CSiBridge® Version 21.1.0
Release Notes

Notice Date: 2019-08-21

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 v21.0.2 (Released 2019-02-19)

Analysis
Enhancements Implemented

*	Ticket #	Description
*	2699	A new feature is available for running multiple load cases on separate parallel processors, significantly speeding up models with many independent load cases. This can be particularly useful where a large suite of earthquakes need to be considered, such as for performance-based design. This option is turned off by default, since it can affect the performance on machines used for multiple purposes. When enabled, the number of processors to be utilized can be set explicitly or can be determined automatically as the number of physical processors found on the machine. Sequential load cases will be run on a single processor. Parallel load cases will be automatically assigned to processors as they become available, after any prerequisite load cases have been run. This feature requires sufficient memory (RAM) to support the number of parallel instances of the analysis engine. Larger models may run faster with fewer processors if memory is limited. All processors will access the disk, which can become the limiting factor for speed if the disk is slow or if the number of processors utilized becomes too large.

API
Enhancements Implemented

*	Ticket #	Description
	2443	A change was made for the digital signing of the installed files to improve security. This does not affect the behavior of the software except with respect to using the Application Programming Interface (API). External applications and plug-ins that reference CSiBridge20.dll or CSiAPIv1.dll will need to re-reference the new installation and be re-compiled. No other changes are required. This is a one-time change and should not be necessary in future versions.

Bridge Design and Rating
Enhancements Implemented

*	Ticket #	Description
	2207	An enhancement was implemented to provide detailed reports for the design and rating of steel U-girder bridges per the AASHTO code for the Strength and Service types of design/rating requests.

*	Ticket #	Description
	2307	An enhancement was implemented to provide an option to ignore proportion limits when performing an AASHTO strength rating of steel U-girder bridge sections. By default, proportion limits will still be checked.
*	2322	An enhancement has been implemented for bridge superstructure rating of steel U-girder composite bridges according to the AASHTO code to now account for the effect of torsion in the webs when calculating the strength rating factor for shear. In the one-web method the torsional shear in one web is computed separately and added to the one-web direct shear. This may lead to lower shear rating as compared to previous versions, especially in regions with high torsion demands.
*	2392	An enhancement has been implemented for the Indian IRC-2011 concrete superstructure design to calculate the required reinforcement quantity. This is presented as a separate table that shows the total area of reinforcement required at specified distances from the top and bottom of the section to achieve a D/C ratio of unity, independent of any user-specified rebar that may be present in the section. The existing check of user-specified reinforcement is still available, and provides the actual D/C ratio achieved. The new table can be used to guide changes to user-specified reinforcement. This enhancement is applicable to the following concrete bridge sections: box girder, multi-cell box girder, composite with precast concrete girders, flat slab, and T-beam.
	2427	An enhancement has been implemented for the Canadian bridge rating shear check in which the spacing of the specified transverse rebar in concrete sections is now reported in the tabular output, as well as reporting whether or not the provided transverse shear reinforcement satisfies the minimum per 14.14.1.6.2.
	2500	Bridge superstructure design for steel girder bridges per the AASHTO code has been expanded to now include amplification factors for flange lateral bending stress per AASHTO (6.10.1.6-4 or 6.10.1.6-5).
*	2503	An enhancement was implemented to add superstructure design of flat-slab and T-beam bridge sections according to the Indian IRC-2011 code.

Bridge Modeler

Enhancements Implemented

*	Ticket #	Description
*	2291	The "Quick Bridge" template for creating new models has been enhanced as follows: (1) The generated layout line has been extended to account for end skews. (2) Automated wind load is available as an option based on the AASHTO code. (3) Pretension load is generated for precast concrete girder bridge sections. (4) Caltrans Amendments have been added for the generated load combinations used for superstructure design and rating per the AASHTO 2017 code. (5) Design load combinations can be generated even if design or rating requests are not selected. (6) Default design requests can be generated for the AASHTO, Eurocode, CAN/CSA, and IRC-2011 codes for all bridge section types that support design. (7) Default rating requests can be generated for the AASHTO and CAN/CSA codes for all bridge section types that support rating. (8) The Quick Bridge template can remember selections for the next time it is used. (9) When a model-settings file is used to start a new model, the Quick Bridge template can choose from existing bridge sections, bent and abutment properties. (10) When a model-settings file is used to start a new model, the Quick Bridge template will use the included vehicles, and additional vehicles can be added.

*	Ticket #	Description
	2303	The Bridge Modeler has been enhanced for the modeling of steel-brace type cross-frames (diaphragms) so that now up to three pairs of diagonal braces can be specified. Previously only one pair of diagonal braces could be specified. When multiple pairs are specified, the spacing is uniform and each pair uses the same frame section property in a repeated V, inverted-V, or X pattern. This multi-pair brace-type cross frame is applicable to the exterior diaphragms in steel I- and U-girder bridges and the precast concrete I-girder bridge. It is not applicable to the interior bracing of steel U-girders.
	2304	The Bridge Modeler has been enhanced for the modeling of steel-brace type cross-frames (diaphragms) as follows: (1) Two new orientations, “Up” and “Down”, are now available for T-section cross-frame members; previously only “Forward” and “Backward” were available. The corresponding location options for the new orientations are “Center”, “Before” and “After.” (2) Horizontal-offset modeling is now available for I-section cross-frame members. Previously I-sections were always centered. The new options include gusset plate thickness and location, as well as member-location settings “Center”, “Before” and “After.”
	2312	An enhancement was implemented to allow the use of tightly curved layout lines for bridge objects. Previously a bridge object could not be generated if, for any of its spans, the extended line along either skewed end of the span intersected either edge of the bridge deck anywhere along the span length. Now such tightly curved spans are permitted, provided that the edges themselves of the bridge deck do not intersect along the span length.
*	2316	The Bridge Modeler has been enhanced to provide for the definition of detailed foundation properties that can be placed at the bottom of bent columns. Foundations that can be modeled include footings, pile groups, piers, and shafts. Footings can support a single column or multiple columns within the bent. Layered soil profiles can be defined as part of the foundation property. Each soil layer specifies a spring constant for direct pressure and a shear factor for tangential stiffness. Foundations assigned to the bents are automatically converted to frame and shell objects when the bridge object is updated. Soil springs are automatically generated at the base and sides of the footings, or along the length of piles, piers, and shafts. Note that database tables have not been implemented for the foundation properties as of this release. This means that models imported from text files (.B2K, .$BR) and database-table files (Excel, Access, XML) will need to have the properties redefined. Bridge foundation models generated from foundation properties will be retained. Foundation properties will be retained in the model file (.BDB).
	2347	The Bridge Modeler has been enhanced for the modeling of bridge diaphragms (cross frames) as follows: (1) For Chord and Brace type diaphragms, an option is now provided for members to be pinned or fully connected at their ends. Previously members were always pinned. However, the fully connected option is better when trying to capture out-of-plane bending moments due to horizontal eccentricity between the various chord and brace members and the connection plate at the girder web. (2) The Single Beam type diaphragm, when used in a steel I-girder bridge section, can now be represented as a mixed model using frame objects for the flanges and area (shell) objects for the web if the steel I-girders themselves model the webs as area objects. The option remains to model the Single Beam diaphragm as a single frame object, and this option will always be used when the steel I-girders are modeled as frames. Note that Single Beam type diaphragms used in steel U-girder bridge sections always use the mixed model for the diaphragms (a new feature with this release).
	2352	An enhancement has been implemented for the Bridge Modeler to allow in-span hinges to be used with user-defined bridge sections.
	2348	The Bridge Modeler for segmental bridges has been enhanced such that the Schedule Wizard for creating the construction sequence now automatically includes the operation “Add Guide Structure” at the beginning of the first task for all segments except closures. This will produce cumulative displacement values and improve the graphical presentation for the deformed shape. This change has no significant effect on forces and stresses in the structure. For segmental bridges, use the command Bridge > Erection > Schedule Wizard to access this feature.

*	Ticket #	Description
	2433	Detailed superstructure design calculation reports are now available for the steel I-girder strength check per the CAN/CSA S6 code.

Installation and Licensing

Enhancements Implemented

*	Ticket #	Description
*	2319	The version number has been changed to v21.1.0 for a new intermediate release.
	2445	The software and installation have been updated to use the Microsoft .NET Framework 4.7.1.

