

Meshing

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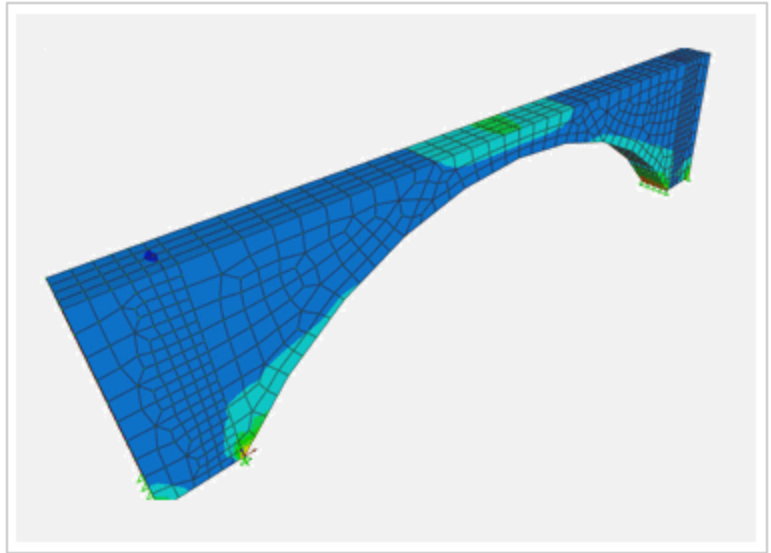
A **mesh** is a network of line elements and interconnecting nodes used to model a structural system and numerically solve for its simulated behavior under applied loading. First, computational techniques create an analytical model by populating the material domain with a finite-element mesh in which each line element is assigned mathematical attributes (axial, bending, shear, and torsional stiffness, etc.) which simulate the material and geometric properties of the structural system. The system is then **restrained** within boundary conditions and subjected to mechanical or thermal loading. Numerical solution may then resolve structural stresses, strains, and displacements.

The **SAPFire**® Analysis Engine drives the meshing and numerical-solution procedures of

CSI Software. A multi-threaded solver takes advantage of current multi-core **CPU systems**, and can utilize more than 4 GB of RAM. This enables sophisticated and efficient meshing techniques which automatically translate the user-defined object-based model into a finite-element model. Analysis, design optimization, and useful output information all proceed automatically through a streamlined and powerful computational process.

Notable meshing features include the ability to:

- Merge independently defined meshes among **frame**, **shell**, and **solid** objects.
- Coordinate tessellation with object orientation.
- Observe material boundaries to establish effective aspect ratios.



Tips

- Mesh size should be decreased through a series of analysis iterations until two subsequent sets of results are similar, or until the balance between accuracy and analysis time are acceptable according to engineering criteria.

Related Content

Articles

Tutorials

- [Create circular openings](#) — Guidelines for **creating a circular opening** and **meshing** the surrounding **shell** object are outlined in this tutorial. While demonstration follows the modeling of a circular opening, the concept and procedures also apply to openings of other shapes.

Test Problems

- [Frame to shell connections](#)