CSiBridge v24.0.0 Release Notes

Notice Date: 10-March-2022

This document lists changes made to CSiBridge since v23.3.1, released 24-September-2021. Items marked with an asterisk (*) in the first column are more significant.

Analysis

Enhancements Implemented

*	Ticket	Description
*	6095	The meshing of frame objects that contain tendons has been changed to generally improve accuracy but also to reduce the size of the analysis model. Previously, any frame object that contained one or more tendon mesh points was discretized based on the minimum discretization anywhere along the length of any tendon that contained a point in that frame. That could lead to over-meshing of frames, yet did not necessarily mesh the frames at the tendon points. It also affected adjacent frame objects if a tendon point was at the end of the frame object, even if the tendon did not pass through that frame. Now, frames are meshed only at the contained tendon points, regardless of the discretization elsewhere in the tendon. Only interior points are considered, so adjacent frame objects are not affected. Note that frame objects containing a tendon point will only be meshed if the frame is a member of the group loaded by that tendon, as specified in the tendon definition. Frame objects representing the bridge superstructure in spine model created by the Bridge Modeler are not meshed at tendon points. All other frame objects may be affected. Area and solid objects are not meshed at tendon points and are not affected by this change. Tendon points that affect frame meshing are the control points used to define the tendon geometry, as well as additional points created to satisfy the minimum discretization specified for the tendon. Frame discretization due to tendons will not create elements smaller than 1/8 of the smaller cross-sectional dimension (t2 or t3) of the frame object, subject to an absolute minimum of 10 times the Auto Merge Tolerance (File > Settings > Dimensions). Affected models run in the new version may exhibit a very small effect upon the results, generally of no engineering significance, unless the model is unstable or ill-conditioned. Verification Example 1-009 has been updated to reflect the new results, which are now approximately 50% closer to the benchmark values.
*	7726	An enhancement was made to allow the disabling of the coupling between major bending, shear V2, and torsion for Channel and General sections, including the cold-formed C and Hat sections. The new option to control this coupling effect of the shear center is available in the affected section-property definitions. Consideration of the shear center is enabled by default.
*	8083	A change has been made to how equilibrium errors are checked for convergence in nonlinear static load cases. Previously, the relative contributions of force unbalance to moment unbalance were dependent upon database length units. This tended to over-emphasize moments for small length units (mm, inch), which are the default database units. In certain cases, this could lead to larger force equilibrium errors than expected based on the relative convergence tolerance specified for a load case (the default is 0.0001). Now these equilibrium measures are independent of length units, and they are better balanced between force and moment for typical structural dimensions. Because of this change, the results of nonlinear static load cases may differ when run in the new version compared to the previous version. Generally any change will be small, but it may be more significant for sensitive or ill-conditioned models. Note that nonlinear static analysis is an approximate, iterative process. Results should be confirmed by engineering judgment, and re-running certain load cases using progressively smaller convergence tolerances may be necessary to get the expected equilibrium for some models. Results for non-iterative, event-to-event load cases should not be affected, except that the reported error at the end may differ.

