Troubleshooting Checklist

Troubleshooting suggestions, organized from basic to advanced, are listed as follows:

1. **Preliminary suggestions**
   a. **Approach to modeling** – It may be best to begin with a simple model and then build upon its sophistication.
   b. **Analysis method** – Ensure that the analysis method and the object properties are suitable for the desired output.
   c. **File location** – Run models from a local hard drive and not from a network drive. If necessary, models may be copied to the network.
   d. **Relabel** – Select Edit > Auto Relabel All and then select OK.
   e. **Export then import** – For various reasons, files may become corrupt. This may be resolved by exporting then importing the model.
   f. **Solver** – For large models, try using the Multi-Threaded Solver and a Separate Process, available through Analyze > Set Analysis Options > Solver Options.

2. **Resolve instabilities**
   a. **Run log** – After analysis, ensure that the model is stable by checking the analysis log, available through File > Last Analysis Run Log.
   b. **Dead load** – Review the animation of deformed configuration under self-weight to ensure reasonable response from gravity loading.
   c. **Mode shapes** – Run modal analysis to verify that each mode-shape period is reasonable. Especially long periods will indicate instability. Animate the deformed shape of an unstable mode to identify the location of instability, then edit the model to resolve convergence problems.
   d. **Restraints and constraints** – Do not restrain DOF that are associated with a constraint.
   e. **Release only one end** – Ensure that releases are not assigned to both ends of frame objects. Releasing both ends may prevent load transfer, leading to numerical problems. Information on numerical problems is available using the Standard Solver, available through Analyze > Set Analysis Options > Solver Options.
   f. **Avoid full fixity and full rigidity** – Rather than applying full fixity to DOF and full rigidity to structural objects, restrained and rigid conditions should be modeled using sufficiently large stiffness values, perhaps on the order of 1e11, or 1e3 to 1e4 times the stiffness of nearby members. Stiffness values may be assigned using spring constants, property modifiers, or section properties. Full fixity or full rigidity may cause numerical sensitivity in linear solutions and singularities in nonlinear numerical formulation, leading to convergence problems or instabilities.

3. **Discretization**
   - Ensure that the mesh is not too coarse. Iteratively decrease mesh size until subsequent analyses provide similar results or until the balance between accuracy and analysis time are acceptable according to engineering criteria.

4. **Assign damping**
   - During dynamic analysis, ensure that at least a small amount of damping is assigned to the structure. Damping helps provide for stable numerical solution.

5. **Assign mass and inertia**
   - During dynamic analysis, ensure that mass, inertia, and perhaps rotational inertia are distributed throughout the structure. Mass and inertia couple during dynamic behavior as an integral part of mathematical formulation. When links are located at support points, inertia may either be assigned using the link property, or it may be added directly at the joint. Rotational inertia is added by assigning a mass value between $^1/_{10}\, md^2$ and $^1/_{100}\, md^2$, in which m is a characteristic mass located a characteristic distance d from the support.

See Also

- Error codes and descriptions article
- Backup and troubleshooting corrupted models article