



**38<sup>th</sup> Annual Meeting**  
**Turbomachinery Research Consortium**  
**May 15 – 16, 2018**

**Half page Synopsis of Reports for website**

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Title of Report:  
Solid Modeler Implemented Rotordynamics

**Summary:**

This project aims to provide TRC members with a stand-alone 3D solid finite element multiphysics rotordynamics software (compiled in C code) which runs under the new EXCEL system umbrella without any other software (Matlab, Fortran, ANSYS ...) installation.

Users are able to import the rotor system (including shaft, disk, casing, support structure, etc.) modeled in various CAD software and then conduct thermal, structural and rotordynamic analysis of a coupled rotor-support system with the 3D solid finite element method.

The code provides rotordynamic modeling and simulations with structural meshes composed of axisymmetric solid or 3D, quadratic tetrahedral finite elements. Temperature and stress are calculated with single geometry file simultaneously. Centrifugal and stress stiffening and softening effects are included in the rotordynamic simulations. The code also include a feature for predicting rotordynamic response with large support motion inputs such as rough sea ship or maneuvering plane motions. Simulations include rotordynamic stability, imbalance response, natural frequencies and mode shape. Guyan and modal reductions are available to reduce model size and computation time.

