

## Module 02 Student Workshop: Problem Statement

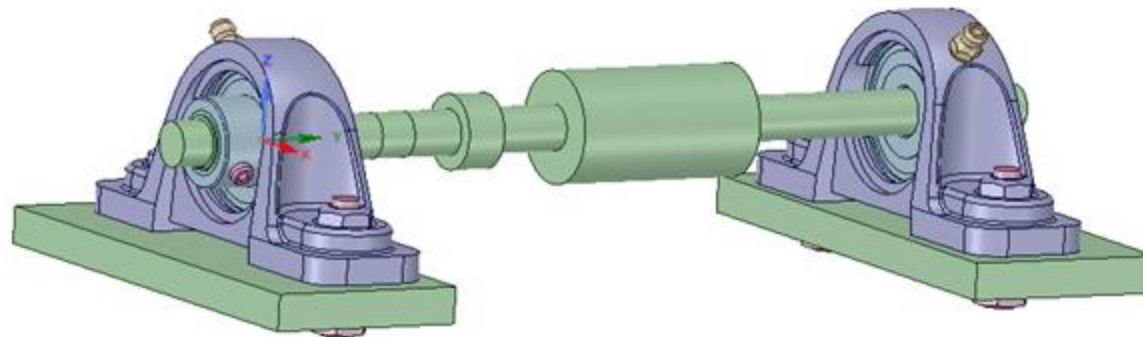
Please note:

- These training materials were developed and tested in Ansys Release 2023 R1. Although they are expected to behave similarly in later releases, this has not been tested and is not guaranteed.
- The screen images included with these training materials may vary from the visual appearance of a local software session.
- Although some workshop files may open successfully in previous releases, backward compatibility is somewhat unlikely and is not guaranteed.



## Workshop 02: Problem Statement

- You're analyzing a bearing and shaft assembly. It is part of a conveyor belt system in the tooling industry used for transfer of manufactured products.
- You'll not study the assembly when rotating. You'll study it when the motor is off and when the belts are mounted. The tension is supposed to be equal in each side of a belt.
- We have an existing design of a drive system for a conveyor. It will be supplied as a starting geometry file in a later module. Presently, the journal bearing housings are made of stainless steel. In order to reduce manufacturing and production costs, we are asked whether we can manufacture the housings from a polycarbonate material.