Loading

Enhancements Implemented

*	Ticket #	Description
	2300	An enhancement has been implemented for the Bridge Modeler in the Slab Wet Concrete Load Assignments form to now allow individual scale factors to be specified on the loads from the bridge section (Haunch, SIP Form, Permanent, and Temporary). Previously these could only be controlled by selecting Yes or No.

Results Display and Output

Enhancements Implemented

*	Ticket #	Description
*	2439	The display of results from modal time-history load cases, including FNA, has been made faster for large models. This improvement will most notably affect modal time-history load cases using a large number of modes for models with a large number of joints. Speed will be improved for the graphical display of displacements, forces and stresses, section cuts, and other response quantities; for producing tabular output; and for running design.

Analysis
Incidents Resolved

*	Ticket #	Description
*	2338	An incident was resolved where nonlinear static, staged-construction, and nonlinear direct-integration time-history load cases could exhibit inconsistent convergence behavior for models containing link elements when the analysis was parallelized. Due to the inconsistent convergence behavior, results could differ from one run to the next, or the analysis could fail to converge in some runs. Converged results should differ within the convergence tolerance unless the model is very sensitive or ill-conditioned. The number of threads used for parallelization of links is reported in the analysis log file (.LOG). This will normally be greater than one unless the machine has less than four cores (two physical cores), or unless the environment variable SAPFIRE_NUM_THREADS has been set to 1 before starting the software.
	2368	An incident was resolved where the program could terminate when attempting to run a moving load case in a model containing a large number of vehicles and/or lanes.
*	2398	An incident was resolved where the analysis could terminate with a fatal error when a staged-construction load case was run that contained the operation Change Section on link objects, and was then followed in the same run by a nonlinear static, direct-integration time-history, or another staged-construction load case that continued from the same previous stiffness case as the stage-construction case with the Change Section operation. For example, consider initial case LC0 followed by staged-construction case SC1 and separately by nonlinear static case LC1. If case SC1 changes link sections, then case LC1 may fail if it runs after SC1. This error did not occur if LC1 was run in a separate instance from SC1. This error did not occur when the link section properties were of the same type and size (number of data points for multi-linear properties) before and after the section change operation. When this error occurred, analysis results were lost. Otherwise, results were not affected.
	2552	An incident was resolved where an error message was sometimes generated when trying to run an analysis that included a staged-construction load case containing the operation “Remove Forms” and the assigned Concrete Pour (see Bridge > Loads > Slab Wet Concrete Load) for that operation included Haunch and/or SIP Form loads. When this occurred, the analysis did not run and results were not available for the load cases selected to run. When such a load case was able to be run, results were not affected.
*	2628	An incident was resolved where a model with joints that have both local axes not parallel to the global axes and also non-isotropic mass assignments (i.e., with different values along the local axes) would give incorrect results for linear and nonlinear direct-integration time history load cases. When this issue occurred, the dynamic response would typically diverge, resulting in very large displacements. This issue was particular to direct-integration time history load cases and does not affect modal time history load cases or static load cases.
*	2638	An incident was resolved where nonlinear static and staged-construction load cases could converge to the wrong answer under the following circumstances: (1) The nonlinear convergence iteration used line search, which is not the default setting in the nonlinear solution parameters, (2) the line-search iteration was able to find a solution without further iteration, and (3) the unbalance force in the first step of line search was significantly larger (by orders of magnitude) than the applied load. All three conditions were necessary to cause this issue. This error was not common. In CSiBridge v17.0.0 to v21.0.1, if event-to-event stepping was enabled in the nonlinear solution parameters, which is the default setting, the line-search algorithm was automatically disabled. In CSiBridge v21.0.2, the default nonlinear solution parameters disabled line-search. Situations that can cause item (3) include load steps where the stiffness becomes much larger, such as the closing of gaps with non-zero initial opening. This does not apply to gaps with zero initial opening, such as at the base of a structure. Displacement-controlled nonlinear static load cases, such as for static pushover, do not use line search and were not affected. Nonlinear direct-integration load cases were not affected, even when line search was used.

*	Ticket #	Description
	2666	An incident was resolved in which a system memory error could occur when attempting to run an analysis and there were more than twenty frame-property-modifier or shell-property-modifier named sets defined in the model.

API

Incidents Resolved

*	Ticket #	Description
	2344	An incident was resolved in the API, where the SetInitialCase and GetInitialCase API functions for load cases attempting to set or get a staged construction load case as the initial case did not work. This issue was inadvertently introduced in v21.0.0.

Bridge Design and Rating

Incidents Resolved

*	Ticket #	Description
	2308	An incident was resolved in which the design of steel U-girder bridge sections would sometimes produce a warning and then not complete the rest of the design check due to top-flange proportion limits not being satisfied when the section actually did meet the requirements. This was a tolerance issue when the actual flange proportion was very close to the limit.
	2337	An incident was resolved for AASHTO steel I-girder bridge design in which the constructability design check was sometimes unable to be performed. Now the previously used gradient calculation method has been replaced by the panel method, which is also used in strength design, to avoid this problem and to make the design methodology more consistent. When the error did occur, no results were available for the affected design request.
	2341	An incident was resolved in which bridge superstructure design and rating requests would not run if a temperature-dependent material was used in the bridge superstructure and the first temperature record defined for that material was non-zero. When this occurred, superstructure design and rating results were not available for the affected bridge object. No other results were affected.
*	2355	An incident was resolved where the flange lateral bending stress in a steel I-girder bridge was calculated incorrectly for bridge superstructure design check of type "Steel-I Comp Construct Stgd" (constructability - staged) when the tributary slab elements were present in the structure in the considered load-case stage used for design, but the stage operation "Flag As Composite" had not been applied to those slab elements. When this occurred, the stresses tended to be much larger than expected, and the effect was obvious and conservative. This error did not affect the more common cases where either the slab was not present, or where the slab was present and properly flagged as composite. Note that the design check "Steel-I Comp Construct NonStgd" (constructability - non-staged) was not affected. A minor enhancement has been made to staged construction load cases where the operation "Remove Forms", which adds slab objects corresponding to a Concrete Pour defined for a bridge object, will now automatically perform the operation "Flag As Composite". The operation "Flag as Composite" should still be used for slab objects added manually in a staged construction load case used for design.
*	2371	An incident was resolved for bridge superstructure service rating per the AASHTO code where changing the parameter “Stress Factor Tens Lim Units” in the Superstructure Rating Request Parameters form from “ksi” to “MPa” would convert the numerical value of “Stress Factor Tens Lim” correctly for MPa units, but would leave the “Stress Factor Tens Lim Units” parameter set to “ksi”. This inconsistency could affect the rating results for AASHTO service rating for the Concrete Box, Multicell Concrete Box, Flat Slab, and Precast Concrete girder bridge sections. Tensile stresses were always being checked against the specified value in ksi units. Results agreed with the values as shown in the form, tables, and reports.

*	Ticket #	Description
*	2378	An incident was resolved for bridge superstructure rating that caused incorrect reporting of flexural capacity of non-composite I-sections when running Steel I NonComp Strength Rating request. In the previous version the algorithm was not correctly determining the controlling flexural capacity within the unrestrained panel, leading to incorrect rating factors. Whether the capacity was underestimated or overestimated was dependent on the particular modeling situation. This affected Steel I NonComp Strength rating requests for all versions of AASHTO LRFD.
	2395	An incident has been resolved for bridge design and rating where the error message "Error in locating girder in nearby section cuts from section cut at station" was generated while performing shear checks of concrete sections when the number of girders varied from one section cut to another. When this occurred, affected results were not available. No produced results were affected. The impacted design and rating requests include Shear Design and Shear Rating, for ConcBox2 and PrecastComp sections, for all AASHTO LRFD codes.
	2407	An incident was resolved for bridge superstructure design of precast concrete girder bridges in which the girder's first moment of area above and about the horizontal axis at the girder center of gravity was calculated incorrectly such that the shear design results could be too conservative. This only affected the shear design check for the EUROCODE and IRC-2011 design codes.
	2413	An incident was resolved in which pedestrian live loads were, by default, being considered as long-term composite for the Bridge Design Action instead of short-term composite. Now they default to short-term composite. By way of background, Bridge Design Action is set for each load case using the Design button on the Load Case Data form. When set to Program Determined, the value defaults based on the design type of the first Load Pattern listed in the Loads Applied region. This can be changed by selecting User Defined and picking the desired Design Action.
*	2418	An incident was resolved for bridge superstructure design and rating of steel-girder bridges where end panels were incorrectly being classified as internal panels, resulting in a higher shear resistance than expected being reported. The classification used was reported with the design results. This affected steel I- and U-girder bridge sections for the shear strength and constructability design and rating requests according to the AASHTO code.
	2423	An incident was resolved for bridge superstructure design of concrete slab bridge sections where the design results were not reporting correct values for the concrete tensile limit. The incorrectly reported value was typically 2.62 times lower than the correct value when the square root multiplier in the design parameters data form was entered in ksi units, but it was correct when entered in MPa units. The calculated section stresses were correct. This impacted Conc Slab Stress design checks for all versions of the AASHTO LRFD code.
	2428	An incident was resolved for superstructure bridge design where the AASHTO LRFD steel section classification was applied conservatively when the specified steel material yield stress was exactly equal to the limit specified by AASHTO. Now a 1% tolerance is applied to the material stress limits when checking whether the section is compact.
	2434	An incident was resolved for bridge superstructure design and rating of steel-girder bridges where the depth of the web in compression was taken as being the entire web when the design/rating request parameter "Use Stage Analysis?" was set to "Yes". The algorithm for calculating the depth of the web in compression under negative bending has been modified to reflect the fact that correspondence between demand stresses at different points in the web is not maintained when stresses are obtained directly from a staged-construction load case. The new procedure derives the depth of web in compression from the yield moment when the design/rating request parameter "Does concrete slab resist tension?" is set to "Yes", and directly from the section property for negative bending when "Does concrete slab resist tension?" is set to "No". This affects steel I-girder and U-girder Service requests for design and rating for all versions of AASHTO LRFD. The previous results tended to be conservative.

*	Ticket #	Description
*	2437	An incident was resolved where Permit vehicles were not recognized as being vehicle live loads for design and rating requests that were using Live Load Distribution Factors (LLDF). Combinations containing permit vehicles were distributing the load from permit vehicles evenly onto girders rather than applying the LLD factors. This was unconservative for design and rating purposes. Analysis results were not affected. The determining factor was the Design Load Type that is set for each load case. The following Design Load Types were being properly distributed using LLDF when requested: "Vehicle Live", "Vehicle Fatigue", "Permit Veh Fatigue", "Euro LoadModel1 Character", "Euro LoadModel1 Frequent", "Euro LoadModel2", "Euro LoadModel3", "Euro LoadModel4", "Vehicle Deflection", "Live", and "Notional". Now "Permit Veh Live" will also be included. For load cases whose Design Load Type is "Programmed Determined", the design load type is set to one of the listed options if the load case is of type Moving Load, or if a load pattern is applied with any of the listed design types for other types of load cases. The actual Design Load Type chosen for the load case depends on the vehicles included in the load case definition.
*	2462	An incident was resolved for bridge rating where the Optimization feature was not available after running a rating request if the rating code was set to AASHTO RATING 2018. The rating results themselves were not affected.
*	2474	An incident was resolved for bridge superstructure design of multi-cell concrete box-girder bridge sections where the results for the stress-check design request were empty (zero). This issue affected all design codes and was inadvertently introduced in v21.0.0. No other types of design request for the multi-cell concrete box girder were affected, and no other bridge sections were affected.

Bridge Modeler

Incidents Resolved

*	Ticket #	Description
	2306	An incident was resolved where several girder section cuts generated based on parametric variation control points could be too close to each other and prevent creation of the analysis model. When this occurred, no results were available.
*	2315	An incident was resolved in which an abnormal termination of the software could occur when attempting to open a construction schedule for a model containing tendons with more than one load pattern assigned to a tendon. Now multiple load patterns assigned to a tendon may be used in the Scheduler, but only the first assigned load pattern can be used in the Prestress Tendon operation that adds and loads a tendon simultaneously. Other load patterns can be applied to a tendon that is already present in the structure using the Load operation.
	2335	An incident was resolved for the Bridge Modeler where the bridge section was not modeled correctly at the internal support locations if bent supports were located right at (or very close to) kinks in the layout line. This error affected area- and solid-object models. When this occurred, the error was obvious and results agreed with the model as generated.
	2358	An incident was resolved for the Bridge Modeler where certain bridge objects modeled as solids could generate an unexpected shape for the tendons when the layout line was curved and had non-zero grade. This issue was not common. When it occurred, the error was obvious and results agreed with the model as generated.

*	Ticket #	Description
	2360	An incident was resolved for the Bridge Modeler that corrects two items related to the "Use Girder Depth Instead" option for solid-type bridge diaphragms: (1) When used with a spine model, the weight of the generated rigid links was not being adjusted based on this option, but always used the girder depth for precast I-girder and T-section bridges. Bridge models updated as area or solid objects were not affected. (2) This option was not included in the database tables, so it always assumed the default value (Yes) when importing text (.B2K, .$BR) or database files (Excel, Access, XML), or when the diaphragm property was edited using the Interactive Database Editor. Note that the "Use Girder Depth Instead" option only applies to precast I-girder and T-section bridges. Precast U-girder bridges always use the girder depth, and solid-girder bridges always use the specified depth.
	2363	An incident was resolved for the Bridge Modeler where the area or solid mesh of a bridge object could be incorrect at a support if all three of the following conditions were met: (1) The layout line was curved, (2) The bridge object was offset from the layout line such that the layout line was not within the bridge deck, and (3) The support was skewed. When this occurred, the generated model was obviously incorrect. Results agreed with the model as generated.
	2364	An incident was resolved for the Bridge Modeler where some bridge objects modeled as shells or solids could generate partially connected models at internal support locations (bents) or at span transitions (no support) in either of the following two cases: (1) The layout line had a kink in the vertical profile near the support/transition, or (2) The layout line had non-zero grade and the support/transition was highly skewed. When this occurred, results agreed with the model as generated, and typically exhibited excessive deflection at that location due to inadequate continuity of the model at the bottom of the bridge section.
	2384	An incident was resolved for the Bridge Modeler in which a single-span bridge model containing precast I-girders with tendons defined within the girder section properties could not be updated when the model did not contain a bent definition.
	2410	An incident was resolved for the Bridge Modeler where generated bridge tendons did not account for non-zero super-elevation for a straight bridge. Super-elevation was properly considered when generating tendons for curved bridges. When this occurred, the error was visually obvious, and results agreed with the model as generated.
	2429	An incident was resolved for the Bridge Modeler where the vertical elevation at the end of a lane defined from a layout line could be zero instead being the same elevation as the layout line if the lane had the same length as the layout line. This did not occur for lanes that were shorter than the layout line. This had no effect on results, since lane loading points are calculated from the vertical projection of the lane onto the structure.
	2454	An incident was resolved for the Bridge Modeler where the location of the support bearings at an abutment could be slightly offset in the bridge longitudinal direction for a curved bridge with non-zero grade and non-zero superelevation. This offset was generally small and the effect upon results was negligible, except for the case when a grade beam was assigned to the abutment which could cause the bearings not to be connected to the grade beam as expected. In such a case, the bearings were still grounded so the structure remained stable, but the grade beam would not bear any of the load from the bridge.
	2471	An incident was resolved for the Bridge Modeler where models that had been generated from the Quick Bridge template would sometimes produce an error message when trying to save the model, modify/show the generated moving load case, or open the database tables. This error would occur when the vehicle library was specified as None in the template form. Now the moving load case will not be generated if the vehicle library is set to None in the template form. Vehicles can still be added and moving load cases defined after the model is initially created from the template form.

*	Ticket #	Description
	2494	An incident was resolved for the Bridge Modeler where interior diaphragms generated for steel U-girder bridges might not be correctly located for curved bridges. This issue affected the bridge diaphragm assignment "All Girder Interiors", and the error depended upon the bridge discretization length. When this occurred, the error was visually obvious, and results agreed with the model as generated.
	2502	An incident was resolved for the Bridge Modeler where a staggered diaphragm in a steel I-girder bridge might not be placed at the desired location or desired orientation if the specified location of two or more staggered diaphragms was very close to a bridge global section cut. In such a case, the area objects adjacent to the staggered diaphragms would not be meshed as expected. When this occurred, the error was visually obvious and results agreed with the model as generated.

