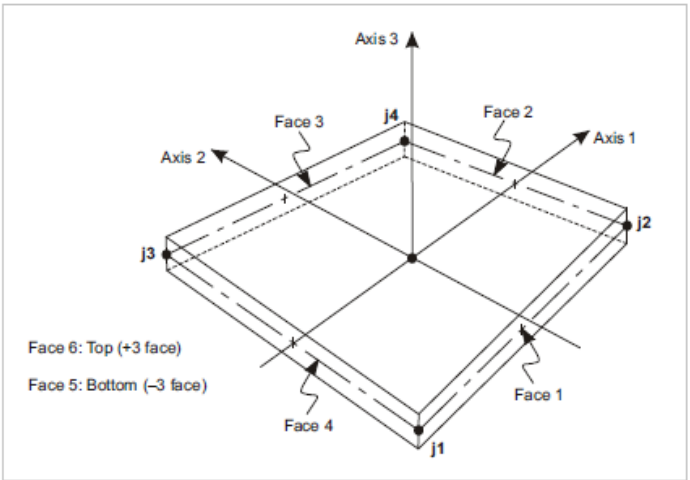
Shell

A **shell** is a three or four-node area object used to model membrane and plate-bending behavior. Shell objects are useful for simulating floor, wall, and bridge deck systems; 3D curved surfaces; and components within structural members, such the web and flanges of a W-Section.

Shells may be homogeneous or layered throughout their thickness. Temperature-dependent, orthotropic, and nonlinear material properties may be assigned to layered shells. Layered shells will exhibit localization of nonlinear behavior. Shells may be assigned edge constraints, and may be loaded in any direction, along any side.

Full shell behavior and the Mindlin-Reissner thick-plate formulation are recommended for analysis. Additional options and details are discussed in the CSI *Analysis Reference Manual* (Homogeneous *and* Layered, page 159).



Articles

Tutorials

Title	Description	Program
Create circular openings	Circular openings may be created within area objects, and the surrounding mesh may be improved.	SAP2000
Modeling simply supported shells	Procedure for modeling simply supported shells and coordinating their support systems.	SAP2000
Radial point load	Application of point loads in the radial direction using the Advanced Joint Coordinate Axes feature.	SAP2000

Test Problems

Title	Description	Program
Frame to shell connections	This tutorial describes the application of connections between frame and shell elements.	SAP2000
Influence surface	Influence-surface verification for a cantilever beam modeled using shell objects.	SAP2000
Options for applying area loads	Uniform (Shell), one-way Uniform to Frame (Shell), and two-way Uniform to Frame (Shell) load application to shell objects and associated meshing procedures.	SAP2000