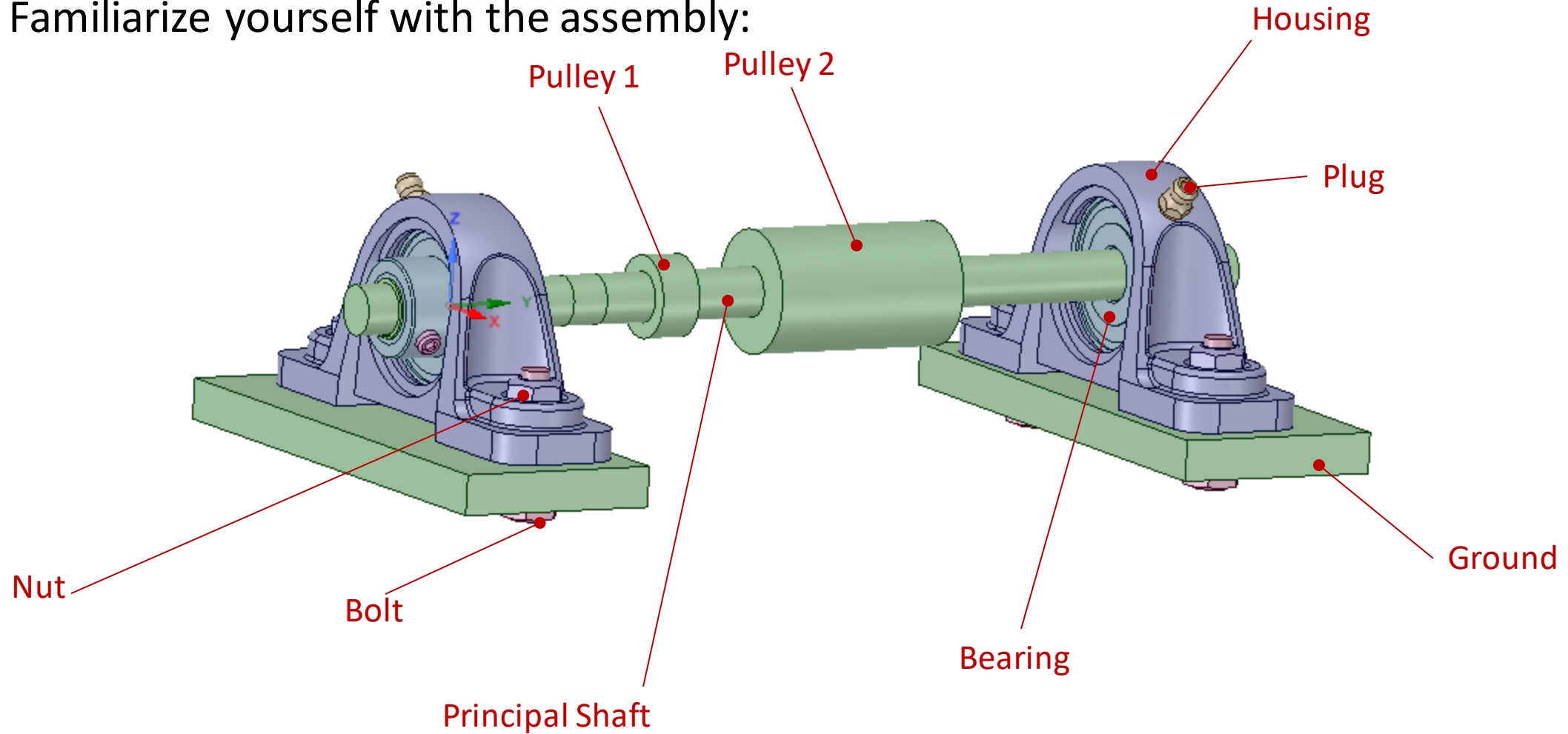


# / Workshop 02: Problem Statement

- We need to perform a comparison between the existing design and the proposed polycarbonate design to ensure:
  - For safety and reliability reasons, that the assembly can withstand the imposed shaft loadings in a “fault” condition (10 times the design loading), and
  - Axial misalignment between the ends of the shaft will not vary by more than 5% from the misalignment in the current design; otherwise, overall system performance would suffer and lead to premature bearing failure.
- You will focus on the context of the overall assembly model. Your assignment is to determine whether the proposed polycarbonate design is acceptable based upon the fault loadings on the assembly and the specified limits for stress results and misalignment.