Bridge Design and Rating

Enhancements Implemented

*	Ticket	Description
	6475	The Chinese concrete box-section design requests have been updated to reflect the JTG 3362-2018 code. Also, the shear and crack-width calculations now evaluate the effective stress of the prestressed strands based on the actual forces carried by the tendon elements as determined from analysis. Previously this stress was calculated based on the total axial force in the section and center of gravity of the tendons. The new method is more accurate, but the change in results is small.
	6476	Bridge superstructure design of concrete box-girder bridges per the Chinese code have been updated to reflect the latest provisions of JTG 3362-2018. The shear and crack-width calculations also now evaluate the effective stress of the prestressed strand based on the actual force carried by the tendon, as determined from analysis. Previously this was determined from the reactive stresses carried by the concrete section.
*	7042	The AASHTO LRFD 2020 code is now available for bridge superstructure design and as a resistance code for bridge superstructure rating. Bridge sections considered include the composite steel I-girder and U-girder, composite precast I-girder and U-girder, concrete box girder, T-beam, and concrete flat slab.
	7146	A new parameter "Ignore proportion limits?" has been added to Steel I-girder and Steel U-girder AASHTO LRFD Fatigue superstructure design requests. Setting the parameter to "No" allows consideration of fatigue stress ranges even for older bridges that do not satisfy the AASHTO LRFD section-proportion criteria.
*	7599	An enhancement has been implemented for the Bridge Modeler, as well as for bridge design and rating, to allow the specification of longitudinal web stiffeners for steel I-girders and U-girders on a girder-by-girder basis. Previously longitudinal stiffeners were specified as a design parameter in the design and/or rating requests. Now longitudinal stiffeners are explicitly modeled in non-spine models, more precisely capturing the interaction with the web and the stress distribution throughout the composite section. This enhancement affects analysis results and applies to all design and rating codes for steel I-girder and U-girder bridge sections.
	7629	The calculation report for the AASHTO bridge superstructure flexural rating of steel I-girder bridges has been enhanced to clarify that the rating factor will be reported as zero when the AASHTO LRFD 6.10.7.3-1 requirement for ductility is violated. This is a clarification added in the calculation report – no results are changed. This affected the AASHTO LRFD Steel I Strength rating request for all supported versions of the AASHTO code.
	7791	A new parameter has been added to the bridge superstructure rating requests for concrete shear per the AASHTO LRFD code that now allows the option to NOT consider the resistance controlled by provided longitudinal reinforcement and tendons on the flexural tension side of the member when evaluating the rating factor. Previously this capacity was always considered, which is still the default, and this can produce a lower rating factor when it controls. The new option is available for the following AASHTO rating requests: Multicell Conc Box - Shear Rating, Precast I and U - Shear Rating, and Conc T Beam - Shear Rating.

Bridge Modeler

Enhancements Implemented

*	Ticket	Description
*	1113	The parametric definition of bridge tendons in the Bridge modeler has been significantly enhanced. Previously, bridge tendons were always defined with respect to the bridge centerline. Tendons could be copied to a girder, but the reference was still with respect to the centerline, and the tendons did not adjust with parametric changes to the girders. Now the following behavior has been implemented: (1.) Bridge tendons can be defined with respect to the bridge layout line or to any girder in the bridge object. (2.) Tendons lengths are measured along the specified reference line for that tendon (bridge centerline or girder line), whose lengths may be different from one reference line to another due to curve, skew, or parametric variation. Girder lengths are measured where the mid-surface of the web, even if inclined, intersects the top surface of the top slab. (3.) Tendon geometry is defined using segment lengths that may be specified as absolute or variable. Both length types use length units. When a reference line changes, either because the tendon is moved or copied, or because the geometry of the bridge object is changed, the tendon geometry is adjusted on a span-by-span basis by changing the variable lengths as needed to fit the new length, holding the absolute lengths fixed. If all lengths are either absolute or all fixed, then all lengths are adjusted proportionally within each span. (4.) When a reference line changes, only the segment lengths are adjusted. The specified vertical and transverse offsets remain the same, but now measured from the new or adjusted reference line. (5.) The operation "Copy to All Tendons" will not change the source tendon, even if it is already defined with respect to one of the girders. When the number of girders is not the same for all spans, the source tendon will only be copied to other girders which exist in the same span range as the source tendon. For models created in a previous version and opened in the new version, the following behavior can be expected: (a.) Tendon geometry will not change unless the bridge object is updated. (b.) Bridge tendons will remain referenced to the bridge centerline unless explicitly changed. (c.) All tendon lengths will be assumed to be of type variable, unless explicitly changed. (d.) Updating the bridge object will change the tendon geometry according to item (3.) above. In particular, tendon control points will correctly reflect the specified segment lengths, whereas in previous versions they could be affected by the skew of the section cuts. (e.) Updating the bridge object will not cause tendons to follow changes in the girder geometry unless the tendons are explicitly re-referenced to the girders. (f.) Tendons that are re-referenced to a girder will need a one-time change to their horizontal offsets to subtract out the distance between the original bridge centerline and the new girder line.

