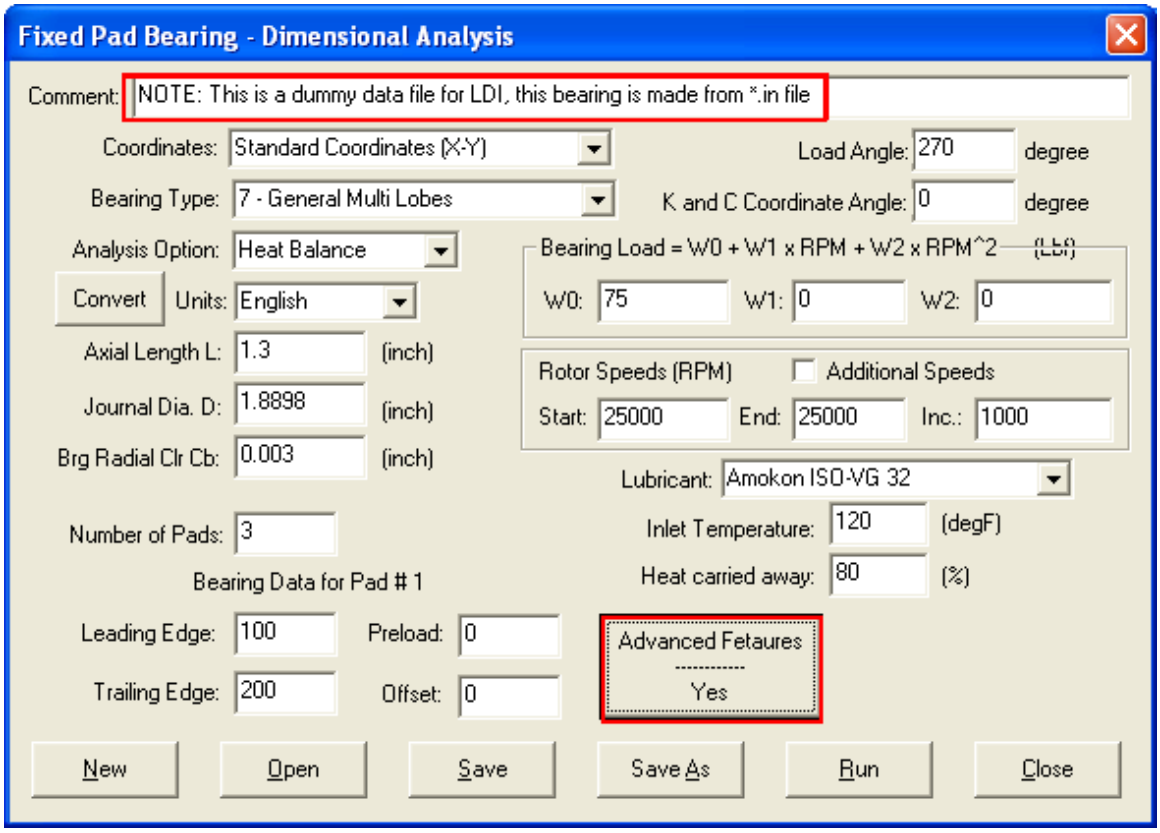
Since the Reynolds.exe was developed as a general finite element program, it can be used as an independent program. In general, all the 1D and 2D problems can be solved using this program. To execute this program with an existing *.in file, type the following command in the Command Prompt.

