CSiBridge® Version 22.0.0
Release Notes

Notice Date: 2020-01-10

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

The reference number for each change below is now the development Ticket rather than support Incident which was used in previous Release Notes. Emails sent when an Incident is released will now indicate this Ticket number as well.

Changes from v21.2.0 (Released 2019-11-15)

Analysis
Enhancements Implemented

*	Ticket #	Description
*	3474	Multiple copies of the same model can now be run on different machines, and the analysis results merged together on a single machine for performing design and processing results. This can be particularly useful for running a large number of load cases (e.g., earthquakes for performance-based design, moving load cases for bridge design, etc.), and there are multiple machines available for running different load cases simultaneously.

API
Enhancements Implemented

*	Ticket #	Description
	3358	A new function SapModel.File.GetFilePath has been added to the Application Programming Interface (API) to get the full file path (including filename) of the current model file.

Bridge Design and Rating
Enhancements Implemented

*	Ticket #	Description
	2984	An enhancement was implemented to report top-flange and bottom-flange fatigue stress ranges for AASHTO steel U-girder Fatigue Design Requests. The data is provided in tabular and calculation report formats.

Bridge Modeler
Enhancements Implemented

*	Ticket #	Description
	3222	Minor enhancements have been made to the Steel Beam Editor for modifying steel I-girder definitions in the Bridge Modeler: • Previously the Steel Beam Editor form could only be entered once from the Bridge Object Span Assignments form without closing and re-opening the Bridge Object Span Assignment form. Now the Steel Beam Editor form can be used multiple times while in the Bridge Object Span Assignment form. • Previously using the Steel Beam Editor to simply view steel I-girder definitions or to add stiffeners would always trigger an update of the bridge object if the OK button was clicked, even if no changes were made that would affect the generated model. Now an update is only triggered if changes are made to steel plate definitions. • Previously, when the model was locked, the Steel beam Editor form could only be used once to edit the stiffeners data without needing to unlock the model. Now stiffeners can be edited multiple times in a locked model.
	3370	Changes have been made to the load cases and load combinations created by the Quick Bridge new-model template as applied to Steel I-girder, Steel U-girder, and Precast I-girder bridges: • Load cases created by the Quick Bridge template are now flagged for design purposes as Non-Composite, Short-term Composite, and Long-term Composite. Previously these load cases were not explicitly flagged for composite action, which could affect design results for load combinations using these load cases. • Two new load cases have been added: "Deck Cured NonComp" and "Deck Cured Composite", both of which continue from the existing "Deck Plus" load case. The Deck Plus load case uses the "Pour Concrete" operation to consider the weight of wet concrete, permanent and temporary formwork, and bracket loads acting on the girders. The two new load cases use the "Remove Forms" operation to remove the temporary formwork and bracket loads, and replace the wet concrete loads with actual concrete slab objects having self-weight. The stresses in the slab objects are due only to the removal of the temporary formwork and bracket loads. The two new load cases are identical, except that "Deck Cured NonComp" is flagged as non-composite for design purposes only, while "Deck Cured Composite" is flagged as composite. • All strength and service load combinations that are automatically created for design purposes by the new-model template now use the "Deck Cured NonComp" load case instead of the "Deck Plus" load case that was used in previous versions. This removes the temporary formwork and bracket loads from the load combinations. The "Deck Plus" load case can still be used for constructability load combinations created by the user. These changes only affect new models created by the Quick Bridge template. Existing models are not affected.
*	3451	The option to preview and print plate-layout elevations for steel I-girders has been added to the Steel Beam Editor of the Bridge Modeler. Tables with detailed plate-size tables are included. The distribution of stiffeners and diaphragms, together with comprehensive dimensions and steel weight quantities, summarize all necessary information about the I-girder cross sections that are defined in the analytical model. The printout is intended to serve as basis for developing design drawings or to be directly included in reports and calculation packages. Page layout can be customized for the number of spans per page and can be generated in US Customary or SI units.

Data Files
Enhancements Implemented

*	Ticket #	Description
	2935	An enhancement was implemented, adding the option to import/export models from/to an XML file. The XML file format is based on the database tables used for Excel, Access, and the model text files.

Design – Concrete Frame
Enhancements Implemented

*	Ticket #	Description
*	3434	An enhancement was implemented to add the New Zealand NZS 3101:2006 concrete frame design code. This code is for frame design and does not contain any specific bridge design provisions.

Design –Steel Frame
Enhancements Implemented

*	Ticket #	Description
*	3434	An enhancement was implemented to add the New Zealand NZS 3404-1997 steel frame design code. This code is for frame design and does not contain any specific bridge design provisions.

Installation and Licensing
Enhancements Implemented

*	Ticket #	Description
*	3235	The version number has been changed to 22.0.0 for a new major release.

Loading
Enhancements Implemented

*	Ticket #	Description
	3457	The Bridge Modeler has been enhanced with the addition of a new temporary construction load defined as part of the bridge-section definitions for steel I-girder, steel U-girder, and precast I-girder bridges. This new "Additional Overhang Load", when specified, will be added on top of the other temporary construction loads that apply to the whole slab, including overhang. This load will be applied as an equivalent vertical load and bracket load (either as a force couple or torque) on the exterior girders during the Pour Concrete operation of a staged-construction load case, and will be removed during the Remove Forms operation.
	3466	Individual modes from modal and buckling load cases can now be added to load combinations. Multiple modes can be added from the same load case, each with its own scale factor.

Structural Model
Enhancements Implemented

*	Ticket #	Description
	1890	An enhancement was made to add a message after a run has completed if frame nonlinear hinges need to be regenerated and the model needs to be unlocked and rerun. This is required if the hinges depend on results from some load case or load combination and those results have just become available or have changed. The behavior is unchanged: re-running the analysis will update the hinge, but now the message alerts the user when this is necessary.

*	Ticket #	Description
*	3460	Detailed foundation properties can now be defined and used to generate parametric foundation assemblies which can be added to the model. Here the term "assembly" refers to a collection of component objects (points, lines, areas, and links) that are created to represent the foundation. Foundation assemblies are automatically regenerated when the properties of the foundation or its location are changed. The available foundation properties are Isolated Footing, Combined Footing, Pile Group, Pile Pier and Pile Shaft. The combined footing is of the strip-type foundation and the rest are of the isolated-type foundation. Draw commands are used to create foundation assemblies by clicking a single point for an isolated-type foundation or two points for a strip-type foundation. The top of the generated foundation assembly will connect to the clicked point. Note that the foundation property data is currently only saved as binary data, and as such cannot be imported from the model text file (.B2K, .$BR) or database table files (Excel, Access, XML). Import capability will be implemented in a later version. The detailed foundation properties are the same as those used by the bridge modeler to define foundations at the base of bent columns. However, drawn foundation assemblies can be used independently from any bridge object.

Bridge Design and Rating
Incidents Resolved

*	Ticket #	Description
	3360	An incident was resolved where curved or kinked bridges were reported as being straight in the Constructability Calculation report. This was an informational issue only and had no impact on the design results. The impacted Calculation reports were for the AASHTO LRFD code, all versions, Steel I or Steel U Constructability checks.
*	3473	An incident was resolved for steel I-girder and U-girder bridges where the panel lengths calculated for the Steel Beam Editor and used for superstructure design and rating could be incorrect if the bridge object was updated when the current length units, as shown in the lower-right corner of the graphical user interface, were different from the database length units in which the model was created or imported. No other results were affected. This error only affected version 21.2.0.

Bridge Modeler
Incidents Resolved

*	Ticket #	Description
*	3357	An incident was resolved for the Bridge Modeler where the segment lengths shown in the Steel Beam Editor, which are obtained from the nonprismatic sections used in the bridge model, might be incorrect when the top-flange, web, or bottom-flange transitions occurred at different longitudinal locations from each other. What this means is that the nonprismatic frame sections generated from the Steel Beam Editor were correct, but they might not be viewed correctly the next time the Steel Beam Editor was used. This error did not affect the model unless the OK button was clicked in the Steel Beam Editor and the bridge object was updated. The model would still be correct if these display errors (if any) were corrected before clicking OK in the Editor. The model was unaffected if the Cancel button was clicked in the Editor or if the bridge object was not updated after clicking OK in the Editor. This error only affected version 21.2.0 where the Steel Beam Editor was introduced.

Graphics
Incidents Resolved

*	Ticket #	Description
	2430	An incident was resolved where joints were not shown on the model view when using the DirectX graphics mode, even when the "Invisible" option for joints was turned off.

Loading
Incidents Resolved

*	Ticket #	Description
*	3423	An Incident was resolved for moving load analysis where the overturning effect on vertical vehicle loads due to superelevation was not properly applied. The vertical vehicle overturning effect was being calculated using the grade (percentage) rather than the superelevation (percentage). In the most common case where the grade was zero, the overturning effect due to superelevation was zero. This did not affect overturning due to centrifugal loading, since the effect of superelevation is inherent in the geometry of the structure for this case. No other results were affected.

Results Display and Output

Incidents Resolved

*	Ticket #	Description
	3361	An incident was resolved where the Hinge Status reported for single-degree-of-freedom and interacting hinges in the Hinge Results plot (Display > Hinge Results) may be inconsistent with the Hinge Status reported in the "Frame Hinge States" tables, and the hinge status for interacting hinges may not be correctly reflected in the hinge color displayed on the deformed shape. When this issue occurred, the status reported in the "Frame Hinge States" tables was correct. The Hinge Status results from the Hinge Results plot and the hinge color displayed on the deformed shape have been corrected.
	3372	An incident was resolved where bridge girder forces were sometimes not being reported for the right exterior girder in the database table "Bridge Object Girder Forces" for any span that had fewer girders than the maximum number of girders of all the spans. Models with the same number of girders in each span were not affected. Additionally, when working in the Bridge Response Display form, trying to show results for the affected right exterior girders could generate an abnormal termination of the software. No analysis or design results were affected by these errors.
	3493	An incident was resolved for the Bridge Object Response Display form where attempting to display beam stresses for a precast I-girder bridge section could result in the software becoming unresponsive or terminating if any of the precast I-girders had a large number of tendons defined directly in the frame section property, i.e., by using the Tendon Layout Data in Precast Concrete I-section Definition form. Although these stresses could not be displayed in certain cases, no results were affected.