CSiBridge® 2014 (Version 16.0.0)
Release Notes

Notice Date: 2013-08-05

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

Changes from v15.2.0 (Released 2012-01-04)

User Interface
Enhancements Implemented

*	Incident	Description
*	46214	The memory capacity has been increased for the graphical user interface, allowing larger models to be handled. For 32-bit operating systems, the maximum accessible memory has been increased from 2GB to 3GB, provided that the 3GB operation is enabled in the boot.ini file of the operating system, which should be done by an I.T. professional. For 64-bit operating systems, the maximum accessible memory has been increased from 2GB to 4GB, without the need for any changes to the operating system.
	53824	For the Construction Scheduler, the Define/Edit Operation form has been modified to make it easier to work with longer names for objects, groups, and load cases.
	55199	A new Offset View option is available for the Set Display Options command that shows the offset position of frame objects or elements with insertion points and shell objects or elements with joint offset overwrites. The offset location is drawn connected to the end joints in their original locations, which are not offset. This view also allows the plotting of the local axes as they are transformed to account for the offset location. The "CSI Analysis Reference Manual" has been updated to better describe how the object local axes are transformed to account for the case where the frame or shell object after offset is not parallel to its original position before offset.

Modeling
Enhancements Implemented

*	Incident	Description
	39998	General groups created by the bridge modeler are now more tightly tied to the bridge group from which they are generated. Previously, changing the name of the general group would disconnect it from the corresponding bridge group, and vice-versa, such that a new general group would be generated next time the bridge object was updated. This could disconnect the bridge group from other definitions such as staged-construction load cases and user-defined section cuts that used the general group. Now, the bridge group and general group remain connected regardless of name changes.
*	46082	A new link property has been added to represent the triple-pendulum isolator (bearing). This bearing has four spherical sliding surfaces that act as three independent friction-pendula in series. By adjusting the friction coefficients, radii, and edge stop distances of the sliding surfaces, this bearing can produce multiple levels of stiffness and energy dissipation to accommodate a range of seismic excitation.
	46373	Hybrid built-up steel U girders have been added as a new type of frame-section property. The shape is singly-symmetric. Separate steel materials may be specified for the top flanges, bottom flange, and webs.

*	Incident	Description
	49920 52464	Tendons have been enhanced to allow the modeling of straight external tendons. Joints of a discretized tendon that are not contained within the bounding box of any frame, area, or solid element that is a member of the group associated with the tendon will be treated as external if: (1) they are not one of the two end joints of the tendon, and (2) the tendon is straight at that joint. Such straight external portions of a tendon will normally exhibit constant axial force under analysis. The end joints of a tendon will always be connected to the nearest frame, area, or solid element if they are not contained within a bounding box. Likewise, interior joints that are not contained within a bounding box but are at a curved or kinked region of the tendon will be connected to the nearest bounding box. Previously such interior joints were connected to the nearest bounding element regardless of whether the tendon was straight or not.
	55445	New built-in materials have been added for the U.S. standard ASTM A709 (steel) and ASTM A772 (tendon), and these are now the defaults for the United States Region.

Bridge Modeler

Enhancements Implemented

*	Incident	Description
*	27804	The precast I-girder bridge deck section now permits the use of nonprismatic girders and staggered diaphragms. Each girder is defined as a nonprismatic frame section property composed of precast I-girder segments that may vary within and between the segments. The nonprismatic variation is considered for analysis, design, and rating. However, code-based live-load distribution factors (LLDF) do not account for non-prismatic girders, so the LLDF must be calculated from analysis or directly specified by the user. Diaphragms may be defined between any adjacent pair of girders or across the full section. The depth of the diaphragms is adjusted for the nonprismatic variation of the girders.
	40580 41646 51059	Parametric variations defined in the Bridge Modeler may now be applied to the entire bridge object as well as to individual spans. This makes it easier to guarantee compatible geometry across skew bents by using the same variation for multiple spans. In this case, the distance defining the variation is measured from the start abutment rather than from the start of the individual spans.
*	46746	A new type of bridge section has been added to the Bridge Modeler to represent composite steel U-girder superstructure sections. This section is composed of a concrete deck and one or more steel U girders that use the new "hybrid U built-up steel" frame-section property. The steel frame sections may be nonprismatic to account for changes in plate thickness. The U-girder may be modeled as shells or mixed. Diaphragms (cross-frames) may be assigned along the length of the spans, and they may be internal (inside the U girder) or external (between girders). Cross-frames are restricted to be normal to the axes of the U girders. Top lateral bracing may be specified of Warren, Pratt, and X types.
	49847	The section-cut discretization at skewed double-bearing bents is now created parallel to the bent at the two lines of bearings. This ensures that the bearings connect to the girders directly below a discretized section cut for zero grade. Previously the section cut was not always parallel to the bent, and the connector between the bearing and the girder could be inclined. This had a minor effect on results, although equilibrium was maintained. With non-zero grade, the connectors may still be inclined, but they will be parallel to each other and the section cut line at the top of the deck will still be vertically above the bearings.
*	52066	The Bridge Modeler has been enhanced to automatically assign vehicle response components (VRCs) to all bents to specify that the forces in the bearings, columns, caps, and ground supports are to be computed for those vehicles intended only for calculating negative moments and the forces at interior support, such as the AASHTO HL-93S vehicle. Bent properties assigned at the end of a bridge object will be assumed to be part of a larger bridge and will be treated as interior. Unlike previous versions where the influence line was used to determine if a response quantity corresponded to an interior support, now all response quantities assigned VRCs for interior supports will report non-zero values if loaded.