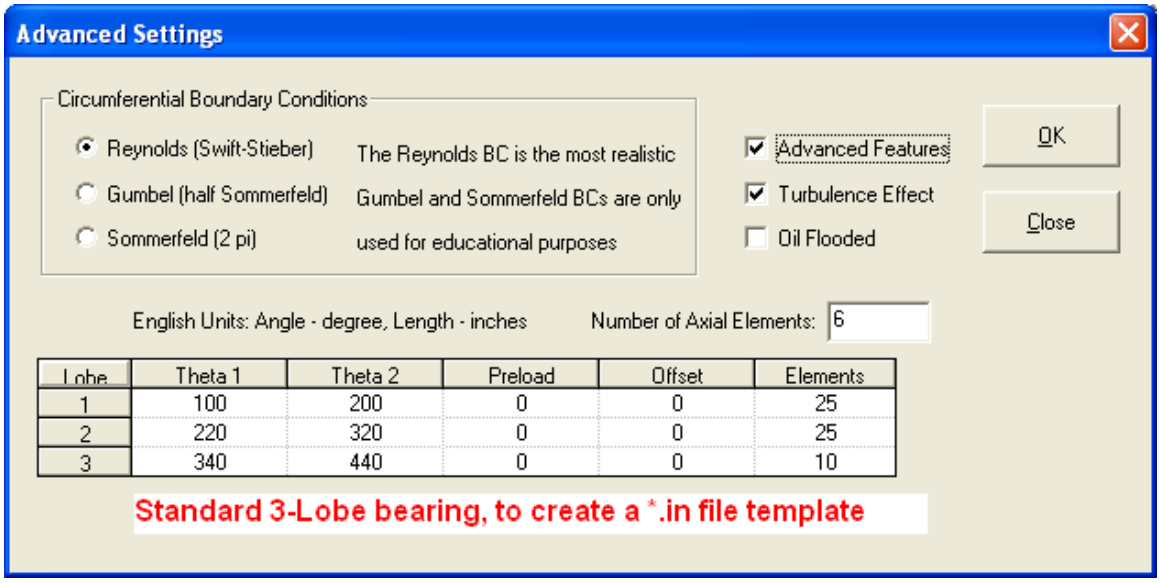
Reynolds.exe filename (with the complete path)

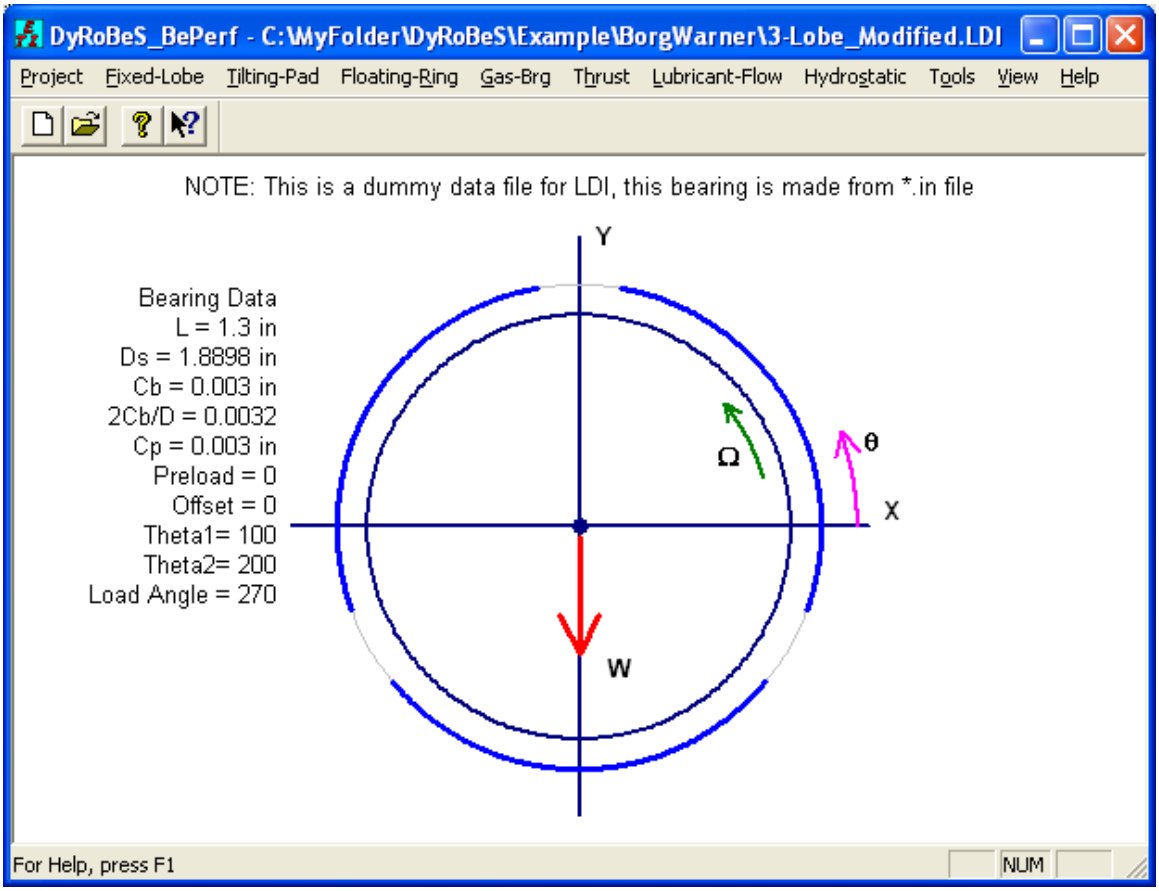
Or write a batch file to execute this program in a batch mode.