*	Ticket	Description
*	6689	The Bridge Modeler has been enhanced to provide the option of a "closure pour" at double-bearing bents to model live-load continuous behavior. This feature is available for precast concrete I-girder and Super-T bridge sections that are the same on both sides of the bent. Details include: (1.) A new bent type called "Double Bearing Live Load Continuous" that can be assigned to internal supports or used at abutments. A gap can be specified between the ends of the girders on either side of the bent. (2.) A new diaphragm type called "Closure Pour" that can only be used at "Double Bearing Live Load Continuous" bents. This diaphragm connects to the girders on either side of the bent, extends upward to the slab, and can optionally be extended transversely beyond the exterior girders. (3.) A new bridge group type "Closure Pour" with options "All" and "Guide". This group includes a "Closure Pour" diaphragm, the portion of the slab above the diaphragm and between the two bearing lines, and for option "All" the connections between the diaphragm and the girders. (4.) The Quick Bridge new-model template provides an option to model live-load continuous bents with closure pours, and will automatically create staged-construction load cases that add the girders along with "Closure Pour - Guide" groups, then pour the slab except at the bents, and finally add the full "Closure Pour - All" groups when the forms are removed from the slab. This simulates the girders being initially disconnected until the slab is poured and cured, after which full continuity is achieved. Similar load cases can be created to model other construction scenarios.
	7274	The default bearings generated by the Bridge Modeler for the Quick Bridge new-model template have been changed in the following significant ways: (1.) Two sets of bearings are now generated instead of the previous single set: (1a.) The previous bearing properties "Pinned", Roller", etc. are now called "Pinned (Fixed)", "Roller (Fixed)", "RollerLongit (Fixed)", etc. These properties designate the restrained degrees of freedom as "Fixed", which internally uses the very large stiffness values of 1.000e11 kN/m (6.852e09 Kip/ft) for translational degrees of freedom, and 1.000e11 kN-m/rad (7.376e10 kip-ft/rad) for rotational degrees of freedom. (1b.) A new, parallel set of bearing properties will also be created called "Pinned (Stiff)", "Roller (Stiff)", "RollerLongit (Stiff)", etc. These new properties designate the restrained degrees of freedom as "Partial Fixity", with specified stiffness values that are four orders of magnitude smaller than the fixed values. These are 1.000e07 kN/m (6.852e05 Kip/ft) for translational degrees of freedom, and 1.000e07 kN-m/rad (7.376e06 kip-ft/rad) for rotational degrees of freedom. The new values correspond approximately to the stiffnesses of a cubic meter or cubic yard of concrete, and are expected to be more realistic values for a fixed bearing than the "Fixed" values. (1c.) The new "Stiff" bearing properties will now be used in the generated template models. The previous "Fixed" bearings could, in certain cases, cause numerical sensitivity in the model, especially for spine models. This was not common, but is the reason for this enhancement. (1d.) Results for models created in the new version of CSiBridge could differ slightly from the same model generated in previous versions due to the reduced stiffness. Simply reassigning the bearings to use the "Fixed" bearing properties and updating the bridge object will produce the same results as for models created in previous versions. (1e.) Models created in previous versions of CSiBridge will not be affected when opened in the new version, since the previous bearing properties will not be changed. (2.) The default bearings have been changed to a pinned support for every girder at the start of each span and a longitudinal roller for every girder at the end of each span. This means that the transverse direction is now restrained at every girder at both ends of each span. Previously, the transverse direction was restrained at only one girder at each end of the span and free at the remaining girders. This allowed the girders to "breathe" transversely, but because the bearings were not the same at every girder, the support conditions created by the Bridge Modeler were less obvious to some users. This change only affects new models created using the Quick Bridge template. Existing models created in previous versions of CSiBridge will not be affected when opened in the new version. Note that template models are only intended as a convenient starting point. They should be reviewed by the engineer for their appropriateness for each individual structure that is being modeled, and modified as necessary to achieve the intended engineering goals.

Data Files

Enhancements Implemented

*	Ticket	Description
	7964	The following changes have been made to the Chinese materials library: (1.) GB steel materials have been updated and new material grades added. (2.) tendon materials in accordance with GB 50010 have been added.
	8169	The Russian material library has been updated to add materials from the latest standards SP 63.13330.2018 (concrete, rebar, tendon) and SP 63.13330.2017 (steel). The materials from the older standards, available previously, are still present in the updated library.
	8174	Two new Russian frame section libraries have been added to conform to the latest standards. These files are Russian2020_en.XML and Russian2020_ru.XML. The former contains the frame sections with names in the English language, and the later contains the same frame section with names in the Russian language, where applicable.

Design – Slab

Enhancements Implemented

*	Ticket	Description
*	2138	Several enhancements have been made to the Concrete Shell Design in accordance with Eurocode 1992-1-1:2004: (1.) Concrete shell design has been moved to the Advanced > Design menu. (2.) Design Preferences can be used to specify several design parameters, including the national annex. (3.) The design now includes iteration to calculate the design thickness of the outer layers and to determine the optimum amount of reinforcement. (4.) Design can now be performed for a single layer of reinforcement, assumed to be at mid-thickness, as well as for two layers (top and bottom reinforcement). (5.) Design is available for shells with variable thickness under the assumption that the cover remains constant within each element. (6.) Graphical display of the design results has been enhanced to provide more detailed information. (7.) Design results are now available in the database tables. Tabular results can be presented as envelopes, step-by-step, or with correspondence, depending upon the types of load cases and load combinations selected.

Installation and Licensing

Enhancements Implemented

*	Ticket	Description
*	7223	The version number has been changed to v24.0.0 for a new major release.

Structural Model

Enhancements Implemented

*	Ticket	Description
*	7585	AS3600-2018 is added to the types of time-dependent material properties available for concrete materials, supporting creep, shrinkage, and age-dependent stiffness behavior.
	7725	An enhancement was implemented to report the shear center location for certain frame-section properties. This value may be reported even in cases where it is not used for analysis. The shear center is only used for shear V2; only for Channel, General, cold-formed C and cold-formed Hat sections; and only if the option to consider the shear center is selected (see Ticket 7077 for this release).

User Interface

Enhancements Implemented

*	Ticket	Description
	7722	An enhancement was made to the display of frame property data to additionally show the location of the centroid and section moduli both on the positive and negative sides, as well as the warping constant when it has been computed.

Analysis

Incidents Resolved

*	Ticket	Description
*	7504	An incident was resolved where nonlinear static and staged-construction load cases could converge with equilibrium errors that were larger than expected when large external loads were applied. When this occurred, the errors were typically in a direction or region of the model not significantly affected by the external load. For example, horizontal reactions in one portion of the model may be out of balance due to large vertical loading in a different region of the model. The effect of this error was negligible for most models. Now equilibrium convergence is measured using the relative convergence tolerance times the magnitude of the internal forces, rather than the previous approach of considering the larger of the internal and external forces. This change will have no impact on most models, and will tend to increase iteration and improve equilibrium for other models. A few models that previously converged may now fail to converge under the tightened equilibrium requirements; this can usually be resolved by improving the stability or conditioning of the model. Note that the behavior of the pure event-to-event solution strategy is not affected by this change, except that the reported equilibrium error could be larger; no other results will be affected.

API

Incidents Resolved

*	Ticket	Description
	7414	An incident was resolved for the Application Programming Interface (API) that corrected errors that occurred when updating the database tables "Bridge Layout Line 1 - General" and "Bridge Object Definitions 01 - General" using the API function DatabaseTables.ApplyEditedTables. When these errors occurred, the data specified in the tables was not applied to the model.

Bridge Design and Rating

Incidents Resolved

*	Ticket	Description
	8089	An incident has been resolved for the bridge superstructure design and rating of steel U-girder bridges where the the enclosed area within the box section, Ao, was calculated incorrectly by including the area between slab and top flange of the steel U/tub girder. The impacted design and rating requests are: Steel U Strength (design and rating) and Steel U Constructibility (design) for all codes.
	8096	An incident has been resolved where the steel beam editor did not correctly set the I-girder web thickness. The web thickness was incorrectly set as the thickness of the bottom flange instead. This error happens only when the steel I-girder section is defined as an I/Wide-Flange section.
*	8175	An incident was resolved for the bridge superstructure strength design of steel I-girder bridge sections per the AASHTO LRFD code where the Demand-over-Capacity ratio of discretely braced compression flanges per Appendix A expression A6.1.1-1 was incorrectly calculated by using the absolute value of the entire numerator rather than just of the first term in the numerator. The effect of this error tended to be under-conservative. Now the Demand-over-Capacity ratio is evaluated correctly based on the code equation. Impacted Design Requests: Steel I Composite - Strength. Impacted codes: AASHTO LRFD all versions.

Bridge Modeler

Incidents Resolved

*	Ticket	Description
	7190	An incident was resolved for the Bridge Modeler where the ends of tendons in Super-T girders were sometimes not aligned with the ends of the girders themselves at skewed supports or for curved bridges. The ends of the tendons were always aligned along the normal the the layout line, while the ends of the Super-T girders followed the skew of the support. When this occurred, excessive deflections could occur at the ends of tendons that fell outside the girders. Prestress forces on the girders were affected near their ends, but were approximately correct for tendons modeled as elements.
*	7232	An incident was resolved for the Bridge Modeler affecting steel U-girder bridges, super-T bridges, and precast concrete U-girder bridges in which the transverse girder dimensions could be slightly smaller than the expected dimensions if the girders were modeled as straight instead of along the layout line and the bridge section cut orientation was not perpendicular to the straightened girder line. This error was proportional to the angle between the bridge section cut orientation and the straightened girder line.
	7269	An incident was resolved for the Bridge Modeler where the informational display of the section variation could be incorrect for a curved steel I-girder bridge with girders modeled as straight. When using the Show Section Variation button in the Bridge Section Variation Definition form and scrolling along the length of the bridge object, the top and bottom flanges of the steel girders were not located correctly within the cross section. This was a display error only and did not affect analysis and design results.
	7284	An incident was resolved for the Bridge Modeler where, for steel U-girder bridge models, the frame members of a U-girder interior brace-type diaphragm could be disconnected from the girder when the section-cut orientation at the diaphragm was nearly, but not exactly, perpendicular to the girder line. This was a rare case and typically happened near the mid span.
	7291	An incident was resolved for the Bridge Modeler where a bridge model containing multiple bridge objects that was updated as spine or solid model might display an error message "Error in Creating Analysis Model" during the process of creating analysis model, and when that occurred, superstructure results would then not be available in the superstructure response plots or database tables. This did not occur when updating the bridge model as area objects. Models with a single bridge object were not affected. Bridge superstructure design and rating were not affected.
	7409	An incident was resolved for the Bridge Modeler where the edge of the bridge deck generated for a concrete box girder bridge with both skew supports and parametric variation of the bridge width and/or girder spacing could show unexpected nonuniform variation. This appeared as a minor horizontal "zigzag" effect on the generated mesh at the edge of the deck for either area- or solid-object models. Spine models were not affected. The effect on results was insignificant.
*	7742	An incident was resolved where the stress calculation for a bridge object with a bridge section of type advanced concrete box girder could be incorrect when a non-zero top-slab vertical offset had been specified. This affected results as follows: (1.) For a bridge object modeled as a spine model, the stresses throughout the section could be incorrect near the beginning of each span for the affected bridge sections; (2.) For a bridge object modeled as any type (spine, area, solid), the stresses could be incorrect at the top surface of the top slab at the girder-web-centerline locations. When this occurred, the superstructure design and/or rating results using those stresses could be affected. However, the error was generally small, proportional to the ratio of the vertical offset to the depth of the section. By default, the top-slab vertical offset is zero, so most models were not affected. No results other than the above-mentioned stresses were affected. For models created in older versions of CSiBridge, it will be necessary to update affected bridge objects after opening the model in the new version in order to correct the section properties used to calculate these stresses.