*	Incident	Description
	52813	Connection plates may now be included in the definition of diaphragms (cross-frames) of beam or brace types for use with steel I-girder and U-girder bridge sections. The connection plates are modeled as frame objects in the plane of the diaphragm between the top and bottom flanges of the girders when the webs are modeled as area objects; otherwise they are omitted.

Loading

Enhancements Implemented

*	Incident	Description
	41612	The built-in vehicles for the Indian IRC code have been updated as follows: (1) Load values previously specified in KN and KN/m are now specified in tonf and tonf/m units. Because of the rounded values previously used, the net effect of this change is to reduce the load by the factor 0.9807. The new values are in conformance with the code. For example, the value 700KN previously used has become 70 tonf, which is equal to 686.5 KN. (2) Concentrated (axle) and uniform loads were previously specified as having no width. Loads are now created with two-point or uniform distributions across the width of the vehicle. (3) An error was corrected for the Class AA Tracked vehicle "IRC_AA_T" where the total load was given for the uniform load value, whereas it should have been distributed over a 3.6 meter length. This means that the load applied was 3.6 times larger than intended. (4) The names of the vehicles have been changed slightly for improved clarity.
*	43405	Ground-displacement loading assigned to a joint will now act through single-joint links connected to that joint. Previously ground displacement loading only acted at joints connected to ground by joint restraints or joint springs. Joint reactions were previously reported at joints connected to ground by restraints, springs, and single-joint links, and this has not changed. Similarly, base reactions were previously calculated as the sum of the reactions at all joints connected to ground by restraints, springs, and single-joint links, and this also has not changed. Previous models with ground-displacement load applied to joints connected to single-joint links may now produce different results than in previous versions.
*	48510	The application of loads specified in the local coordinate system of a frame object has been changed for the case where the assigned frame insertion points change the direction of the local-1 axis. This can occur when the joints offsets are not equal at the two ends or for certain cases where non-centroidal cardinal points are assigned to a non-prismatic object. Previously the loads were applied in the direction of the local axes as calculated for the frame orientation based on the joint locations, i.e., before considering the insertion points. In addition, distributed loads and self-weight were based on the length before offsets. This was consistent with how the loads were displayed in the graphical user interface. Now the loads will be applied in the direction of the local axes as calculated for the frame after the insertion points are considered, and will be based on the length after offset. This is consistent with how the loads are now displayed in the graphical user interface when the new "Offset" display option selected. When the "Standard" display option is selected, the loads are displayed in the nominal coordinate system as before. This change does not affect the common cases where loads are applied in the global or other fixed coordinate system, or where the neutral axis remains parallel before and after considering the insertion points. Models with unequal frame insertion points may produce somewhat different results from previous versions, although the effect will usually be small.

*	Incident	Description
*	52903	The AASHTO load combinations generated for bridge design have been enhanced as follows: (1) The Vehicle Live design type for load patterns and load cases have been supplemented by three new types - Permit Vehicle Live, Vehicle Fatigue, and Permit Vehicle Fatigue. (2) Any moving load case containing an AASHTO fatigue vehicle will be assumed to be of type Vehicle Fatigue; any moving load case containing a Caltrans permit fatigue vehicle will be assumed to be of type Permit Vehicle Fatigue; any moving load case containing a Caltrans permit (non-fatigue) vehicle will be assumed to be of type Permit Vehicle; all other moving load cases will be assumed to be of type Vehicle Live; the user can overwrite the load case type. (3) Bridge-design load combinations defined for the AASHTO 2007 code will generate a single Fatigue limit state that does not distinguish permit vehicles. (4) Bridge design load combinations defined for the AASHTO 2012 code will generate two fatigue limit states. (5) Other minor differences in the load combinations between AASHTO 2007 and 2012 are implemented. (6) An option for modifying the AASHTO load combinations to conform with Caltrans specifications has been provided. This will generate two fatigue limits state for both the AASHTO 2007 and 2012 codes, and will modify other load factors as required. (7) These changes only affect load combinations generated in the new version. Previously generated load combinations in existing models are not changed.
*	54587	Automated response-spectrum functions have been added according to the AASHTO 2012 code.
	56545	The area load assignment "Uniform Load to Frame" has been enhanced to allow exclusion of specified frame members from accepting the load transfer from the area objects. This is done using a new assignment, Load Transfer Options, for the frame object. The default frame assignment is to allow load transfer to the frame object, as was the behavior in previous versions.
*	56546	Automated lateral loading has been added according to the IBC 2012 code. This includes seismic loads and response-spectrum functions.
	56547	Automated lateral loading has been implemented according to the Italian NTC 2008 code. This includes seismic loads and wind loads. NTC 2008 response-spectrum functions had previously been implemented.
	56549	Automated lateral loading has been implemented according to the Turkish TSC 2007 code for seismic loads and response-spectrum functions, and the TS 498-97 code for wind loads.

