

# CSiBridge® 2014 (Version 16.1.0) Release Notes

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**Notice Date: 2014-01-03**

This file lists all changes made to CSiBridge since the previous version. **Most changes do not affect most users.** Incidents marked with an asterisk (\*) in the first column of the tables below are more significant and are included in the ReadMe file.

## **Changes from v16.0.2 (Released 2013-11-06)**

### **Modeling**

#### **Enhancements Implemented**

<b>*</b>	<b>Incident</b>	<b>Description</b>
*	60160	The specification of the notional size used for time-dependent creep and shrinkage analysis has been enhanced to now be specified with the frame and shell section properties instead of with the material property. This now provides three options: (1) "Auto", in which the notional size will be calculated automatically based on the section dimensions, when applicable. (2) "User", in which the user specifies an explicit value to be used for the section. (3) "None", in which creep and shrinkage is ignored. Models from older versions that used the notional size in the material property will be updated so that each frame or shell section uses the previously specified value from the material as a "User" value in the section definition. Models from older versions that used material overwrites may produce different creep or shrinkage results if the notional size in the material overwrite assigned to a frame or shell object is different from that in the material used by the section assigned to that same object. Identical results can be obtained by manually adding new sections with the notional size value equal to that in the material overwrites, and assigning them to the affected objects.
*	60261	A new staged-construction operation "Change Section & Age" is now available allowing specification of the "Age at Add" when changing frame sections or shell sections. This age affects time-dependent analysis for creep, shrinkage, and stiffness. The existing operation "Change Section" uses the age of the member as it was before the section was changed. In either case, the member is removed and re-added in the same location without retaining any of the strain or load history, as before.

### **Graphics**

#### **Enhancements Implemented**

<b>*</b>	<b>Incident</b>	<b>Description</b>
	33625	The graphical user interface has been enhanced so that the keyboard arrow keys (left, right, up, down) can be used to rotate 3D views of the model, similar to the use of the middle-mouse button with the Shift key and the command Rotate 3D View.

## Bridge Modeler Enhancements Implemented

*	Incident	Description
	60027	An enhancement has been implemented for defining tendons in the Bridge Modeler where the options to Move Tendon (to Girder) and Copy to All Girders now take into account any existing parametric variations that affect the location and inclination of the girders. Previously the Move Tendon and Copy to All Girders operations would copy the source tendon to the girder(s) based on the initial bridge-section definition without considering parametric variations. Now parametric variations such as deck width, girder spacing, and overhang length are considered. Note that the horizontal offset from the layout line of the source tendon will be applied with respect to the new centerline of the girder where the tendon is moved or copied. Once the Move or Copy operation is complete, the tendon will not be automatically moved again for any subsequent changes in the parametric variations applied to the bridge object. However, changes to the layout line and span definitions will still affect the tendon location as they did previously.
	60099	An enhancement has been implemented for the bridge modeler that allows individual bridge objects to be locked to prevent updating their linked models. This option can be turned off at any time to allow the linked model to be generated from the affected bridge object.

## Bridge Design and Rating Enhancements Implemented

*	Incident	Description
*	59193	Design checking has been implemented for steel superstructure sections according to the Indian Roads Congress code IRC:22-2008 (included under code "IRC-2011" in the software). Superstructure types supported include steel I-girders and hybrid I-girders with composite concrete deck. Separate design checks are provided for strength, serviceability, reinforcing, and constructability. The effect of mild reinforcing is included. Live-load distribution factors can be specified by the user or determined from detailed 3-D live-load analysis. Design results are displayed graphically for the entire section or on a girder-by-girder basis. Detailed tables showing all results and intermediate values are available for display, printing, and export to Excel or Access. Interactive modification of girder sizes and stiffener locations can be performed for rapid optimization of the design.
*	59592	Superstructure design has been implemented according to AASHTO LRFD Bridge Design Specifications, 6th Edition, 2013 Interim Revisions. This is provided as an option to the AASHTO LRFD 2012 code preferences as to whether or not to consider the 2013 Interim Revisions in the design.
*	60022	Design checking has been extended to include composite bridge superstructures with steel U-girders according to the "Eurocode EN 1994-2" code (EN 1994-2:2005, Eurocode 4: Design of composite steel and concrete structures - Part 2: General rules and rules for bridges). Separate design checks are provided for strength, service stress, service rebar, and constructability. The effect of mild reinforcing is included. Live-load distribution factors can be specified by the user or determined automatically from detailed 3-D live-load analysis. Design results are displayed graphically for the entire section or on a girder-by-girder basis. Detailed tables showing all results and intermediate values are available for display, printing, and export to Excel or Access. Interactive modification of girder sizes and stiffener locations can be performed for rapid optimization of the design.
	60230	An enhancement has been implemented to update the AASHTO bridge rating to include the 2011 and 2013 interim revisions. No changes were necessary for the rating algorithm. Only the documentation and rating preferences have been updated to indicate that these revisions are covered.
	60232	An enhancement has been implemented to update the AASHTO seismic bridge design to include the 2012 and 2014 interim revisions. No changes were necessary for the design algorithm. Only the documentation and design preferences have been updated to indicate that these revisions are covered.

