

Bridge Modeler

i Please note that the **Bridge Modeler** supplements [SAP2000](#) releases through Version 14, and has since extended into [CSiBridge](#). Most material in this space applies to both of these products, therefore the term *Bridge Modeler* will refer to both SAP2000 and CSiBridge application.

The **Bridge Modeler** enables parametric definition of girder-type bridge systems. Users initiate high-level parametric modeling by defining span length, *layout lines*, cross section, and other geometric and structural specifications. The Bridge Modeler then assembles *frame*, *shell*, and *solid* objects, and connects them with *link elements*, to automatically create bridge objects. The Bridge Modeler expedites design by automatically generating, meshing, and analyzing complex bridge models. Templates are also available for several superstructure and substructure design checks.



Articles

Tutorials

Title	Description	Program
Analysis and design of composite steel-girder bridge	Use CSiBridge to model a composite steel-girder bridge based on that from the LRFD Design Example, Steel Girder Superstructure Bridge (FHWA NHI-04-041).	CSiBridge
Applying parametric variation to bridge width and girder spacing for bridge object with skewed abutments (steel I-girder bridge deck section)	Demonstration of how to apply parametric variation to the deck width and girder spacing of bridge object with skewed abutments.	CSiBridge
Applying parametric variation to bridge width for bridge object with skewed abutments (flat slab bridge deck section)	Demonstration of how to apply parametric variation to bridge object with skewed abutments	CSiBridge
Applying point, line, and area loads to bridge objects	This tutorial demonstrates point-, line-, and area-load application to bridge objects.	CSiBridge
Concrete box-girder bridge model	Model from the SAP2000 Bridge Examples document.	SAP2000
Create and copy frame properties	Use interactive database editing to create and copy frame section properties between models.	CSiBridge
Haunched steel-girder bridge	Guidelines and tutorial for modeling haunched steel-girder bridges.	SAP2000
Import frame properties from shape libraries	Guidelines for importing frame properties from shape libraries.	CSiBridge

Influence-based moving-load analysis first steps (CSiBridge)	Procedure for setting up influence-based moving-load analysis.	CSiBridge
Influence-based moving-load analysis first steps (SAP2000)	Procedure for initiating influence-based moving-load analysis.	SAP2000
Layout-line geometry	Guidelines for defining vertical and horizontal layout lines, also known as baselines.	SAP2000
Manual modeling of bridge foundations	PowerPoint presentations are attached which provide detailed examples of a 2-span PCC-girder bridge with three different foundation types. A step-by-step modeling procedure, with detailed descriptions and sketches, outlines the process.	CSiBridge
Manual modeling of wall-type bents	This tutorial describes a manual modeling process for wall-type bents within bridge objects.	SAP2000
Manual modification of bridge bearings	Guidelines for the manual modification of bridge bearings automatically created by the bridge modeler.	SAP2000
Model from Bridge Seismic Design Request manual	Example bridge model from the Bridge Seismic Design Request manual.	CSiBridge
Pushover analysis first steps	Guidelines for performing pushover analysis.	SAP2000
Steel bridge	Tutorial included with the SAP2000 Bridge Examples document.	SAP2000
Steel-girder bridge with variable flange thickness	Guidelines and tutorial for creating a steel-girder bridge with variable flange thickness.	SAP2000
Step-by-step moving-load analysis first steps (CSiBridge)	Procedure for setting up step-by-step moving-load analysis.	CSiBridge
Step-by-step moving-load analysis first steps (SAP2000)	Procedure for initiating step-by-step moving-load analysis.	SAP2000
Variable girder spacing	Procedure for developing a model with variable girder spacing.	SAP2000

Test Problems

Title	Description	Program
Bridge shrinkage example	Evaluate shrinkage for a one-span and a continuous two-span bridge system.	CSiBridge
Horizontal moving loads	Demonstration of horizontal moving loads compared against hand calculated results.	CSiBridge
Hyperstatic forces for bridge-object superstructures	The hyperstatic forces within a superstructure which is modeled using bridge objects may be obtained using any of three methods described in this test problem.	CSiBridge

Staged-construction analysis of two-span precast-girder bridge	Modeling and construction stage analysis of precast-girder bridge which is simply supported for dead load and continuous for live load.	CSiBridge
Start and end station for bridge line-load input	This test problem explains start- and end-station interpretation for line load offset from baseline.	CSiBridge
Temperature-gradient loading for bridge objects	This test problem demonstrates CSI Software calculation and application of temperature-gradient loading to bridge objects.	SAP2000
Tendon force vs. frame response	Tendon application is validated by comparing tendon forces to those in an equivalent frame system.	SAP2000

References

- Aviram, A., Mackie, K., Stojadinovic, B. (2008). *Guidelines for Nonlinear Analysis of Bridge Structures in California*. Berkeley, CA: Pacific Earthquake Engineering Research (PEER) Center.