Data Files

Incidents Resolved

*	Ticket #	Description
	2309	An incident was resolved where importing a model text file (.B2K, .$BR) containing AASHTO steel U-girder strength and/or service rating requests would generate an error message. When this happened the rating request would not be imported and the entire model may not have been imported completely. This did not affect normal opening of the model file (.BDB).
	2421	An incident was resolved where the model file (.BDB) could not be saved if there were one or more bridge seismic design requests defined and the bridge superstructure design code was set to CAN/CSA-S6.
	2447	An incident was resolved where the model could not be imported from a text file (.B2K, .$BR) or database-table file (Excel, Access) when the Girder Longitudinal Layout setting in any of the bridge-span section definitions was set to “Straight Line” instead of “Along Layout Line.” This was an import issue only for the text/table files and did not affect opening the model file (.BDB).
	2590	An incident was resolved where the model could not be imported from a text file (.B2K or .$BR) or database table file (Excel, Access, or XML) if the model contained a user-defined bridge section of type concrete box that was assigned to a bridge-object span, and that bridge section had no girders defined using the bridge-section tools in Section Designer. Such bridge sections are legal and can be used in a spine model. The model file (.BDB) could be opened; only the import process was failing.

Database Tables

Incidents Resolved

*	Ticket #	Description
*	2324	An incident was resolved for the Bridge Modeler in which the analysis results and bridge-superstructure design or rating results could be incorrect for steel I-girder bridge objects if the model was imported from a text file (.$BR, .B2K) or database-table file (Excel, Access, xml) under the following conditions: (1) the bridge object contained non-prismatic girder sections, and (2) the bridge object was last updated before export or saving with the option "Mesh Slab at Critical Steel I-Girder Locations" selected, and (3) the bridge object was not updated after import. Bridge section-cut information was not properly recovered during import, affecting bridge superstructure analysis and design/rating results. No other analysis results were affected. No frame-design results were affected. The issue was able to be corrected by updating the bridge object to create its linked model after import, and then running the analysis and/or superstructure design or rating.

*	Ticket #	Description
	2327	An incident was resolved for superstructure design optimization of steel U-girder bridges where the database tables after optimization were empty when clicking the buttons “Display As Analyzed Table” and “Display As Designed Table”, or the “As Analyzed” table would be displayed instead of the “As Designed” table. This was a results display issue only. No results were affected.
	2328	An incident was resolved where some bridge stations were omitted when displaying the Bridge Object Girder Forces database table for a concrete box girder bridge modeled with solid objects. This was a reporting issue only and did not affect any results that were reported.
	2419	An incident was resolved where an error was generated when attempting to display the table "Bridge Object Definition 28 - Span Segments" using the interactive database editor. This table is not importable and should not have been available through the interactive database. This was a database table issue only and did not affect results.
	2669	An incident was resolved where the database tables for bridge superstructure design results were sometimes not available for display or export when at least one design request was for AASHTO LRFD concrete box shear design and it used the MCFT method for design. When this occurred, the tables were not available from the commands Display > Show Tables or File > Export. On the other hand, the tables were available for display and export using the command Display > Show Bridge Superstructure Design Results, and choosing the Show Table option for each design request.

Design – Steel Frame

Incidents Resolved

*	Ticket #	Description
*	2456	An incident was resolved for steel frame design per the "Eurocode 3-2005" code where the demand-capacity ratio (D/C) computed for closed pipe and tube (box) sections could be unconservative in the presence of significant torsion. For the design of pipe sections, the shear stress (tau) due to torsion was being calculated using c = t/2 instead of c = d/2 in the formula tau = T*c/J. A similar error occurred for tube sections, where the computed stress was proportional to the wall thickness rather than to the exterior dimensions of the section. This error affected the calculations of the strength reduction factor, reduced shear capacity for the presence of torsion, and reduced flexural capacity for the presence of torsion. The resulting D/C ratios were smaller than their correct values in the presence of torsion. Only pipe and tube sections were affected. In the absence of torsion, the D/C ratios were correct.