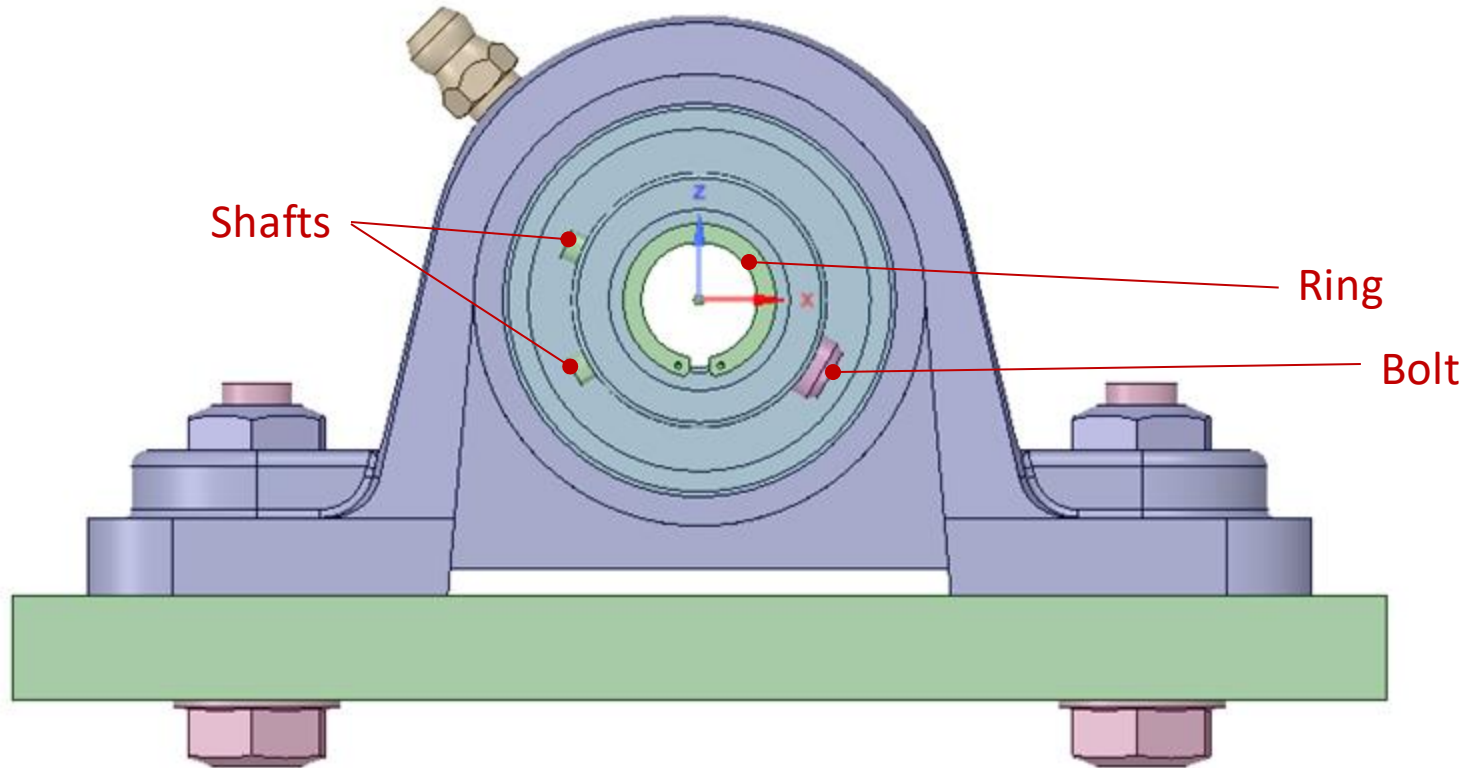
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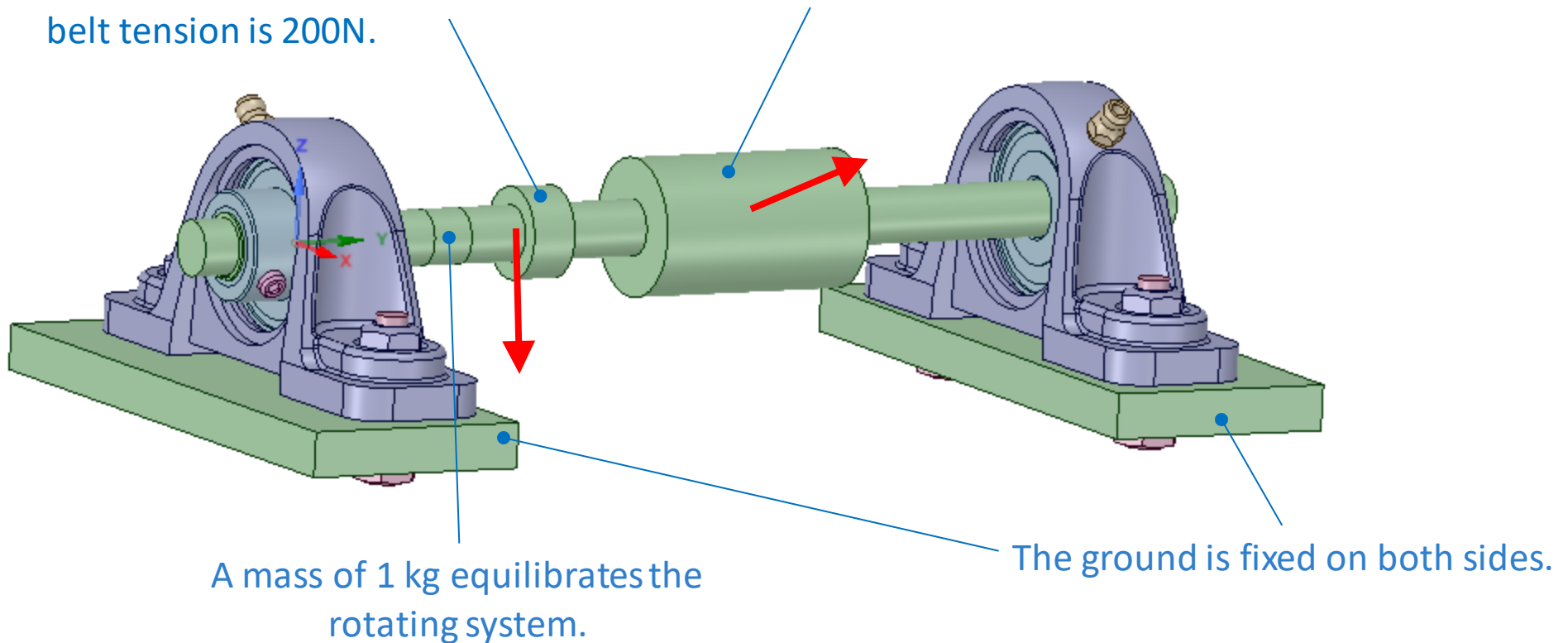


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- Familiarize yourself with the assembly:

Pulley 1 supports a belt in Z direction. The belt is, on the other end, attached to a shaft of an electric motor. The nominal belt tension is 200N.

Pulley 2 supports the conveyor belt. The conveyor has a 30° orientation around Y axis. The nominal belt tension is 250 N.





**End of presentation**