*	Ticket	Description
	7953	An incident was resolved for the Bridge Modeler where the generated bridge object could be incorrect for a given span of a steel I-girder or U-girder bridges when the number of girders in any of the subsequent spans is greater than the number for the current span, and that span is shorter than the current span. This error could occur when the girder webs were modeled as shell objects. When this occurred, the effect was visually obvious, and results agreed with the model as generated.
	8116	An incident was resolved for the Bridge Modeler where staggered diaphragms for steel I-girder bridges were not being created in the correct location for the following cases: (1.) The distance used to locate a staggered diaphragm along a girder reference line was very close to a skewed support that also had a diaphragm, or (2.) There were more than 10 staggered diaphragms that each had one end very close to, or crossing, a skewed support. The workaround was to slightly increase the distance from the support or to change the reference line to a different girder where the diaphragm crossed further from the support.
	8127	An incident was resolved for the Bridge Modeler where steel I-girder sections that were edited in the Steel Beam Editor could produce very short non-prismatic segments -- shorter than the merge tolerance -- that would then produce an error when running bridge superstructure design and/or rating. When this occurred, design and/or rating results were not available. This typically could occur when the lengths specified for the different flange and web variations did not exactly align, producing very small segments. Now such short segments within the tolerance will be merged as expected.
	8140	An incident was resolved for the Bridge Modeler where, in the Steel Beam Editor form, the web clear-height dimension was not displayed correctly if the web height in a segment of a non-prismatic Steel U-girder was varied. When this happened, the web height at the end of the segment was displayed with the same dimension as at the beginning of the segment. If the OK button was clicked, the new constant height was applied to the segment. If the Cancel button was clicked, then no change was made and the variable web height was retained.

Data Files

Incidents Resolved

*	Ticket	Description
	7271	An incident was resolved where an error could occur while importing tendon data for a model that contained many precast I-girder and/or Super-T girder frame section properties. This affected the import from model text files (.B2K, .$BR) and models exported from CSiBridge in table format to Excel, Access, or .XML files.
*	7764	An incident was resolved where the depth and width of unequal angles imported form AISC15.xml, AISC15M.xml, AISC15.pro, and AISC15M.pro libraries were switched. Consequently, the program was showing the longer leg as horizontal but the section properties in the database were based on the longer leg being vertical. This was an issue in the section database itself and has now been addressed. No other section libraries were affected by this bug. Older files that use unequal angles from the AISC15 databases will have the error corrected when opened in the new version by reimporting the section. Older versions of the program can replace the AISC15 databases in their section libraries and reimport any unequal angles used in the models.
	8145	An incident was resolved where the material data for the Spanish region was not available for versions 23.3.0 and 23.3.1. This was caused by an invalid character in the library file that has now been fixed. Note that the corrected library file also includes corrections to the thermal coefficients as previously reported for v23.3.0 under Ticket 7175.

Database Tables

Incidents Resolved

*	Ticket	Description
	7426	An incident was resolved where in rare cases the software would terminate when attempting to export tables to Excel from the form shown with the Display > Show Tables command. This is believed to be related to freezing rows in the generated Excel file if the Excel application was in a certain display state.
	7852	An incident was resolved where export to “MS Excel spreadsheet .xls File” operation was limited to 100 rows per bridge object/girder per load case/combination for the tables Bridge Object Forces and Bridge Object Girder Forces, and when this limit was NOT exceeded, only results for the last load combination (or if none present, the last load case) from the selected load cases and combinations were exported. When this occurred, some results were omitted, but all exported results were correct. This issue affected the two bridge-object tables for versions 23.3.0 and 23.3.1.Prior versions were not affected.

Documentation

Incidents Resolved

*	Ticket	Description
	7651	An incident was resolved to correct a typographical error affecting AASHTO Eq. 5.7.3.5-1 in the various AASTHO superstructure design manuals. This was a documentation error only and did not affect the superstructure design results.

External Import and Export

Incidents Resolved

*	Ticket	Description
	7330	An incident was resolved where import of DXF files did not always import all expected objects from the DXF file. This only affected v23.3.0.

Loading

Incidents Resolved

*	Ticket	Description
*	6538	An incident was resolved where floating-axle loads specified for vehicles were not properly applied in the following cases: (1.) When the floating-axle loads for moment response and other response were specified as equal values, floating axles loads were not being doubled for computing negative span moments even if that option was selected on the vehicle definition. This could be under-conservative for negative moments if doubling was requested. (2.) When the floating-axle loads for moment response and other response were specified as non-equal values, floating axles loads were always being doubled for computing negative span moments even if that option was not selected on the vehicle definition. This could be over-conservative for negative moments if doubling was not requested. These two conditions could affect the bridge superstructure negative major moment M3, and the response component for any object (frame, joint, shell, etc.) for which the Vehicle Response Component was assigned to be "AASHTO H, HS, and HL - Superstructure Negative Moment over Supports". Note that the use of floating axle loads is not common. They are primarily used in older AASHTO H and HS Lane load vehicles, where the two load values are expected to be different and the load is expected to be doubled for negative span moments. Hence behavior was correct for the built-in vehicles and for reasonably expected modifications of them.

*	Ticket	Description
*	7857	An incident was resolved for the Bridge Modeler where bridge point, line, and area loads of type moment (rather than force) would be lost when applied to a bridge object updated as solid objects, since solid objects do not have rotational/moment degrees of freedom. When the analysis was run using the standard solver, the .LOG file would report zero rotational stiffness at joints connected to the loaded solid objects. Automated bridge wind loads on the structure and wind loads on live load would generate such moments due to the eccentricities, and hence could also be affected. Now moment-type point, line, and area bridge loads are converted to force couples when they act on solid objects. Bridge objects updated as spine or area objects were not affected. Note that only certain types of bridge sections can be updated as solid objects.
*	7960	An incident was resolved for auto Eurocode bridge wind loading in which the basic wind speed, vb, that was input on the load pattern form was being ignored and instead a default of 70m/s was used. This default wind speed was overly conservative in the majority of cases.
*	8135	An incident was resolved where the behavior of an area element with a nonlinear layered-shell section property subjected to temperature loads was incorrect: In linear analyses, temperature loads were applied in both in-plane translational degrees of freedom in membrane- and shell-type layers even if the degrees of freedom were set as inactive. This behavior has been corrected so temperature loads only affect the active degrees of freedom of each layer. For a linear analysis where the stiffness of the layer was significantly different from the elastic stiffness of the material property assigned to the layer, the behavior of the layer under temperature load could be incorrect. This could occur if the layer had inactive or nonlinear degrees of freedom and the material had a non-zero Poisson's ratio, or if the linear analysis used the stiffness from the end of a nonlinear analysis. The magnitude of the error was proportional to the difference between the stiffness of the layer and the elastic stiffness of the material property assigned to the layer and, in most cases, was small. This issue has been corrected. Nonlinear static load cases with an Event-to-event only solution scheme could have additional equilibrium errors when temperature loads were applied. This only occurred for nonlinear layered shells and has been resolved. The behavior of other types of shells, such as the thin and thick shell, were not affected by this issue.

Results Display and Output

Incidents Resolved

*	Ticket	Description
	7417	An incident was resolved where the plot of the bridge superstructure response (Display > Show bridge Superstructure Forces/Stresses) was blank or zero for concrete solid-girder bridge sections when the Entire Bridge Section was selected. The results for the individual girders and for the Entire Section plus All Girders were displayed correctly. After displaying the results for individual girders or all girders, changing back to Entire Bridge Section would continue to show the last results displayed for the girder(s). This was a display issue only. Plots of the forces, stresses, and displacements were affected.
*	7591	An incident was resolved where beam and/or slab moving-load response plots for bridge objects modeled using area objects could be incorrect or incomplete when displayed on the Bridge Object Response Display form if more than one thread was used for response recovery. Correct results could be obtained by setting the Number of Threads for Response Recovery to 1 using the command Analysis > Analyze > Design/Response Recovery Options. When this error occurred, the effect was usually visually obvious. This error did not affect the results presented in tables or used for design. Additional Issue: An incident has been resolved for plotting Tee Beam bridge girder stresses when the Tee Beam bridge was updated as a solid-object model. There was no problem for the area-object model. An incident has been resolved for plotting the envelope stress for Super-T bridge girder top flange stresses.
*	7899	An incident was resolved where the bridge girder stresses were plotted as zero for Concrete Tee-Beam bridge sections when the bridge object was updated as a solid-object model. This did not affect the results when the bridge object was updated as an area-object model. Bridge girder forces were not affected. These plots are accessed using the command Home > Display > Show Bridge Superstructure Forces/Stresses.

*	Ticket	Description
	7900	An incident was resolved where the bridge stresses were plotted incorrectly for Super-T bridge sections when displaying the component "Longitudinal Stress Envelope - Top (S11)" for any of the beams (i.e., the Super-T members themselves, without the slab). In particular, the displayed maximum and minimum values at each station would correspond to one of the stress points at the top of the beam, but they would not necessarily be either the max or min values. No other stress results were affected. These plots are accessed using the command Home > Display > Show Bridge Superstructure Forces/Stresses.
	8066	An incident was resolved where the Bridge Object Response Display form (command Home > Display > Show Bridge Superstructure Forces/Stresses) and the tables "Bridge Object Forces", "Bridge Object Girder Forces", and "Section Cuts" were unable to display analysis results for Hyperstatic load cases for bridge objects updated as a solid model when viewed after running the analysis as a separate process or after opening a model with saved results. This was a display issue only. No results were affected.

Structural Model

Incidents Resolved

*	Ticket	Description
	7499	An incident was resolved for where a only a single frame-section property was being created for all the piles of all advanced-foundation properties, even if the pile-section dimensions were not the same in the different advanced foundations. Results agreed with the model as generated using the single frame-section property for all the piles. Models opened in the new version can be corrected by updating bridge objects that contain advanced foundations, or by reassigning advanced foundations to joints that are not part of a bridge object. This process is not necessary if all advanced foundation properties use the same pile section.
	7573	An incident was resolved where the shrinkage strain calculated using the Eurocode 2-2004 type time-dependent material property was larger than expected. This issue occurred due to an extra square root in the calculation for the beta_ds factor. Analysis results were consistent with the documentation, which was also incorrect. Both the shrinkage behavior in analysis and the documentation has been corrected to be consistent with Eurocode 2-2004.

User Interface

Incidents Resolved

*	Ticket	Description
	6277	An incident was resolved where the numerical data stored for advanced foundation properties could be corrupted if the model was opened when the Windows regional setting for the decimal symbol was different from that when the model was saved, for example, changed from period (.) to comma (,). In particular, the stored decimal symbol would be removed and any fractional part to the right of the decimal would be treated as part of a whole number. This issue has been resolved for models saved in the new version. However, the following procedure must be followed to open an old model if the decimal symbol is to be changed: Open the model in the new version on a machine with the decimal setting that matches that used when the model was last saved in the previous version, then save the model in the new version. The newly saved model can then be opened on any machine regardless of the decimal setting.
	7661	An incident was resolved where an abnormal termination could occur when defining a multi-step vehicle live load pattern and trying to add the second vehicle to the list of loads if the lanes for the first vehicle and the second vehicle were both of the floating-lane type. This did not affect influence-based moving load cases, only the multi-step live load pattern.
*	8115	An incident was resolved where an abnormal termination of the software could occur when adding or modifying a load pattern of type Train Live if no rail tracks were defined in advance. Now a warning message is provided instead that rail tracks and vehicles are required before defining this type of load pattern.