## Frame Design

### *Enhancements Implemented*

*	Incident	Description
*	61444	Steel frame design according to Eurocode 3-2005, including Eurocode 8-2004 seismic requirements has been added.
*	61445	Concrete frame design according to Eurocode 2-2004, including Eurocode 8-2004 seismic requirements has been added.

## Results Display and Output

### *Enhancements Implemented*

*	Incident	Description
*	60260	Table output may now optionally include the correspondence between the response components at a single location for additive-, range-, and enveloping-type load combinations when correspondence is available for the contributing load cases and combinations. Response that admits correspondence includes joint displacements and reactions; frame forces at a given station; stresses at a given joint for shells, planes, asolids, and solids; forces and deformations in links; element-joint forces, section cuts; bridge forces and bridge-girder forces; and base reactions. Correspondence is available for single and multi-step load cases, moving-load cases when correspondence is specified for analysis, and combinations of such cases. Correspondence is not available for response-spectrum, steady-state, and PSD load cases. Correspondence is not available for moving-load cases for element joint forces and base reactions. Correspondence requested for table output (Display > Show Tables and File > Export of tables) does not affect any other type of display, design, or the Open API functions.

## User Interface and Display

### *Incidents Resolved*

*	Incident	Description
	59661 59849	An incident was resolved in which certain buttons on the ribbon of the graphical user interface did not work when the program was installed on a non-English language machine. This primarily affected the draw commands on the Advanced tab of the ribbon.

## Graphics

### *Incidents Resolved*

*	Incident	Description
	57898	An incident was resolved where the onscreen rotation of the model would not correctly update the drawing resulting in views where hidden lines could be seen.

## Section Designer

### *Incidents Resolved*

*	Incident	Description
	58397 60165	An incident was resolved for Section Designer in which the section properties were not calculated and a runtime error was generated when trying to display the stresses for a steel pipe with concrete infill if the wall thickness of steel pipe was very small (less than 1%) compared to the pipe radius. Versions 16.0.0 to v16.0.2 were affected.

**Bridge Modeler**  
**Incidents Resolved**

*	Incident	Description
	58833	An incident has been resolved for bridge modeler in which (1) a bridge object updated as area object model has unexpected discontinuity at the single bearing bent when the bridge sections before and after the bent have different top slab thickness; (2) for a bridge object with AASHTO-PCI-ASBI standard bridge section, a parametric variation assigned to the top slab thickness was not applied to the bridge section overhang thickness, which is expected to be the same as the top slab thickness.
*	59856	An incident was resolved for precast concrete I-girder bridges in which the superstructure moment M3 due to the prestressing was calculated incorrectly for non-prismatic precast I-girders with tendons. This was because the vertical location of the centroid of the tendons was incorrectly calculated for nonprismatic precast I-girders. No other results were affected. This error did not affect prismatic I-girders or any other type of girder. This error affected versions 16.0.0 to v16.0.2.
	59523	An incident was resolved for the Bridge Modeler where parametric variations were not able to be assigned to the haunch height for each girder of composite-type bridge sections. In addition, the drop down list of the "Parameter" field in the database table "Bridge Object Definition 04 - Span 2 - Parametric Variation" only displayed "HaunchHt1" for the first girder in the interactive database editing even when the haunch height of each girder was set not to be constant. This did not prevent entering other values manually.
	61039	An incident was resolved for the Bridge Modeler where, for a steel I-girder bridge model with nonprismatic I-girder section properties modeled as shell or mixed objects, and when a staggered diaphragm having a connection plate was assigned to the non-prismatic girder at a location exactly where there was a bridge section cut (superstructure output location), the generated area objects associated with the connection plate would be missing from the model generated every alternate time the linked bridge model was updated. In other words, the affected objects were present the first time the linked model was updated, absent the second time, present the third time, etc. When the connection plate objects were missing, it was obvious from looking at the model and from the deflected shape.

**Loading**  
**Incidents Resolved**

*	Incident	Description
*	59490	An incident was resolved for the Bridge Modeler that affected two issues for temperature loading: (1) Bridge temperature loading applied to one span in a given load pattern would also be applied to any subsequent span that has no bridge temperature loading assigned in the same load pattern. For example, if bridge temperature load is applied in load pattern "A" only to spans 1 and 4 of a 5-span bridge object, then the temperature applied to span 1 would also apply to spans 2 and 3, and the temperature applied to span 4 would also apply to span 5. (2) For a bridge object with a composite deck section having nonprismatic girder sections (steel-I, steel-U, precast-I), bridge temperature-gradient loads were not correctly distributed across the depth of the section when the bridge object was modeled as area objects and the girders were modeled as area objects or mixed area/frame objects, and thus the analysis results were not be as expected. In particular, the temperature distribution applied was based on the girder section at the start of the span rather than the actual nonprismatic section at each location along the span length. Note that temperature-gradient loads are always converted to an equivalent uniform temperature and uniform temperature-gradient loads that cause the same axial force and bending moment in the bridge section, and this has not changed. Composite bridge sections with prismatic girders were not affected by this issue.

## Analysis

### Incidents Resolved

*	Incident	Description
*	61455	An error has been detected where the direct stresses (S11, S22, and S33) reported in plain-strain and asolid elements is incorrect under temperature loading. The error is approximately equal to the Poisson's ratio of the material times the restrained thermal stress S33. Solid, Shell, and Plane-stress elements were not affected.

## Bridge Design and Rating

### Incidents Resolved

*	Incident	Description
*	59545	An incident was resolved for the bridge rating of steel I-girder bridges using the AASHTO 2007 and AASHTO 2011 codes where the calculated DC moments for the rating requests of types Steel-I Comp Strength and Steel-I Comp Service were incorrectly divided twice by the number of girders to obtain the girder demands. In other words, the DC demand moments were too small by a factor equal to the number of girders in the section. This could cause the final rating factor to be overestimated. No other results were affected. This error affected versions 15.1.0 to v16.0.2. Rating requests of these types should be re-run with the new version.
	59845	An incident has been resolved for the Eurocode bridge design check "Steel I Comp Service Rebar" in which the first design request parameter should have been called "Gamma s for Reinforcement" instead of "Gamma c for Concrete". No results are affected by this change.
*	60191	An error has been detected for bridge superstructure design using the AASHTO LRFD code where, for the non-staged constructability checks of steel-I- and steel-U girder bridges, the top and bottom flange lateral bending stresses were sometimes incorrectly calculated. These values were being averaged over all girders rather than calculated individually for each girder. The reported D/C ratio could be affected by this error. The following affected design requests should be re-run with the new version: AASHTO LRFD 2007/2012 Steel-I Constructability Unstaged and Steel-U Constructability Unstaged. No other design requests were affected.
*	61642	An incident has been resolved in the AASHTO Bridge Rating for steel I-girder bridges in which the live load stresses were not calculated correctly, resulting in incorrect rating factors. The effected rating checks were: (1) Steel I Comp Ultimate with the parameter UseStagedAnalysis set to Yes, and (2) Steel I Comp Service with the parameter UseStagedAnalysis set to Yes. Models using either of these rating checks should be rechecked. These checks were not affected when the parameter UseStagedAnalysis was set to No.

## Database Tables

### Incidents Resolved

*	Incident	Description
	60308	An incident was resolved for bridge superstructure design using the Concrete Box Shear design check of the AASHTO LRFD 2007 and 2012 codes where the units for the field (column) "AsTLongExtr" were incorrect in the results tables "Bridge Super Design AASHTOLRFD07 03 - CBoxShear-SectResult" and "Bridge Super Design AASHTOLRFD12 03 - CBoxShear-SectResult" for the two codes, respectively. This field provides the required area of extra longitudinal steel required for torsion. The units used were Area per length but should have been Area. The values produced were incorrect when the units chosen for display were different than the database units. Database units are those used when the model is first created and displayed whenever the model is opened.

## Data Files

### *Incidents Resolved*

<b>*</b>	<b>Incident</b>	<b>Description</b>
*	61392	An incident has been resolved where model files from v15.2.0 or v15.2.1 containing frame sections imported from databases may have inadvertently contained nonzero values of shear center when they should have been zero. Versions 15.2.0 to v16.0.2 account for the shear center location and therefore the results were affected by this error. Versions after v16.0.2 will check for non-zero values and set them to zero for sections that should not have non-zero values.

## Installation

### *Incidents Resolved*

<b>*</b>	<b>Incident</b>	<b>Description</b>
	60455	An incident was resolved in which the check for updated versions that is performed each time CSiBridge is started would issue warning messages if the system was disconnected from the internet. These warning messages have now been suppressed.

## Miscellaneous

<b>*</b>	<b>Incident</b>	<b>Description</b>
	60110	The version number has been changed to v16.1.0 for a new minor release.