However, the focus here is for the bearings. To fully utilize the pre- and post- processors of BePerf, one may use the BePerf to start a preliminary *.in file. Then use any text editor to modify the *.in file to suite the need. For example, if we need to analyze a taper-land bearing, we start the program with a 3-lobe bearing. The following figures show the progress.


Fixed Pad Bearing - Dimensional Analysis
Comment: NOTE: This is a dummy data file for LDI, this bearing is made from *.in file
Coordinates: Standard Coordinates (X-Y)
Load Angle: 270 degree
Bearing Type: 7 - General Multi Lobes
K and C Coordinate Angle: 0 degree
Analysis Option: Heat Balance
Bearing Load = W0 + W1 x RPM + W2 x RPM^2 (LBF)
Convert
Units: English
W0: 75 W1: 0 W2: 0
Axial Length L: 1.3 (inch)
Rotor Speeds (RPM) Additional Speeds
Journal Dia. D: 1.8898 (inch)
Start: 25000 End: 25000 Inc.: 1000
Brg Radial Clr Cb: 0.003 (inch)
Lubricant: Amokon ISO-VG 32
Number of Pads: 3
Inlet Temperature: 120 (degF)
Heat carried away: 80 (%)
Bearing Data for Pad # 1
Leading Edge: 100 Preload: 0
Advanced Fetaures
Yes
Trailing Edge: 200 Offset: 0
New
Open
Save
Save As
Run
Close

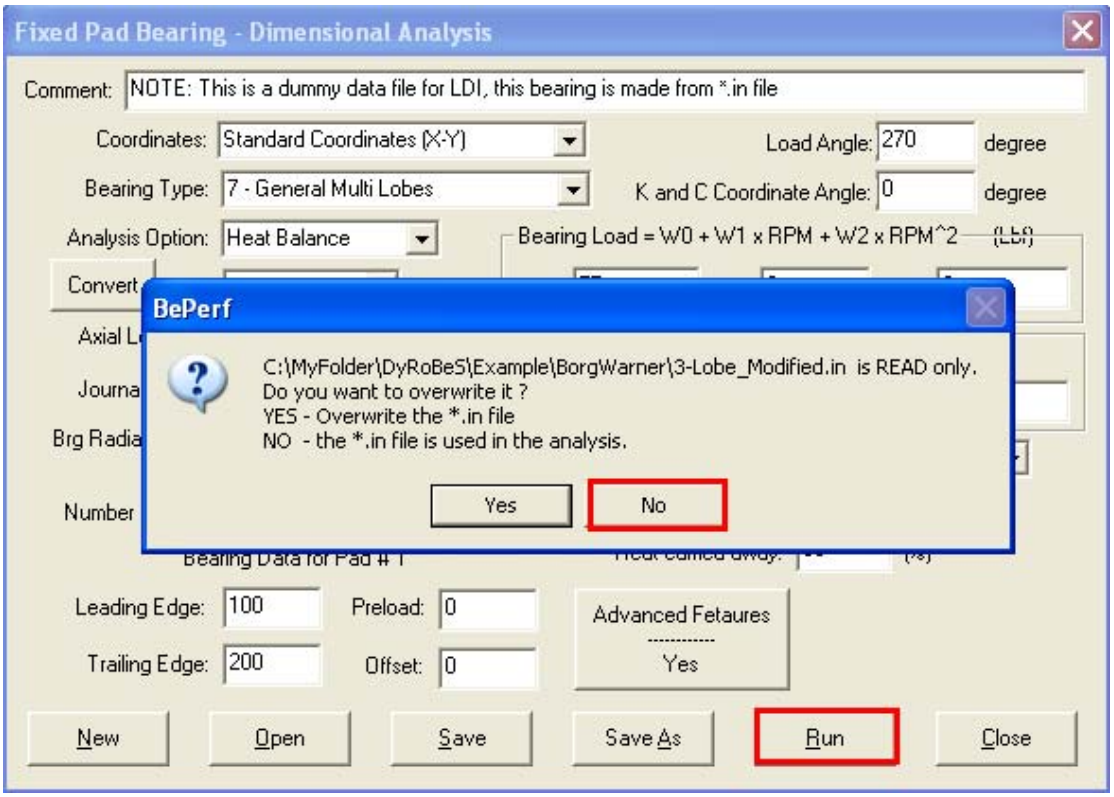

Advanced Settings
Circumferential Boundary Conditions
Reynolds (Swift-Stieber)
Gumbel (half Sommerfeld)
Sommerfeld (2 pi)
The Reynolds BC is the most realistic
Gumbel and Sommerfeld BCs are only
used for educational purposes
Advanced Features
Turbulence Effect
Oil Flooded
OK
Close
English Units: Angle - degree, Length - inches
Number of Axial Elements: 6
Lobe Theta 1 Theta 2 Preload Offset Elements
1 100 200 0 0 25
2 220 320 0 0 25
3 340 440 0 0 10
Standard 3-Lobe bearing, to create a *.in file template



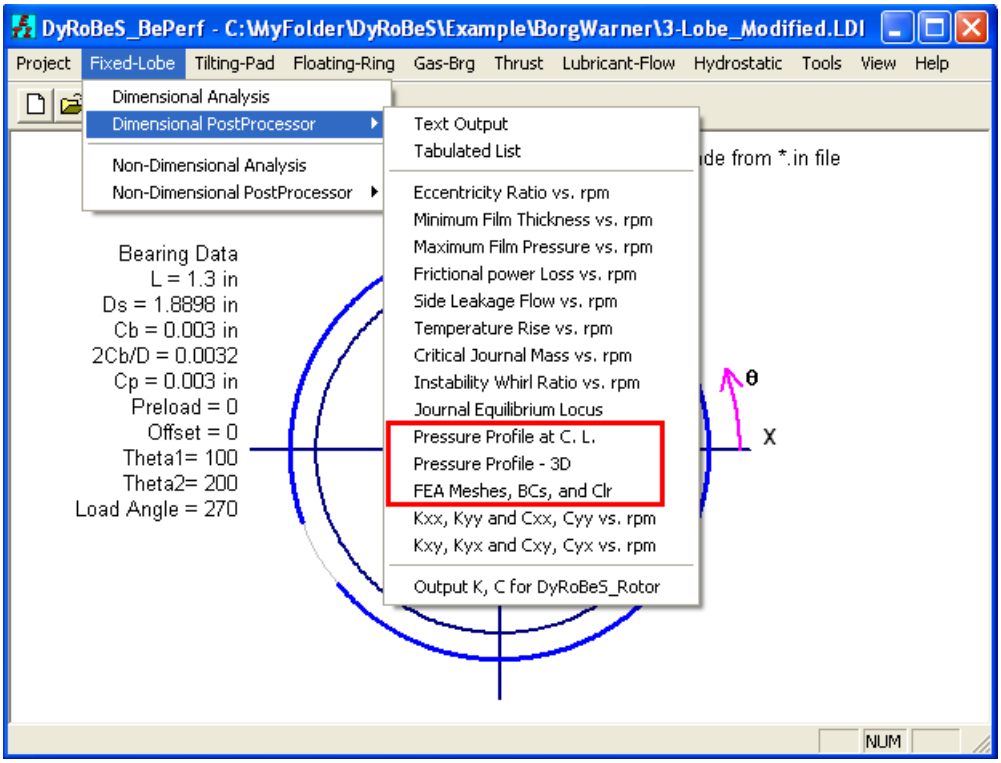
Click the "**Run**" button to create the *.in file. Then use the text editor to modify the *.in file. The following commands need to be modified to meet the requirement:

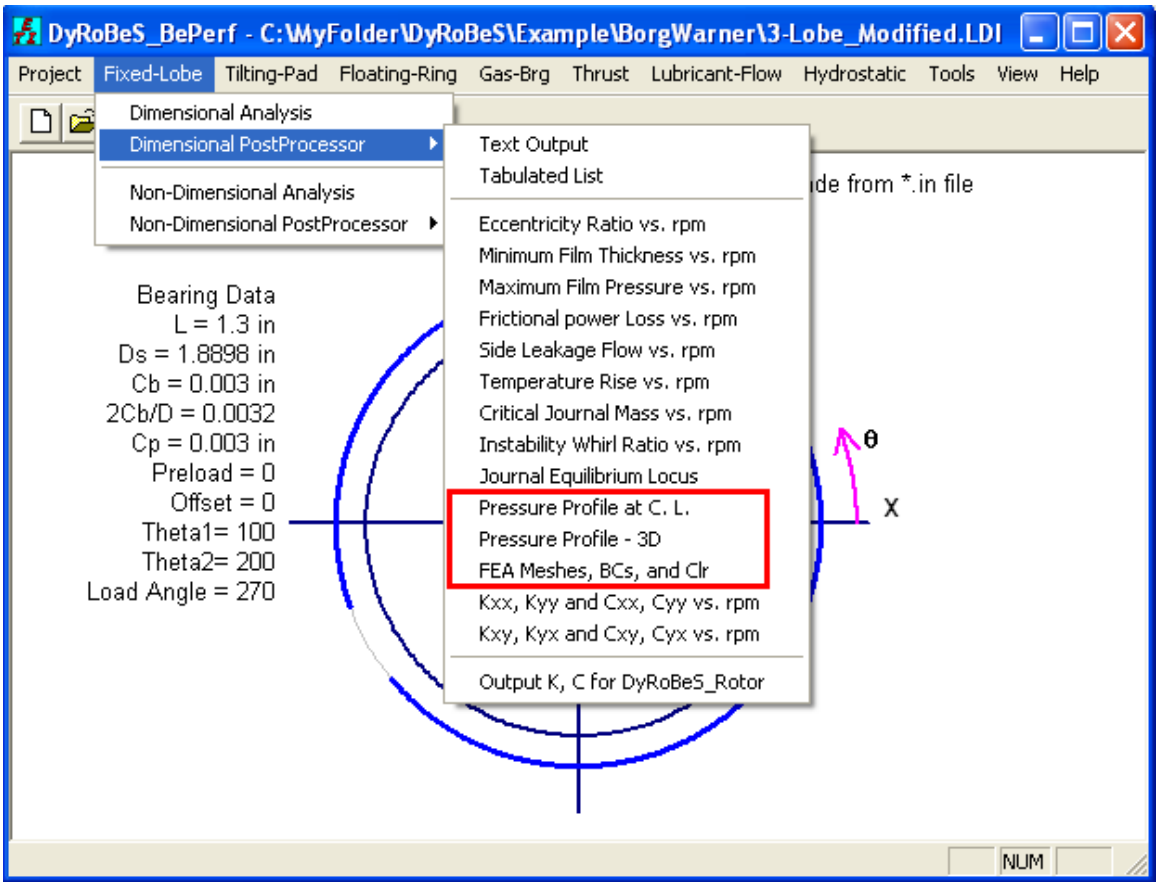
NODE – Node data
ELEMENT – Element data
AUXI – Additional clearance and derivatives
BOUNDARY – Boundary conditions

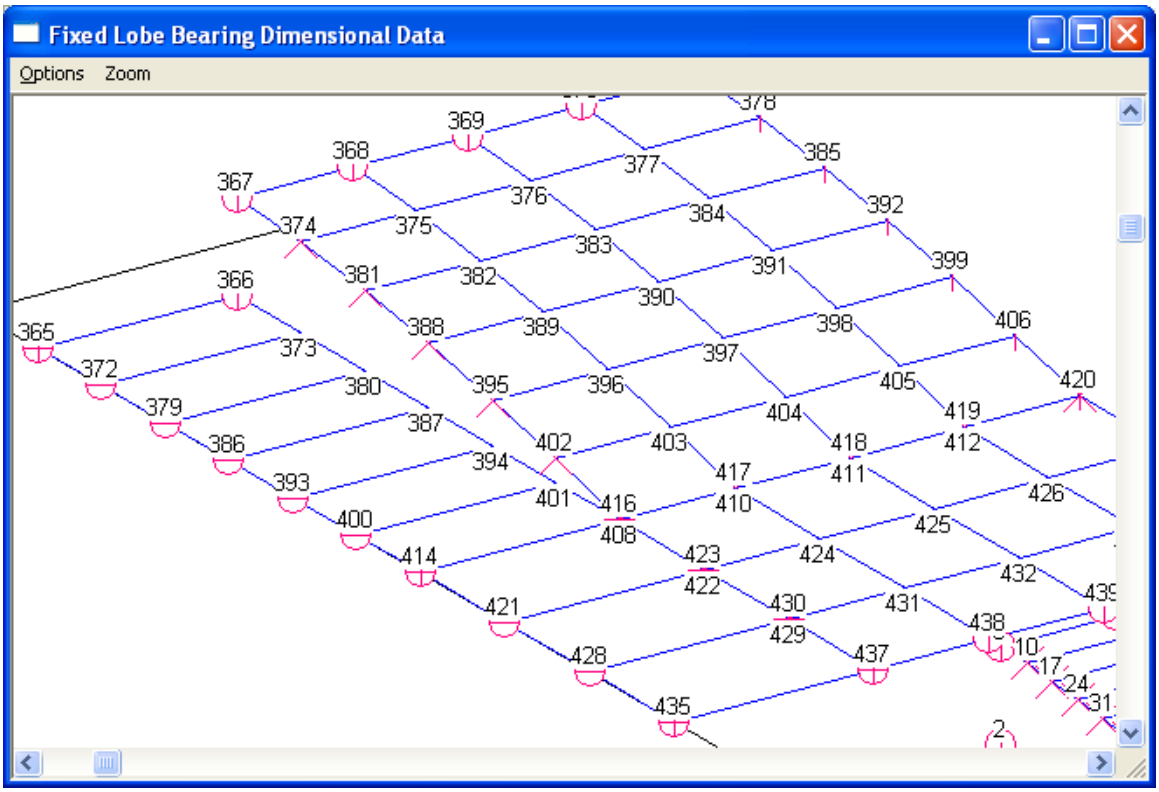
This process can be automatic once the user knows the command's format well enough. One can write his own program to generate the Bearing Geometric Data automatically. Once the *.in file is modified, the analysis can be executed using the command prompt as described previously. Or the analysis can be executed through the BePerf GUI. It is important to add the first line with a symbol "$" in the *.in file to indicate that this *.in file can NOT be overwritten by the BePerf GUI. The *.in file without $ in the first line, this file will be automatically overwritten by the BePerf GUI for the analysis. Once the $ is added, the BePerf GUI will prompt you if you want to overwrite the file. The following figure illustrates this process.

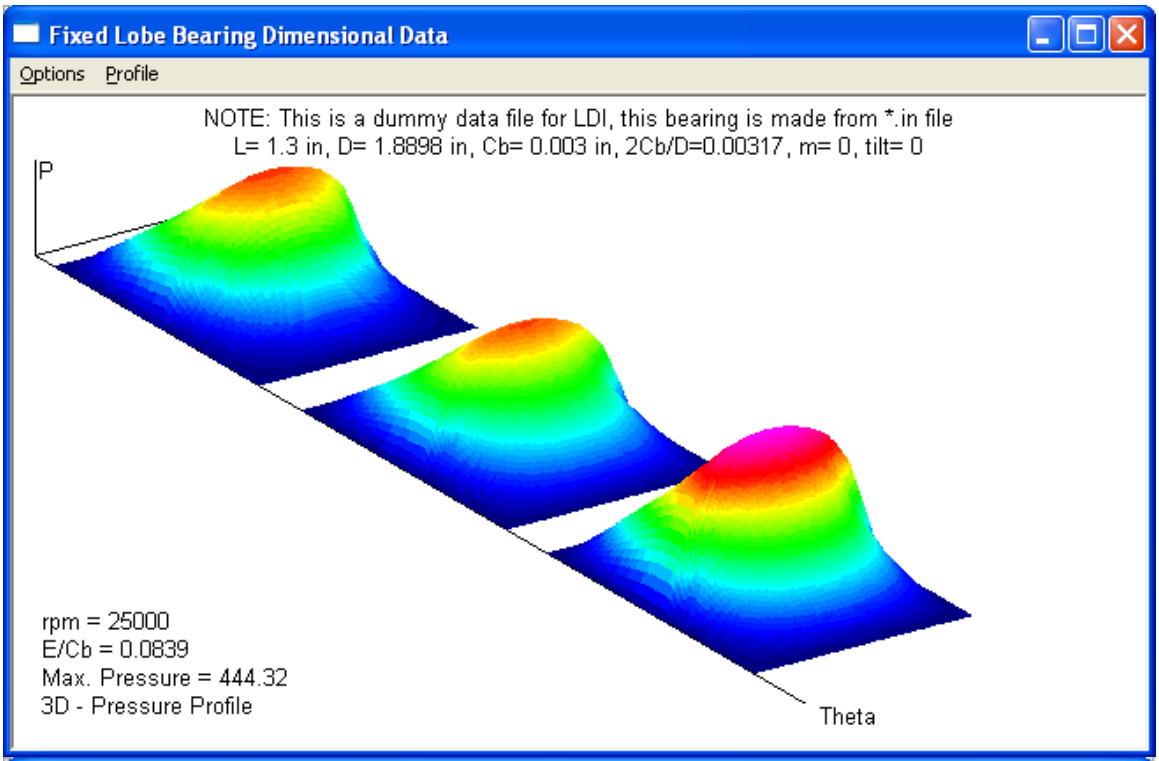


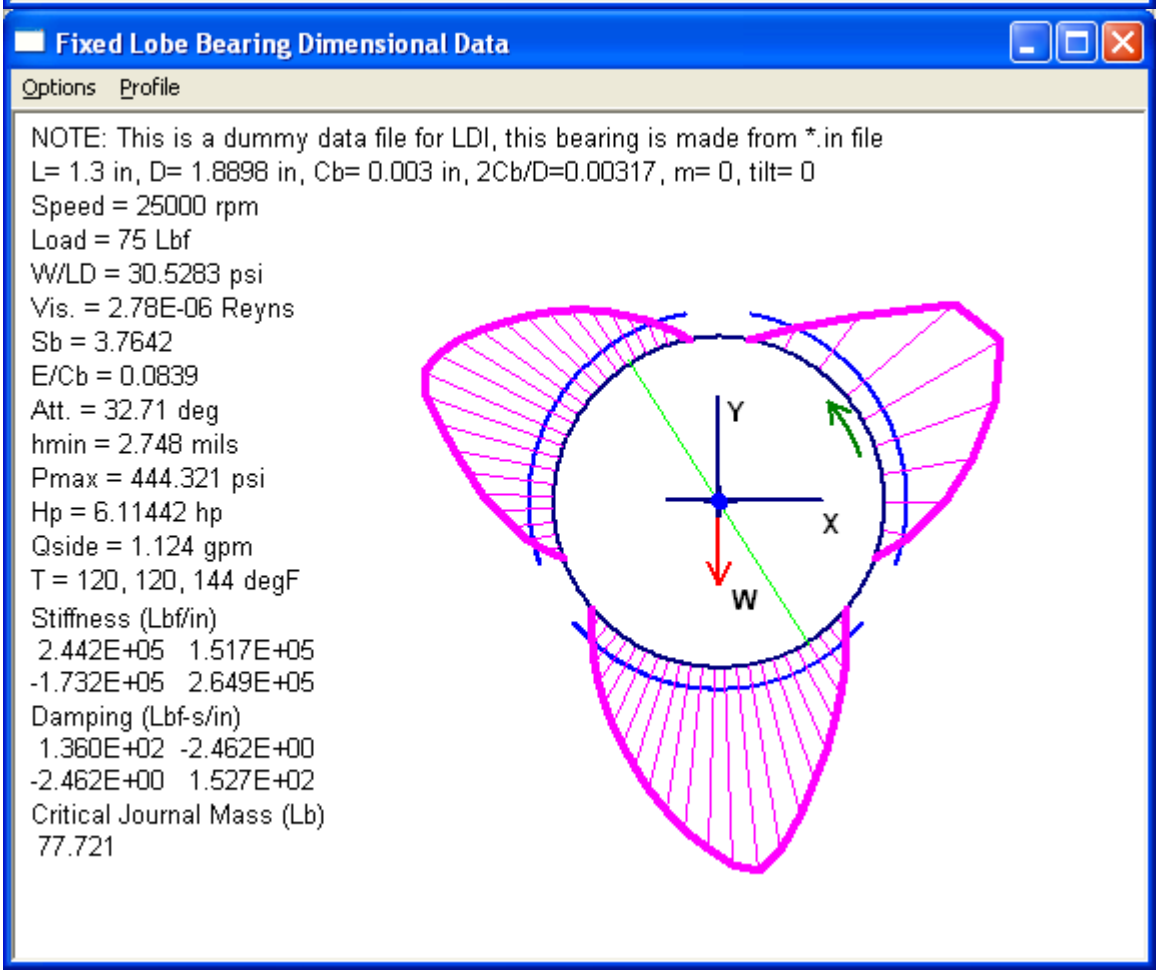
Once the analysis is performed, one can use the post-process to view the meshes, boundary conditions, and results. The post-processor option "FEA meshes, BCs, and Clr" allows you to verify your model.




DyRoBeS_BePerf - C:\MyFolder\DyRoBeS\Example\BorgWarner\3-Lobe_Modified.LDI
Project
Fixed-Lobe
Tilting-Pad
Floating-Ring
Gas-Brg
Thrust
Lubricant-Flow
Hydrostatic
Tools
View
Help
Dimensional Analysis
Dimensional PostProcessor
Non-Dimensional Analysis
Non-Dimensional PostProcessor
Text Output
Tabulated List
Eccentricity Ratio vs. rpm
Minimum Film Thickness vs. rpm
Maximum Film Pressure vs. rpm
Frictional power Loss vs. rpm
Side Leakage Flow vs. rpm
Temperature Rise vs. rpm
Critical Journal Mass vs. rpm
Instability Whirl Ratio vs. rpm
Journal Equilibrium Locus
Pressure Profile at C. L.
Pressure Profile - 3D
FEA Meshes, BCs, and Clr
Kxx, Kyy and Cxx, Cyy vs. rpm
Kxy, Kyx and Cxy, Cyx vs. rpm
Output K, C for DyRoBeS_Rotor
ide from *.in file
Bearing Data
L = 1.3 in
Ds = 1.8898 in
Cb = 0.003 in
2Cb/D = 0.0032
Cp = 0.003 in
Preload = 0
Offset = 0
Theta1= 100
Theta2= 200
Load Angle = 270
θ
X
NUM


Fixed Lobe Bearing Dimensional Data
Options
Zoom


Fixed Lobe Bearing Dimensional Data
Options Profile
NOTE: This is a dummy data file for LDI, this bearing is made from *.in file
L= 1.3 in, D= 1.8898 in, Cb= 0.003 in, 2Cb/D=0.00317, m= 0, tilt= 0
P
rpm = 25000
E/Cb = 0.0839
Max. Pressure = 444.32
3D - Pressure Profile
Theta


Fixed Lobe Bearing Dimensional Data
Options Profile
NOTE: This is a dummy data file for LDI, this bearing is made from *.in file
L= 1.3 in, D= 1.8898 in, Cb= 0.003 in, 2Cb/D=0.00317, m= 0, tilt= 0
Speed = 25000 rpm
Load = 75 Lbf
W/LD = 30.5283 psi
Vis. = 2.78E-06 Reyns
Sb = 3.7642
E/Cb = 0.0839
Att. = 32.71 deg
hmin = 2.748 mils
Pmax = 444.321 psi
Hp = 6.11442 hp
Qside = 1.124 gpm
T = 120, 120, 144 degF
Stiffness (Lbf/in)
2.442E+05 1.517E+05
-1.732E+05 2.649E+05
Damping (Lbf-s/in)
1.360E+02 -2.462E+00
-2.462E+00 1.527E+02
Critical Journal Mass (Lb)
77.721
Y
X
W