Analysis

Enhancements Implemented

*	Incident	Description
	37686	New command-line arguments have been added for running CSiBridge via batch files. The option /U updates all bridge objects before performing analysis or design. The option /B PQR runs the various types of bridge design, depending on the presence of the parameters P (superstructure design), Q (seismic design), and R (rating). When bridge seismic design is requested, it will always be run first before any other requested analysis and design. Any database tables requested under Analysis Options will be exported after all analysis and design have been run.
	46354	The undeformed shape of the structure can now be plotted for staged-construction load cases without the need for running the analysis. These plots show the objects that will be present in the model at each stage of the analysis. The load-case tree display is used to select the load case and stage for plotting. Using this display, load cases that depend on staged construction load cases will also show only the active structure in the undeformed shape.
	46825	The number of time steps that can be run in a single linear or nonlinear (FNA) modal time-history load case has been increased. Previously the number of time steps could be limited if the model had a large number of link elements. Now the number of link elements has no direct impact on the number of time steps that can be run in a single modal history load case.

*	Incident	Description
	48270	A new type of special-purpose loading, called Load Inertia, is available for response-spectrum and Ritz modal analysis. This is not intended for general use. The primary purpose of this loading is to capture the vibrational response due to ground displacement, and is intended to be used as part of larger specialized procedures such as fault-rupture analysis and multi-support response-spectrum analysis. Load-inertia loading references a load pattern and applies an inertial force at each degree of freedom that is equal to the product of its mass and the linear static displacement due to that load pattern. It is expected that the specified load pattern applies ground displacement loading, but this is not required. Response-spectrum cases may apply either standard ground acceleration or load-inertia loads, but not both. When load-inertia loading is used, the prerequisite modal case must be of type Ritz and must apply the same load-inertia loads.
	49271	The "Auto" Analysis Process Option that can be set using the command Analysis > Analysis Options > Solver Options has been changed so that models with more than 1500 joints in the analysis model will be run as "Separate Process", while smaller models will be run as "GUI Process". Previously the "Auto" option was basing the choice on the amount of available memory. For most newer systems with more memory, this had the practical effect that many larger models that would benefit from being run as "Separate Process" were instead being run as "GUI Process".
*	50240	The analysis of certain non-symmetrical frame sections now accounts for coupled bending due to the product of inertia, I23, and for the coupling between major shear (V2) and torsion when the shear center is not located at the centroid of the section. Section types that include the product of inertia are angles, cold-formed Z sections, Section Designer sections, and bridge sections generated by the bridge modeler. The major shear-center eccentricity is included for the channel section. Both the product of inertia and the major shear-center eccentricity may be specified by the user for general frame sections. In order to account for the proper orientation of angle sections, it is now possible as part of the frame insertion-point assignment to specify that the section is mirrored about the frame local-3 axis as well as the local-2 axis. Mirroring about the local axes also mirrors the frame axial stress points for all sections, which was not previously the case. Analysis results for sections having a non-zero product of inertia or major shear-center eccentricity may now differ from those produced by previous versions, although the effect on forces and moments is generally small in most structures. Steel frame design and cold-formed frame design are not affected except as may due to changes in analysis results. Steel frame design was already accounting for the rotated principal axes of bending for angle sections as documented for the various codes.

Frame Design

Enhancements Implemented

*	Incident	Description
*	43717	The specified concrete strength as used for Chinese materials and design codes has been changed to refer to the characteristic strength, whereas in CSiBridge v15 and earlier versions the concrete strength referred to the grade. The built-in Chinese concrete materials have been changed accordingly, and so have the concrete frame design checks. For example, the Chinese material C30 previously specified the strength as 30 N/mm^2, but now specifies the strength as 20.1 N/mm^2. Models created in v15 and prior versions that are opened in v16 will have the concrete strength of ALL concrete materials converted from grade to characteristic strength if the concrete frame design preference in the older model specifies the Chinese code. This should have no effect on the results between versions for Chinese design. Users should review the concrete materials carefully when first opening a model from an older version in v16 if the concrete frame design was set to use the Chinese code.