Loading

Incidents Resolved

*	Ticket #	Description
	2305	An incident was resolved where models containing curved frame objects and either tendons or cables could generate an error message when trying to assign distributed loads to the frame objects. Loads could be assigned to these objects if the curved frame objects were converted to straight frames, or if the tendons and cables were removed from the model.

*	Ticket #	Description
*	2359	An incident was resolved for the automatic generation of load combinations for bridge design that addressed the following issues for the AASHTO code: (1) The load factors for wind load on structure for Strength III and V, and service I and III in the auto-generated AASHTO 2017 load combinations were not correct. The values were instead based on the factors for AASHTO 2014. (2) The two load factors for uniform temperature load were incorrectly applied to the load case as maximum and minimum force effects. Now the smaller load factor is used as a single factor for the regular combinations. In addition, a new set of load combinations will be generated for the same limit state but with the additional word "Deformation" in the combination name, and using the larger load factor. These new Deformation combinations will not be included in the combination group for the same limit state, which is primarily intended for force-based results. This change applies to the design codes AASHTO LRFD 2007 through AASHTO 2017.
	2446	An incident was resolved for the Bridge Modeler where the value of the Height parameter for defining barrier loads on the Define Bridge Section Data form was converting the numerical value entered for units of force-per-length rather than units of length. This error only occurred when the data was first entered in the form, and did not affect values entered in database tables. Values entered in database units were not affected, which is the most common case. Note that database units are those in effect when the model is first created or imported. Results agreed with the model after unit conversion was performed. The barrier height does not affect the barrier load itself, but may affect the area loaded by wind load.
*	2463	An incident was resolved where the bridge temperature-gradient load was calculated incorrectly for a bridge objects with a composite bridge section (steel I and U, precast-concrete I and U) when the girder depths were not the same and the depth of the left exterior girder was not the deepest one. The temperature gradient was based on the depth of the left girder. Now it is based on the depth of the deepest girder. Note that for models created in older versions of the software, the bridge object will need to be updated in the new version order to correct the load.

Results Display and Output

Incidents Resolved

*	Ticket #	Description
	2329	An incident was resolved affecting the display of bridge response results when there were two or more bridge objects in a model. After switching the selected bridge object on the Bridge Response Display form while viewing the results for a multi-step nonlinear load case, the newly displayed results would be for the new bridge object and the first step of the load case, but the step number displayed on the Bridge Response Display form would still indicate the load-case step number that was being displayed for the previous bridge object. Once the step number was subsequently selected, the displayed results would then agree with the selected step number. The results themselves were correct, just the displayed step number could be incorrect immediately after switching between bridge objects.
*	2375	An incident was resolved in which the software could terminate unexpectedly when attempting to display the rating report for a rating request type for which the report option was not currently available. This was a reporting issue only and did not affect results.
	2381	An incident was resolved for Canadian steel bridge design and rating where the units in which the Coefficient of Monosymmetry was reported could be incorrect when the display units were different than the database units. (Database units are those in effect when the model is first created or imported.) This affected all versions of the Canadian code for steel I-girder strength and constructability design/rating requests and steel U-girder constructability design requests. This was a reporting error only. No other results were affected.

Structural Model
Incidents Resolved

*	Ticket #	Description
	2240	A change has been made to remove target force load assignment to tendon objects. This feature previously did not work well with tendon objects and has therefore been removed from the program.

User Interface
Incidents Resolved

*	Ticket #	Description
	2346	An incident was resolved where some of the dropdown boxes on the Display Load Assigns - Area Elements form were not always populated when the form was opened. This was a user interface issue only and did not affect results.
*	2353	An incident was resolved in which the program could terminate when attempting to show the static pushover curve and the min and max values for either the horizontal or vertical axes were set equal to each other. This was a user interface issue only and did not affect results.
	2386	An incident was resolved where the shear center eccentricity defined for a frame section property of type General would change each time the definition was viewed, but only after first defining certain sections that are non-symmetric about the 2-axis such as a channel section. When this occurred, results agreed with the shear center eccentricity as could be seen in the database tables.
*	2450	An incident was resolved in which the program would generate an error when attempting to display link object or element assignments when there were no area objects in the model.
	2626	An incident was resolved where the text for the Undo and Redo commands in the interactive database editor menus was incorrect.