CSiBridge® 2015 (Version 17.0.0)
Release Notes

Notice Date: 2014-07-28

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.

Changes from v16.1.0 (Released 2014-01-08)

User Interface
Enhancements Implemented

*	Incident	Description
	67597	The program now has a comprehensive menu system as an alternate to the ribbon for program control. Users can easily switch from one to the other from the Options menu when in menu mode or from File > Settings when in ribbon mode.

Graphics
Enhancements Implemented

*	Incident	Description
*	42430	The animation capabilities in DirectX graphics mode have been enhanced. Specifically, the animation option is now available for deformed shape plots in when in DirectX graphics mode, and the video (AVI) capture will use DirectX graphics when in DirectX graphics mode. Additionally, the video capture can include a graph of the input time function with a moving dot indicating the time at which the deformed shape is plotted.

Modeling
Enhancements Implemented

*	Incident	Description
*	34973	A bilinear Maxwell viscous damper has been implemented as a new link property. This device is a linear spring in series with a dashpot whose force-velocity relationship exhibits linear viscous behavior up to a specified force-velocity limit. When the force and velocity exceeds this limit, the additional damping force is proportional to the additional velocity by a different, smaller damping coefficient. The behavior is symmetrical with the sign of the velocity.
*	62240	A friction-spring hysteretic damper has been implemented as a new link property. The force-displacement relationship exhibits linear slipping stiffness when loading, but unloads with a smaller slipping stiffness. A precompression displacement and a displacement stop-limit may be specified. The behavior may be specified as tension-only, compression-only, or symmetrical in tension and compression.
	65233	An enhancement was implemented to add the Russian material properties library.
	65917	An enhancement was made to the definition of column heights in the bridge modeler such that the column height is now measured to the top surface of the cap beam. Previously the input was specified to the center of gravity of the cap beam while the documentation said it was measured to the top of the cap beam. Existing models opened in v17 will have the column heights automatically updated for the modified definition of the column height.

Analysis

Enhancements Implemented

*	Incident	Description
	47495	The speed of nonlinear direct-integration time-history analysis has been significantly increased for models containing nonlinear dampers having fractional exponents on the velocity term. This is due to improved rate of convergence for nonlinear iteration. There has been no change to the actual force-velocity or force-displacement behavior of the damper link element. The response for models run in previous versions may differ very slightly from that of the current version due to the resulting change in the process of iteration. Such changes can be expected to be on the order of the convergence tolerance for the load case. In particular, the response reported for Analysis Verification Example 6-005, "Link - Damper Element under Harmonic Loading" has changed by up to 0.00113% from the previously published values for CSiBridge version 16, but this has no effect on the validity of the example.
*	64466	The iteration algorithm for nonlinear direct-integration time-history analysis has been enhanced to improve the rate of convergence and to reduce the time of analysis for certain models. Models run in the new version should produce the same results as in the previous version, subject to minor variations approximately within the convergence tolerance. Larger differences may be observed for ill-conditioned or sensitive models, but in such cases the new results should generally be better. In particular, the response reported for Analysis Verification Example 2-019, "Shell - Large Bending Displacements" has changed by up to 0.00153% from the previously published values for CSiBridge version 16, but this has no effect on the validity of the example.
*	50911 64479	Moving load analysis has been parallelized, which can reduce the time to run moving load cases, display moving load response in the bridge object display form, and to perform bridge superstructure design and rating. The speed increase will be dependent upon the number of processors available on the machine, the competing load on the machine from other processes, and the characteristics of the model (structure, lanes, and vehicles). The most significant effect will be on analysis run time.
	65587	Nonlinear static analysis, including staged construction, has been enhanced to allow the use of the line-search algorithm during iteration. This feature was already available for nonlinear direct-integration time-history analysis. Line search is helpful for models where the stiffness changes significantly from one step to the next, particularly in cases where the model is stiffening. The line-search option is only available under force control and when event-to-event stepping is not used.

Bridge Design

Enhancements Implemented

*	Incident	Description
*	60024	Design checking has been implemented for U-section steel-girder composite bridge superstructures according to the Indian IRC-2011 code. Design checks are currently available for the Strength, Service, Rebar, and Construction limit states. Design requests are defined that allow overwriting the code-default values of input parameters used in the design calculation. The results of the comprehensive nonlinear staged-construction analysis may be used in the Service and Strength design requests, but this is not required. For simple and fast design checks the stresses on the composite section can be appropriately distributed throughout the section by assigning individual load cases present in the demand set load combinations to be of either non-composite, long-term composite, or short-term composite design types. Live-load effects can be evaluated using distribution factors specified by the user, or the effects can be determined directly from detailed 3-D live-load analysis. Design-check results are reported on girder and station basis and include plots of demand/capacity ratios and important supporting values. Detailed tables showing results and all intermediate values used in the calculation are available for display, printing, and export to Excel or Access. Interactive section optimization is available allowing the user to change plate dimensions and materials for the web and flanges of each girder along the span, as well as to specify stiffener locations, in order to optimally match the capacity to the demand. The girder may vary nonprismatically along the length. Resistance recalculation of the modified section can be performed immediately to check the new capacity against the existing demand without reanalyzing

*	Incident	Description
		the model. Once the optimum section is determined, these changes can then be applied to the model for a subsequent cycle of analysis and design.
*	60026	Design checking has been implemented for U-section steel-girder composite bridge superstructures according to the Canadian CAN/CSA-S6-06 code. Design checks are currently available for the Strength, Service, and Construction limit states. Design requests are defined that allow overwriting the code-default values of input parameters used in the design calculation. The results of the comprehensive nonlinear staged-construction analysis may be used in the Service and Strength design requests, but this is not required. For simple and fast design checks the stresses on the composite section can be appropriately distributed throughout the section by assigning individual load cases present in the demand set load combinations to be of either non-composite, long-term composite, or short-term composite design types. Live-load effects can be evaluated using distribution factors that are automatically calculated using code formulae or specified by the user, or the effects can be determined directly from detailed 3-D live-load analysis. Design-check results are reported on girder and station basis and include plots of demand/capacity ratios and important supporting values. Detailed tables showing results and all intermediate values used in the calculation are available for display, printing, and export to Excel or Access. Interactive section optimization is available allowing the user to change plate dimensions and materials for the web and flanges of each girder along the span, as well as to specify stiffener locations, in order to optimally match the capacity to the demand. The girder may vary nonprismatically along the length. Resistance recalculation of the modified section can be performed immediately to check the new capacity against the existing demand without reanalyzing the model. Once the optimum section is determined, these changes can then be applied to the model for a subsequent cycle of analysis and design.
*	66202	Design checking has been implemented for concrete superstructure sections according to the "Russian SNiP 2.05.03-84" code. Superstructure types supported include prestressed concrete box girders and composite sections with precast I-girders and U-girders. Separate design checks are provided for stress, flexural strength, and shear strength. The effect of mild reinforcing is included as well as the prestress tendons. 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 box section, or on a girder-by-girder basis for multi-celled box girders and composite sections. Detailed tables showing all results and intermediate values are available for display, printing, and export to Excel or Access.

Results Display & Output

Enhancements Implemented

*	Incident	Description
	46510	An enhancement for the bridge superstructure design report has been implemented in which all the sectional input parameters, graphics and clearly described step-by-step formulas as well as the detailed calculation are reported in MS Word format. All calculation procedures are referenced to a relevant design code section. Formulas are printed in generic form followed by a numerical evaluation using MS Word Equation Editor. A detailed report can be requested for any girder in a designed section cut, followed by a tabular report for other girders. Aiming to set a new standard in the industry the reports are compiled and formatted in "ready to submit" mode while enabling rich customization in MS Word if needed. Choice of Customary US or SI units is available. The report is available for the following AASHTO LRFD 2007 and 2012 design checks: (1) Multi-cell Concrete Box Shear, (2) Multi-cell Concrete Box Flexure, (3) Precast Composite I-beam Shear and (4) Precast Composite I-beam Flexure.

Documentation

Enhancements Implemented

*	Incident	Description
	58907	An enhancement has been implemented to add documentation of the properties d33pna and d22pna (locations of the plastic neutral axes) in the Section Designer context-sensitive help.

Miscellaneous

Enhancements Implemented

*	Incident	Description
	65733	The version number has been changed to v17.0.0 for a new major release. CSiBridge v17 will be known as CSiBridge 2015.

User Interface and Display
Incidents Resolved

*	Incident	Description
	61145	An incident was resolved where ribbon menus, submenus, drop-downs, and tooltips could persist on top of other applications when they were displayed in CSiBridge before changing focus to another application. No results were affected.
	65600	An incident was resolved for the Load Case Data - Response Spectrum form for defining where the Scale Factor field for Absolute-type of Direction Combination would be hidden behind the Mass Source field after clicking the Modify/Show button to view or change the definition of a response-spectrum load case. This did not occur when a response-spectrum load case was first defined, or if a load case was changed to response-spectrum from some other types. The value of the absolute scale factor was not changed when this occurred, and no results were affected.
	66909	An incident was resolved where lanes defined from frames did not recognize frame objects with names that included lower case letters. Lanes defined from layout lines were not affected.

Drafting
Incidents Resolved

*	Incident	Description
	60025	An incident was resolved in which the graphical snap and selection was sometimes offset from the actual objects when a high level of zoom was used to view the model. This was a graphical issue only.

Graphics
Incidents Resolved

*	Incident	Description
	59005	An incident was resolved where the joint local axes specification would in rare cases get overwritten. This happened when an area object was meshed and one of the meshing points happened to fall on the joint in question and also it was specified that the local axes of the mesh point take their specifications from the local axes of the corners of the area object. Under such conflicting specification the original local axes should be kept and it now does. When this error occurred the analysis model would show the local axes used.

Bridge Modeler
Incidents Resolved

*	Incident	Description
	62853	An incident was resolved for the Bridge Modeler where the command Bridge > Bridge Objects > Prestress Tendons > Copy to All Girders did not always work correctly for a bridge object with an advanced concrete box section if the girder spacings were not constant and they were further assigned to have parametric variation. In this case, the tendons as copied did not always fall correctly within the bounding box of the girders. When this occurred the effect was obvious and the results agreed with the model as generated.
	63269	An incident has been resolved that corrected two unrelated issues for the Bridge Modeler: (1) For Steel I-girder bridges, the I-girder geometry may not be modeled correctly if (a) a parametric variation was applied to the bridge deck width, overhang length, and/or girder spacing; and (b) the concrete haunch height changed from non-zero to zero along the girder length within the variation distance of item (a). The haunch change could have been due to a nonprismatic girder section or to a parametric variation applied to haunch height. When this occurred, the I-girder could exhibit unexpected kinks, and the effect was obvious in the generated model. (2) In rare situations, for a bridge object with two or more spans and with parametric variations applied to bridge section dimension(s) using the option "Distance measured from start abutment", if one of the parametric-variation control points had the same distance from the start abutment as the distance of an internal bent measured the from abutment, then the top-slab area objects at the bent location could have

*	Incident	Description
		been generated incorrectly. When this occurred the distorted geometry of the generated objects was obvious.
	63565	An incident was resolved in which the Edit Segment form used for defining the bridge layout line would sometimes generate a runtime error if the input-curve data was not valid. No results were affected.
	63916	An incident was resolved for the Bridge Modeler where the generated geometry of staggered diaphragms (cross-frames) could be slightly in error for composite bridge sections (steel or precast concrete, I-girder or U-girder) in the case where the option "Straight Line" was chosen for the Girder Longitudinal Layout in the Bridge Section Data form and the girder would otherwise not be straight due to a curved layout line or parametric variation. When this occurred the effect was obvious and the results agreed with the model as generated.
	64493	An incident was resolved for the Bridge Modeler that addressed two issues for steel U-girder bridges: (1) When the option "Straight Line" was chosen for the Girder Longitudinal Layout in the Bridge Section Data form and additionally two bearings were specified for each U-girder in the Bridge Object Bent Assignment form, then the link elements representing the bearings at a double-bearing bent were not generated correctly regardless of whether bridge was curved or straight. Single-bearing bents were not affected. Single-bearing girders were not affected. (2) When two or more steel U-girders were specified to have internal diaphragms (cross-frames) at the same or near location, the internal diaphragms were sometimes not generated correctly if several user discretization points were located in the same span near the internal diaphragm locations. When either of these two issues occurred, the effect was obvious and the results agreed with the model as generated.
	65289	An incident was resolved for the Bridge Modeler where, for a steel U-girder bridge with two or more non-prismatic girders, one of the connection plates at the diaphragm (cross frame) location may be missing when an internal and an external diaphragm are assigned at the same location and both are defined to have one-sided connection plates. In this case, two separate line objects with different cardinal points should have been created vertically along the web, but one was missing and the connectivity of the cross frames could be unstable. Additionally, the Help has been updated to better describe how to specify the location of internal and external diaphragms along the length of the girders.
*	65389	An incident was resolved in the Bridge Modeler for composite bridge sections that allow non-prismatic girder section assignments where non-prismatic girders could be incorrectly generated if the distance option in the Bridge Section Variation Definition form was chosen to be "Distance Measured from Start Abutment". This option is set using the command Bridge > Spans > Modify/Show Section Variation Along this Span. In this case, nonprismatic girders in the second and subsequent spans would be created and used as if the girder was of length measured from the start abutment rather than the start of the span. This could affect the analysis model created if the girder was modeled as areas or as mixed frames/areas. In addition, this could affect the section properties used to calculate stresses for display in the Bridge Object Response form and used for superstructure design or load rating. Models with these characteristics should be re-updated, re-run, and re-designed with the new version. Only bridge sections of types Steel I-girder, Steel U-girder, and Precast Concrete I-girder permit nonprismatic sections that could be affected by this error. Spans that did not use any nonprismatic girder sections were not affected. Spans with the distance option set to "Distance Measured from Start of Span" were not affected. Spans with the distance option set to "Distance Measured from Start Abutment" were affected even if there were no parametric variations specified for the span.
	66303	An incident was resolved for the Bridge Modeler where the linked model could be generated with incorrect geometry in the uncommon case where the bridge layout line was so highly curved (more than 180 degrees) that the extension of bridge deck edge lines beyond either abutment would intersect with bridge deck edge lines within a span. Bridge objects subject to this condition will need to have their bridge objects updated in the new version to regenerate the correct geometry.
	66670	An incident was resolved for the Bridge Modeler where an error message was generated when trying to modify the bent assignments for a multi-span bridge object with a concrete T-beam bridge section having only one internal girder. This affected the commands Bridge > Bridge Objects >

*	Incident	Description
		Supports > Bents or Bridge > Bridge Objects > Modify/Show > Modify/Show Assignments > Bents. It was still possible to edit the bent data through Interactive Database Editing using the table "Bridge Object Definitions 07 - Bents".
	66811	An incident has been resolved in the bridge modeler for curved composite bridges (steel I/U, precast I/U). When the girder was set to be modeled as a straight line in the bridge section definition form, the bridge section cut polygons and the properties were not calculated based on the "girder modeled as straight line" option. As a result, (1) when users defined a tendon along a straight girder, part of the tendon may have been considered as outside the girder such that the bridge response display diagrams were incorrect when the "include tendon force" checkbox was checked (2) the girder length would still be displayed based on the curved girder length in the Bridge Girders Reinforcement Layout form (3) girder stresses in the Bridge Response Display form could have been slightly off (4) the composite bridge superstructure design/rating results were affected.
	67689	An incident was resolved for the Bridge Modeler where the bearings at a single-bearing bent could be generated incorrectly when the number of the girders is different in the spans before and after the bent and some of the internal girders are discontinuous or terminate at the bent while the rest of the girders are continuous over the bent. When this occurred, the error was obvious and results agreed with the model as generated. Note that in certain cases when the number of girders is different in the spans before and after a bent are still best handled by the use of separate bridge objects.

Section Designer

Incidents Resolved

*	Incident	Description
	64464	An incident was resolved for Section Designer where the range of axial force used to calculate moment-curvature relationships and to generate Caltrans frame hinge properties was taking into account prestress axial force, if any, specified for Caltrans sections. Now the axial force range is determined independently of any prestressing force that may be present. Moment curvature relationships were not affected by this issue, only the range of axial force for which they could be computed. Caltrans hinges were affected in terms of the maximum and minimum axial force of the interaction surface, however, the moment values for any given value of axial force were not affected.
	64966	An incident was resolved where, for certain specific models, the section properties calculated for a Section Designer (SD) frame section were incorrect due to the presence of duplicated points in the definition of the SD shapes. Now such sections will be corrected if detected when a model is opened. This was not common.
	65625	An incident was resolved for Section Designer that could cause the creation of the analysis model to fail, thus preventing the analysis from running. This occurred when Section Designer was unable to calculate the notional size (for creep and shrinkage) for a section that contained shapes that were generated by replication and were overlapping or side-by-side. When this occurred, no results were available.

Loading

Incidents Resolved

*	Incident	Description
*	61933	An incident was resolved where in some cases a tendon defined with circular (not parabolic) curves and modeled using loads could have the tendon loads applied in the wrong direction. This did not affect tendons modeled as elements.

*	Incident	Description
*	65423	An incident was resolved where the location-dependent parameters (SS, S1, PGA, etc.) calculated for certain response-spectrum functions could be incorrect after importing a model from tables in a text file (.b2k, .$br), Excel spreadsheet, or Access database file. When this occurred, the values of these parameters would appear correct if viewed in the form using the command Define > Functions > Response-Spectrum Functions, but would still be incorrect if the Cancel button was clicked. Clicking the OK button would save the corrected values. The actual values of these parameters used for analysis could be seen in the database tables for the definition of the response-spectrum functions, and the computed acceleration values could be seen in the database tables for response-spectrum modal information. This error affected functions defined from location data for the following codes: IBC 2006, IBC 2009, IBC 2012, NCHRP 2007, AASHTO 2007, and AASHTO 2012. It did not affect functions defined directly using the load parameters (such as SS, S1, PGA, etc.). It did not affect newly defined functions or functions in models that were saved and re-opened, only models imported from table files.
	67157	An incident was resolved in which the AASHTO 2012 response spectrum curve values were not always correctly calculated for the points from zero-period to the start of the plateau. The analysis results matched the data points listed in the form and tables.

Analysis
Incidents Resolved

*	Incident	Description
	62187 64172	An incident was resolved where the major bending moments (M3) due to member loads were not being fully released when both M2 and M3 releases were specified at the ends of a frame object with a section property having a non-zero cross moment of inertia I23. When this occurred the error was obvious because the reported M3 moments at the released ends were non-zero. This error did not occur when there were no M2 releases at either end or there were no M3 releases at either end. The bending stiffness was not affected, hence this error had little effect on the overall structural response. Small non-zero M3 moments at the released ends affected the reported moments and could have a small effect on the adjacent members. Only L sections, Section Designer sections, and general sections can have non-zero values for I23. Affected versions are v15.2.0 to v16.1.0.
	63709	An incident was resolved for the link/support object of type T/C Friction Isolator (double-acting friction-pendulum isolator) where the nonlinear iteration could have difficulty converging during the analysis of nonlinear static or nonlinear direct-integration time-history load cases when a non-zero gap opening was specified for the link property. When the convergence failed, results were unavailable. Otherwise the results would be accurate to within the convergence tolerance unless the model was ill-conditioned.
	64200	An incident was resolved where the stiffness used to enforce edge constraints on area objects with layered shell properties was based on the homogeneous material, membrane thickness, and plate thickness rather than the material and thickness of the actual layers. The homogeneous material and thicknesses are not directly visible in the definition of the layered shell property, but can be seen and modified in the table Model Definition > Property Definitions > Area Section Properties > Area Section Properties. The effect of this error is generally insignificant. If the homogeneous values used were much too small compared to the actual layer properties, edge constraints may have been poorly enforced, and the effect would be obvious from the deformed shape and force/stress plots. However, the effect is localized. If the homogeneous values used were much too large compared to the actual layer properties, numerical sensitivity could result, primarily affecting convergence behavior for nonlinear analysis. The behavior of the layered shell elements themselves was not affected by the homogeneous values, only edge constraints if actually present on the edges of the layered elements.
*	64319	An incident was resolved where mass source specified from load patterns was not accounting for loads assigned to joints. Loads assigned to frames, shells, and other types of objects were being used to generate mass from load patterns. This error was introduced in version 16.0.1.
*	64921	An incident was resolved where assigning advanced local axes to solid elements did not rotate the material local axes as specified. Instead, the default orientation was being used, even though the

*	Incident	Description
		graphical display and tables indicated that the advanced local axes had been assigned. Results, however, were consistent with the use of the default axes, not those specified. Note that assigning basic rotation angles for the local axes did work as expected.
	65568	An incident was resolved where the initial stiffness used for iteration on multi-linear links (elastic and plastic) during nonlinear static and nonlinear direct-integration time-history analyses was taken to be zero. This could affect the rate of convergence for these types of analyses at the first load or time step, but did not affect the results to within the convergence tolerance. This is because the initial stiffness is used only for performing iteration, not for determining the actual force-deformation behavior of these elements. Nonlinear modal time-history (FNA) analysis was not affected.
	66370	An incident was resolved where analysis would sometimes terminate with an error message when running a nonlinear staged-construction load case with time-dependent behavior (both creep and shrinkage, with or without aging) in a model containing triangular shell elements with time-dependent materials. When this error occurred, results were not available. When this error did not occur, results were not affected. This error did not affect models having no triangular shell elements, and it did not affect models where either creep or shrinkage, but not both, were considered. This error only affected version 16.1.0.

Bridge Design

Incidents Resolved

*	Incident	Description
	59759	An incident was resolved for bridge seismic design where the design could fail to complete in the case where there were multiple bridge objects in the model and the bents from the ends of two different bridge objects were located at the same station. This is a special modeling technique for dividing a single bridge into multiple bridge objects. When this occurred, the design results were not available. Results that were produced were not affected. Now bent columns and bearings from two bridge objects that are located at the same station will be designed and reported for one of the two bridge objects, depending on the order in which the linked models were updated. This incident was resolved in CSiBridge v16.1.0, previously released, but was inadvertently omitted from the Release Notes.
*	62192	An incident was resolved for bridge superstructure design of composite steel I-girder and U-girder bridges where the design results could be incorrect for a steel girder "A" in the specific case where (1) staggered diaphragms (cross-frames) were assigned to the left and right sides of an internal girder "B" at the same or nearly the same location in the same span, (2) there are no other staggered diaphragms assigned to the left side of the girder "A" which is to the left of the internal girder "B" between the two bridge section cuts adjacent to the diaphragms on both sides of girder "B", and (3) the support at the beginning of the span is skewed. When all three conditions are met, then an extra diaphragm may have been counted for girder "A" when performing the bridge superstructure Strength/Ultimate design check such that the design results could be incorrect for girder "A" near the extra diaphragm location. Whether or not this error occurred could be checked using the command Design/rating > Superstructure Design > Optimize, selecting the "Stiffeners" tab, and clicking "Modify Section" to review the location of the assumed diaphragms. This issue, while not common, affected all bridge superstructure design codes. Models that were affected should be re-updated, re-run, and re-designed in the new version to correct the problem.
	63200 63670	An incident was resolved in which a runtime error was sometimes generated when adding default bridge design load combinations for the AASHTO 2007 and 2012 codes. Load combinations containing fatigue loads were not generated. All other generated combinations were correct. Results were consistent with the generated load combinations.
	63318	An incident has been resolved for the Steel Beam Section Variation form (command Design/Rating > Superstructure Design > Optimize or Design/Rating > Load Rating > Optimize) where changing the length units caused relative lengths of nonprismatic sections to be changed as if they were absolute lengths. This has been corrected. However, it did not have any effect on results, because

*	Incident	Description
		relative lengths are always used in proportion to each other. Any arbitrary scaling of all the relative lengths in a given girder will not change the geometry or results.
	63604	An incident has been resolved for bridge superstructure design of Steel U-girder bridge sections where the design requests would fail to run when the bridge section contained only a single steel U-girder.
	64134	An incident was resolved for bridge superstructure design, load rating, and seismic design using the latest AASHTO code where changing the Interims option in the appropriate Preferences form after running design requests did not delete the previous design/rating results. If the design/rating request was not re-run, the results were consistent with the Interim setting in effect when the request was run.
*	65324	An incident has been resolved for load rating using the codes AASHTO LRFD 2007 and AASHTO Rating 2011 in the Steel I Comp Service Design Request where the bottom flange stresses in the negative moment regions due to live load were not being calculated correctly when the design request parameter "Does concrete slab resist tension?" was set to No. The stresses were being computed using the short-term positive moment modulus (SxSTermBPos) instead of the negative moment modulus.
*	65327	An incident was resolved that corrected two issues for bridge load rating using the codes AASHTO LRFD 2007 and AASHTO Rating 2011 in the SteeI I Composite Service Rating Request: (1) The rating factor was calculated using a multiplier of 1/3 instead of 1/2 on the bottom steel flange lateral bending stress (fl) in equation 6.10.4.2.2-2. This could have been unconservative in the case where the bottom steel flange controlled. (2) The output table "Bridge Super Rating AASHTORATE11 31 - SteelICompServ-Flx" was reporting the value of Fwcr under the incorrect column heading "Mr". The column heading has been corrected to "Fwcr" (Nominal bend buckling resistance stress for webs. Reported only when negative flexure controls.)
*	66228	An incident has been resolved for load rating using the codes AASHTO LRFD 2007 and AASHTO Rating 2011 in both the Steel I Comp Strength and Steel I Comp Service rating requests where the dead load moment Mdnc on the non-composite section was being incorrectly taken as half (0.5) the correct value. This moment is used together with the moment on the composite section to calculate the yield moment capacity, My. The effect of this error could be unconservative in some cases. It is recommended to re-run the Steel I Comp Strength and Steel I Comp Service rating requests with the new version.
	66614	An incident was resolved for automated bridge seismic design where the acceleration applied in the response-spectrum load case for the X-direction was being applied in the U2 direction. This did not affect the demands or demand/capacity ratios reported in the bridge seismic design tables because these come from a different response-spectrum load case that applies the load in the U1 and U2 directions simultaneously. The X-direction load case was for informational purposes only.

Frame Design

Incidents Resolved

*	Incident	Description
	39703 43774 47616 48223	An incident was resolved in steel frame design using the AASHTO LRFD 2007 in which the error message "Unknown Section" was generated while designing or checking Section Designer built-up sections. When this occurred, design results were not available for the affected members.
	62710	An incident was resolved for steel frame design using the AISC 360-05 code where the design sometimes did not complete following an error message while recovering the frame design forces. When this occurred, no results were available. Any results produced were not affected by this error.
*	64866	An incident was resolved for steel frame design using the AISC 360-10 code where an error message was sometimes generated when designing certain members. When this occurred the results were unavailable for the affected members. Other results were not affected.
	67717	An incident was resolved for concrete frame design per the AASHTO 2007 code where the ratio Ag/Ac was being calculated as gross concrete area per concrete shear area. Now the ratio is calculated as gross concrete area per core concrete area. This affected the minimum shear rebar for

*	Incident	Description
		spiral shear rebar per AASHTO 5.7.4.6 at all stations, and at potential plastic hinge areas for rectangular rebar with rectangular ties per AASHTO 5.10.11.1d. The effect was generally insignificant.

Results Display and Output

Incidents Resolved

*	Incident	Description
	62417	An incident was resolved where the units for influence values shown in the tables using the command Home > Display > Show Influence Lines/Surfaces > Show Table were not being converted for changes in units on the table display form. Now the units are properly converted for the selected units, but still for a unit influence load in the original database units. The units for the influence load are indicated in the column heading in the table. For example, if the database units are KN-m, the column heading is always "Influence / KN". The default units for deflection influence will be m. If units are changed to N-mm, the column heading remains "Influence / KN" and the influence values are converted from m to mm, without conversion of the influence load.
	66694	An incident was resolved where an error message was generated while viewing the Tendon Response Form (obtained by right-clicking on a tendon object when displaying frame/cable/tendon force response) and then trying to change the tendon object using the option on the form. No results were affected.

Database Tables

Incidents Resolved

*	Incident	Description
	61478	An incident was resolved in which an error was sometimes generated when trying to display analysis results database tables. This was a database issue only and did not affect the analysis results. This issue was corrected in previously released version 16.1.0 but inadvertently omitted from the Release Notes.
	63815	An incident was resolved where an error message ("Not a valid filename") was sometimes displayed when creating a Bridge Seismic Design Report if the seismic design request used a response-spectrum function based on any of the following codes: "NCHRP 20-07", "AASHTO 2007", "AASHTO 2012", "IBC 2006/ASCE 7-05", "IBC 2009/ASCE 7-10", or "IBC 2012/ASCE 7-10". After closing the error message, the report was created and no results were affected.
	64406	An incident was resolved in which editing of the database-tables default format file could generate a runtime error when trying to modify the advanced SQL filter and clicking OK to exit the form. No results were affected.
	66044	An incident was resolved where an error message was generated when trying to display database tables for the rating parameters used to define AASHTO rating requests of types Steel-I NonComp Strength and Steel-I Comp Strength. This was a table display issue only and did not affect results.

Data Files

Incidents Resolved

*	Incident	Description
	64055	An incident was resolved in which certain specific models from v15 could not be opened in v16. When this occurred, no error message was generated, but the software became unresponsive. This was not common.

Application Programming Interface

Incidents Resolved

*	Incident	Description
	63660	An incident was resolved for the Open API where moving load results obtained for moving load cases included only the maximum and minimum response for each quantity, without corresponding

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		values, even when correspondence was requested for moving load analysis. The values reported for the maximum and minimum were correct. This incident did not affect the reporting of corresponding results for tables, only for the Open API. This incident only affected version 16.1.0, not previous versions.

External Import/Export

Incidents Resolved

*	Incident	Description
	61584	An incident was resolved to correct and improve the following items related to the import of STRUDL models: (1) CSiBridge can now process STRUDL lists where some of the list components are STRUDL groups, ranges of STRUDL joints, members, or elements with alphanumeric labels (as in 'A1' to 'A25'), and STRUDL lists which specify all STRUDL joints, members, or elements, with or without a restrictive "BUT" clause. (2) CSiBridge can now process STRUDL joint specifications in which the X, Y, and Z coordinates are tagged with an "X", "Y", or "Z" label and specified in a sequence other than the usual X, Y, and Z sequence. (3) CSiBridge can now process the STRUDL "GENERATE JOINTS" command, including the "GENERATE BETWEEN" variant of the command, and the "GENERATE MEMBERS" command. (4) CSiBridge can now process the "ELEMENTS" option of the STRUDL "DELETIONS" command. In addition, in the case of the "MEMBERS" option, CSiBridge previously deleted random members. When this occurred, the results agreed with the CSiBridge model. CSiBridge now deletes only the members specified in the list argument of the STRUDL command. (5) CSiBridge can now process the restrictive STRUDL "ALL BUT" clause of the STRUDL "CONSTANTS" command. This clauses assigns a value of the material property currently assigned for some specified members or elements and another for all the remaining members or elements. Previously CSiBridge assigned a single value of the material property to all the members or elements. When this occurred, the results agreed with the CSiBridge model. (6) The limit of a maximum 100 STRUDL load conditions and 150 STRUDL load combinations has been removed. CSiBridge can now import a number of STRUDL load conditions and combinations that is only limited by the total amount of memory on the machine (including physical and disk based memory). (7) CSiBridge can now process STRUDL "FORM LOAD" commands and creates corresponding CSiBridge load cases which combine the CSiBridge load patterns created for the STRUDL Load Conditions specified in the command with the input factors. (8) CSiBridge can now process STRUDL load conditions with alphanumeric names – as opposed to numbers. Previously, when CSiBridge encountered such load conditions, the STRUDL model was not imported. (9) CSiBridge can now skip several STRUDL command options from STRUDL commands that are not relevant to the creation of a CSiBridge model, such as STRUDL "OUTPUT" command options. Previously, when CSiBridge encountered such options and did not recognize them, the STRUDL model was not imported.

*	Incident	Description
	67675	Several enhancements and corrections have been implemented for the import and export of IFC Structural Analysis View files: (1) When an IFC load group included a general coefficient or individual coefficients for its loads, the coefficients were not applied. When this occurred, the results agreed with the model. The coefficients are still not applied to the loads in the imported CSiBridge load pattern but CSiBridge now reports a warning in the import log file. (2) When an IFC load case included both loads and load groups, CSiBridge load patterns were created for the IFC load groups and another load pattern for the IFC load case itself, but the CSiBridge load case did not contain the load pattern created for the IFC load case. This did not affect the import of IFC load cases made of loads only, or load groups only. When this occurred, the results agree with the model. IFC load cases including both loads and load groups are now imported as SAP load cases containing all the relevant load patterns. (3) When an IFC load case included a general coefficient for its loads and load groups, in addition to individual load and load group coefficients, the global coefficient was not applied. When this occurred, the results agreed with the model. The products of the general coefficient and individual coefficients are now applied, and if the coefficients applied to the loads in the IFC load case vary, several CSiBridge load patterns are created to group the loads which share a same coefficient in the load case. (4) Load combinations defined in IFC 2x3 were incorrectly imported with all the load cases in the load combination assigned a factor of 1.0. Load combinations defined in IFC 4 Structural Analysis View files were correctly imported. When this occurred, the results agreed with the model. Load combinations are now imported with the correct load case factors for both IFC 2x3 and IFC 4 Structural Analysis View files. (5) The temperature unit was incorrectly exported which could result in incorrect values of the coefficient of thermal expansion for materials in applications that import material properties from IFC. (6) Load combinations are now exported to 2x3 Structural Analysis View files. Previously, they were only exported to IFC 4 Structural Analysis View files. They can now be exported to either. (7) Nonprismatic frame sections are now supported, provided the type of section (e.g., rectangular) is the same at the start and end of the frame section. If the CSiBridge nonprismatic section has multiple segments, the internal sections are ignored and a single segment between the start and end section is assumed. When exporting to an IFC 4 structural analysis view files, nonprismatic CSiBridge frame objects are exported as IfcMaterialProfileSetUsageTapering, and in the case of an architectural coordination view file, as 'Body' IfcShapeRepresentation of type 'AdvancedSweptSolid'. When importing an IFC 4 structural analysis view or architectural coordination view file, any IfcStructuralCurveMember, IfcColumn, IfcBeam, and IfcMember entities with a profile defined by an IfcMaterialProfileSetUsageTapering is imported in CSiBridge as a nonprismatic section. (8) The user now has the option to export only part of a CSiBridge model by selecting members prior to using the IFC export command and choosing the Model Selection option in the Create IFC File form.

Documentation

Incidents Resolved

*	Incident	Description
	58521	An incident was resolved in the context sensitive help for the topic "Bridge Section Points for {Bridge Section Name} Form", in which it indicated that after exporting the geometry data to Excel, it could be pasted back into the form. This was incorrect, as the form does not allow editing of the geometry data points. This was a documentation error only.
	66403	An incident was resolved where the Bridge Rating Manual had a typographical error in the rating factor equation RFc in section 5.2.4.1.3 "Negative Flexure in Accordance with Article 6.10.8" for the AASHTO 2010 code. The factor Sxt in the equation should not have been present. This was a documentation issue only and did not affect the results.