*	Incident	Description
	44415	Memory usage has been improved to reduce the likelihood of a memory error message being generated for one or more frame members while running frame design when a large number of load combinations are defined in the model. Design results were unavailable for those members that generated such an error message. Results for other members were not affected. For 32-bit operating systems, the maximum accessible memory has been increased from 2GB to 3GB, provided that the 3GB operation is enabled in the boot.ini file of the operating system, which should be done by an I.T. professional. For 64-bit operating systems, the maximum accessible memory has been increased from 2GB to 4GB, without the need for any changes to the operating system. However, it may still be possible to exceed the memory capacity of the software depending upon the computer system and characteristics of the model.
*	53429	Steel frame design has been implemented according to the American "AISC 360-10" code, including the seismic provisions of the AISC 341-10 code.
*	53433	Concrete frame design has been implemented according to the American "ACI 318-11" code.

Bridge Design and Rating

Enhancements Implemented

*	Incident	Description
*	39773	Design checking has been implemented for steel superstructure sections according to the "Eurocode EN 1994-2" code (EN 1994-2:2005, Eurocode 4: Design of composite steel and concrete structures - Part 2: General rules and rules for bridges). Superstructure types supported include steel I-girders and hybrid I-girders with composite and non-composite concrete deck. Separate design checks are provided for strength, serviceability, and constructability. The effect of mild reinforcing is included. Live-load distribution factors can be automatically calculated using code formulae, specified by the user, or determined from detailed 3-D live-load analysis. Design results are displayed graphically for the entire section or on a girder-by-girder basis. Detailed tables showing all results and intermediate values are available for display, printing, and export to Excel or Access. Interactive modification of girder sizes and stiffener locations can be performed for rapid optimization of the design.
	37609 53313	The following AASHTO 2007/2012 design checks have been enhanced to account for user-defined shear reinforcement specified for the bridge object: (1) ConcBoxSegmental Shear, (2) Multicell ConcBox Shear, and (3) PrecastComp Shear. Previously these design checks ignored any user-specified shear reinforcement, reported the Demand/Capacity ratio for concrete only, and determined the total amount of reinforcement required. Now these checks report the Demand/Capacity ratio for concrete plus any user-specified reinforcement, and determine the amount of additional reinforcement required, if any.
	37689	Bridge seismic design has been enhanced so that users can choose whether or not to delete program-generated items when the model is unlocked or the design results are deleted after running automated bridge seismic design. Such program-generated items include load cases, load patterns, groups, hinge properties, etc. Previously these items were always deleted, making them unavailable for purposes other than bridge seismic design. If the program-generated items are still present in the model next time bridge seismic design is run, and the user chooses not to delete them, they will be retained and new program-generated items will be created that do not overwrite the previous definitions.
*	38895	Automated bridge seismic design is now available for steel columns according to the AASHTO Guide Specifications for LRFD Seismic Bridge Design, Second Edition, 2011. This follows the same general procedure already available in CSiBridge for concrete columns. When hinges are used for pushover analysis (Seismic Design Category D), they may be specified as automatic FEMA 356 PMM hinges, automatic fiber hinges, or user-defined. Supported steel column sections are I-girders for FEMA 356; I-girder, box and pipe for fiber; and any section for user-defined hinges.

*	Incident	Description
*	42167	A new type of automated bridge seismic design has been added for bridges crossing fault-rupture zones, following the procedure develop by the California Department of Transportation under Caltrans Memos to Designers 20-8. The fault rupture zone can be defined as a planar fault crossing the bridge object at a specified location and orientation, with rigid-body motion on either side, or as generalized displacement loading defined by the user. The displacement demand on the substructure is calculated by performing a nonlinear static analysis of the bridge under the specified rupture motion, combined with a linear response-spectrum analysis of the structure due to vibration caused by the rupture. The capacity of the substructure (bents and columns) is calculated following the same procedures used by the AASHTO seismic bridge design procedure. A report is produced showing all input, demands, capacities, and the final demand/capacity ratios for the substructure components.
*	42405	Design checking has been implemented for steel superstructure sections according to the Canadian "CAN/CSA-S6-06" code. Superstructure types supported include steel I-girders and hybrid I-girders with composite and non-composite concrete deck. Separate design checks are provided for strength, serviceability, and constructability. The effect of mild reinforcing is included. Live-load distribution factors can be automatically calculated using code formulae, specified by the user, or determined from detailed 3-D live-load analysis. Design results are displayed graphically for the entire section or on a girder-by-girder basis. Detailed tables showing all results and intermediate values are available for display, printing, and export to Excel or Access. