Ansys Mechanical Beyond the Basics

# Module 05 Workshop: Additional Analysis Settings, Loads, and Supports

Release 2021 R2

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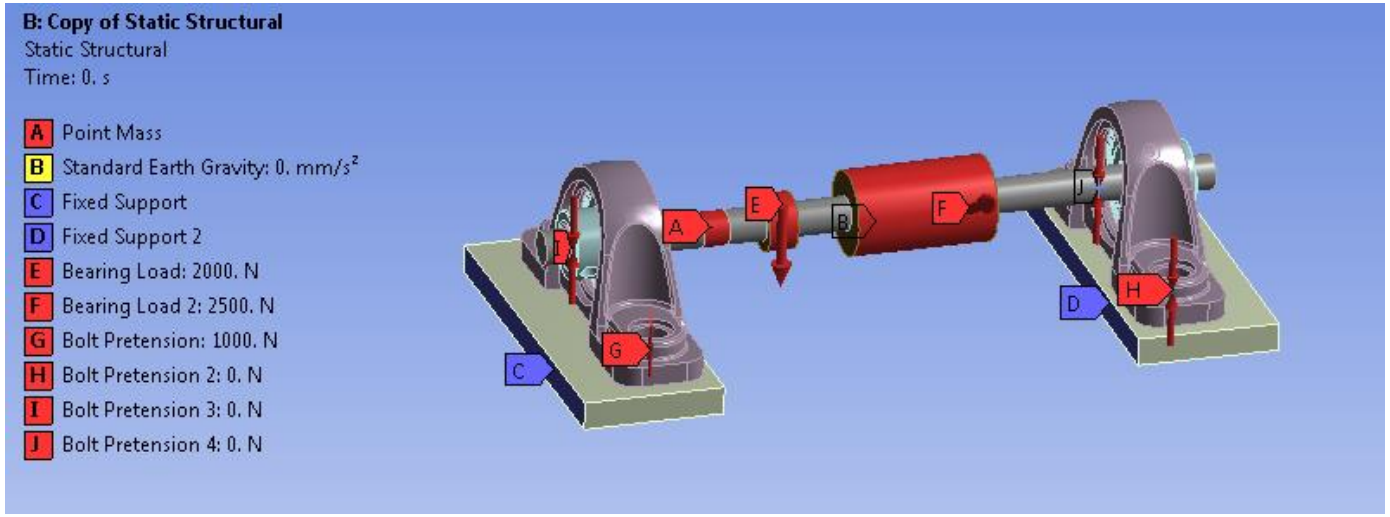
# Workshop 05: Additional Analysis Settings, Loads, and Supports

**Use this guide to work on the Journal Bearing model.**





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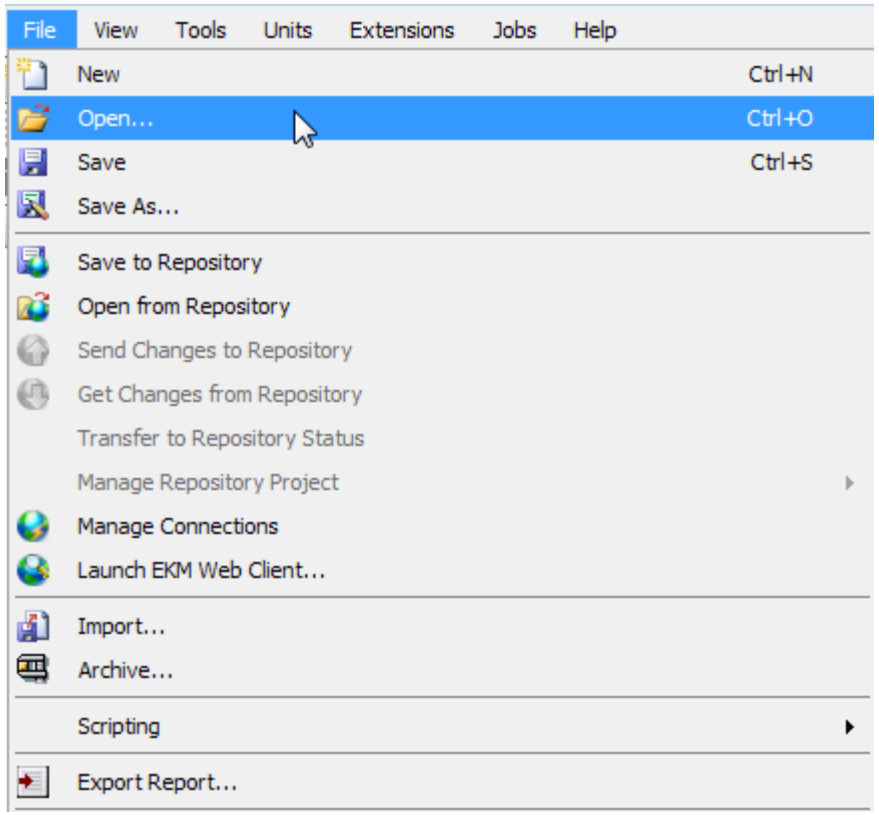
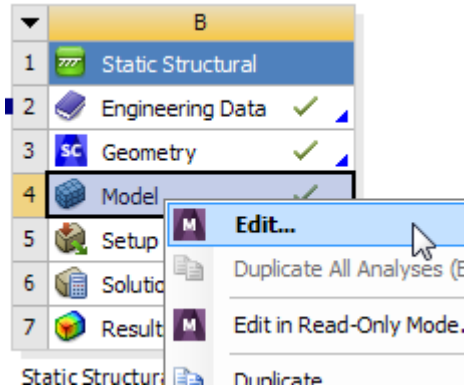
# Workshop 05: Additional Analysis Settings, Loads, and Supports

- **Open Archive:** “Shaft_Bearings_WS05_Start.wbpz”
- **Open** Mechanical





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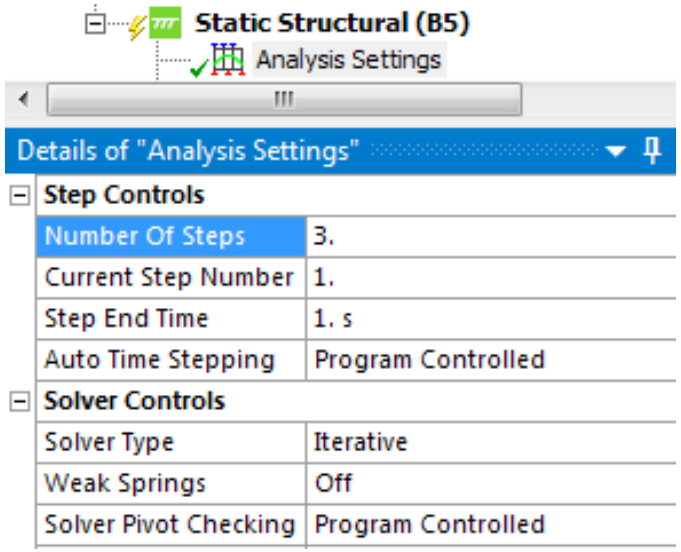
# Workshop 05: Additional Analysis Settings, Loads, and Supports

We'll set up a 3-step analysis in **Analysis Settings**: when using bolt preloads, it is recommended to define at least 3 steps for: 1–load bolt pretensions, 2–lock bolt pretensions, and 3–applied working loads

- In the Analysis Settings details, change the **Number of Steps** to **3**
- Change **Solver Type** to **Iterative**. Depending on the memory you have on your computer, this model will solve faster with the iterative solver.





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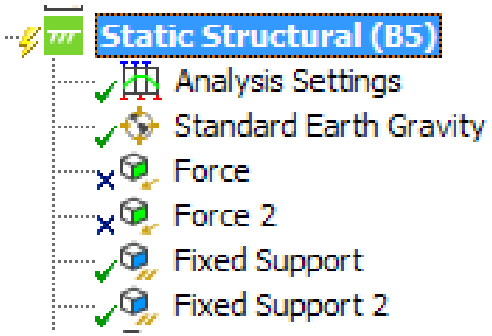
# Workshop 05: Additional Analysis Settings, Loads, and Supports

- Verify the existing loads and supports:
  - **Standard Earth Gravity:** applied in all 3 steps
  - Pulley forces (**Force** and **Force2**): **Suppress** them, they will be replaced by Bearing Loads
  - **Fixed Supports**: supports cannot be changed from one step to the next, so there are no changes to be made





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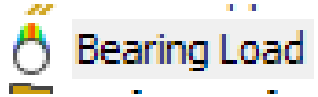
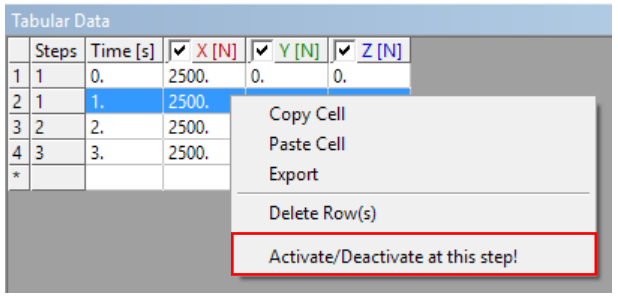
# Workshop 05: Additional Analysis Settings, Loads, and Supports

- Define the Bearing Loads:
  - Insert a **Bearing Load** object 

  - **Scope** it to the smaller pulley external face
  - Define a magnitude of **-2000 N** along the **Z axis** of the **Global Coordinate System**
  - Insert another **Bearing Load** object
  - **Scope** it to the larger pulley external face
  - Define a magnitude of **2500 N** along the **X axis** of the coordinate system named **Coordinate System**
  - Activate both of the defined Bearing Loads *only* for **Step 3**: either **Deactivate** them for **Steps 1** and **2** or define their magnitudes to be **0** for **Steps 1** and **2**




*or*

Tabular Data

| | Steps | Time [s] | X [N] | Y [N] | Z [N] |
|---|---|---|---|---|---|
| 1 | 1 | 0. | 0. | 0. | 0. |
| 2 | 1 | 1. | 0. | 0. | 0. |
| 3 | 2 | 2. | 0. | 0. | 0. |
| 4 | 3 | 3. | 2500. | 0. | 0. |
| * | | | | | |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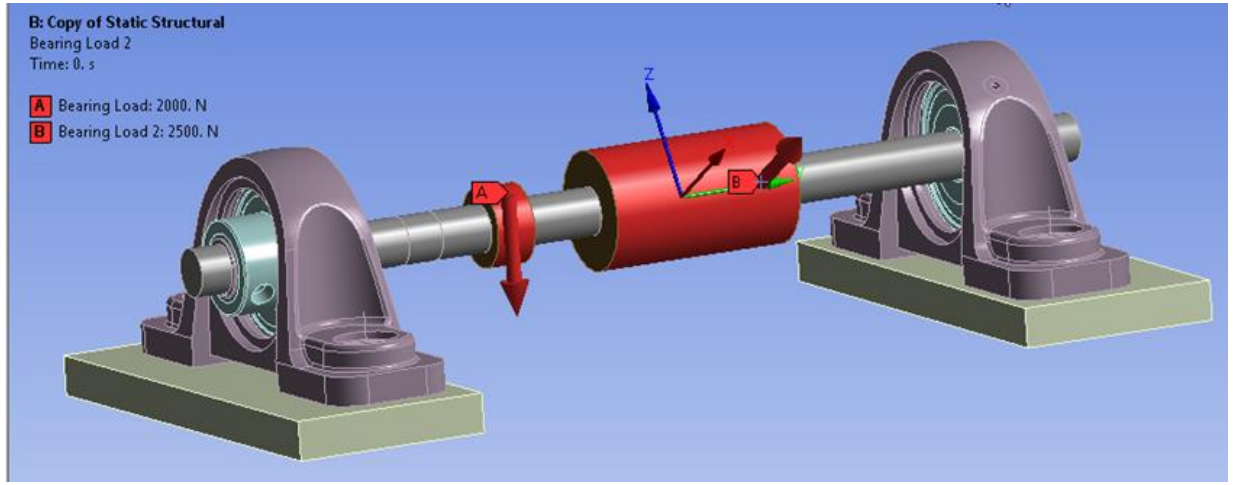
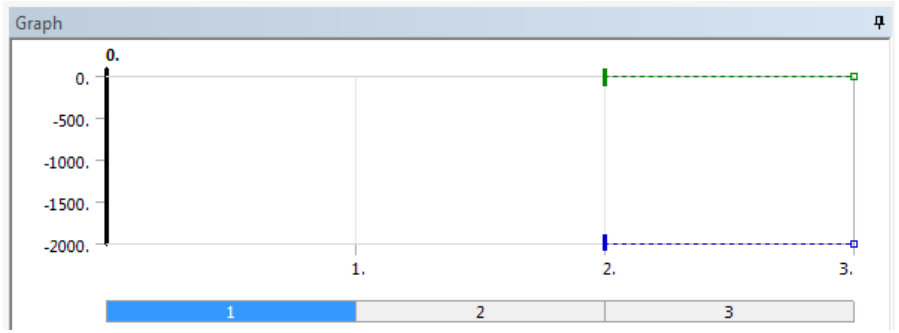
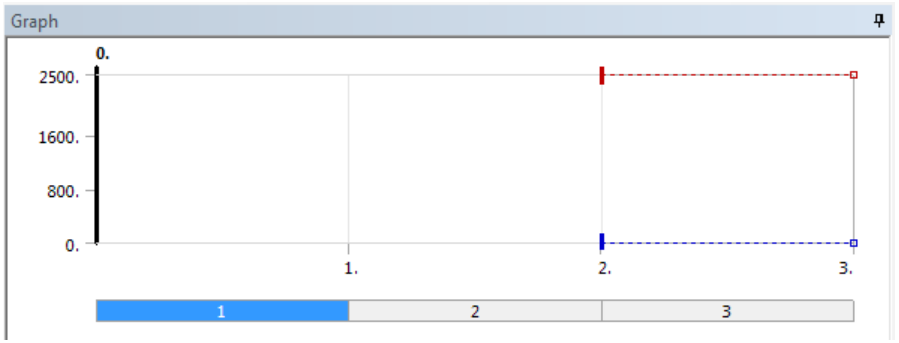



**Bearing Loads Graphical view**

**If Steps 1 and 2 deactivated …**





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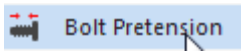
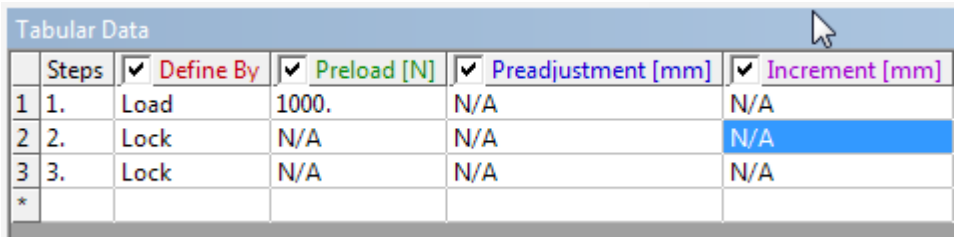
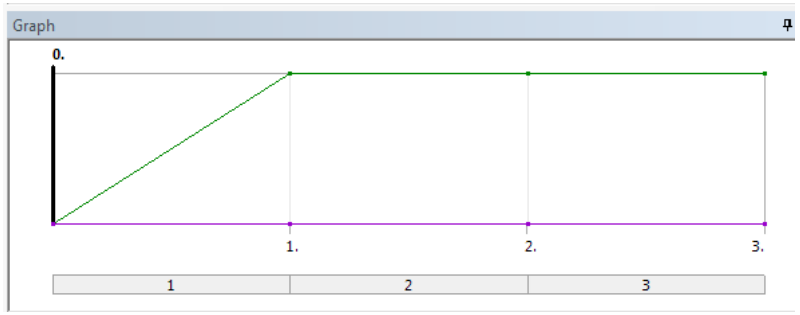
# Workshop 05: Additional Analysis Settings, Loads, and Supports

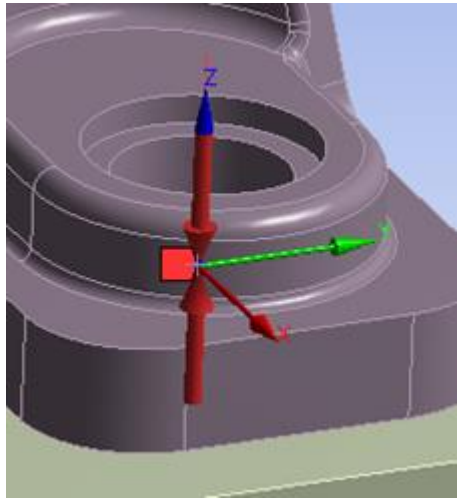
- Define the **Bolt Pretensions**
  - Insert a **Bolt Pretension** object 

  - Scope it to one of the 4 beam bodies, using the **Body** selection filter
  - Select the corresponding local **Coordinate System**
  - Define **Load** of 1000 N for step 1
  - Define **Lock** for steps 2 and 3




| | Steps | Define By | Preload [N] | Preadjustment [mm] | Increment [mm] |
|---|---|---|---|---|---|
| 1 | 1. | Load | 1000. | N/A | N/A |
| 2 | 2. | Lock | N/A | N/A | N/A |
| 3 | 3. | Lock | N/A | N/A | N/A |
| * | | | | | |




  - Repeat the steps above to define the remaining 3 Bolt Pretension loads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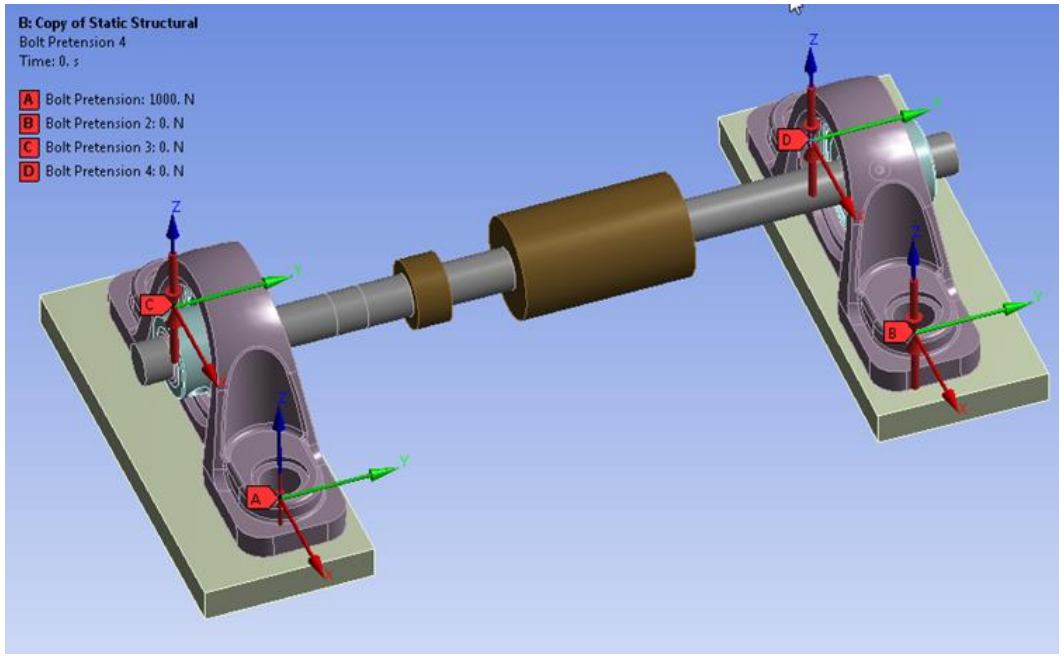
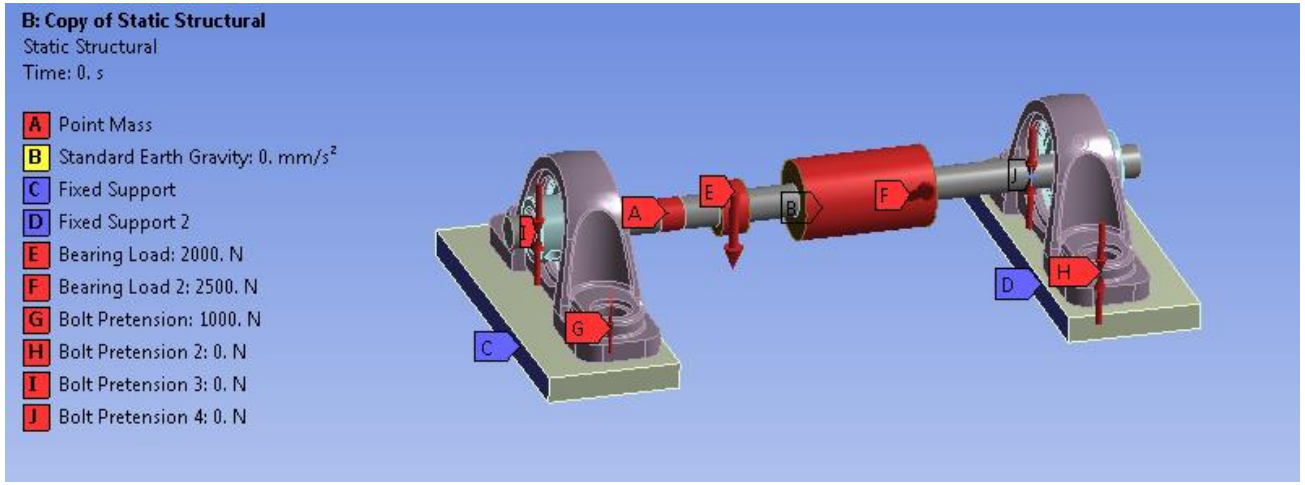



**Bolt Pretension Loads Graphical View**




**All Defined Loads Graphical View**
**(Select Static Structural branch to view)**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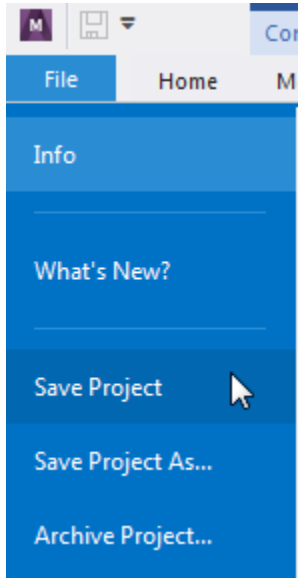
**Save Project** for use later if desired.





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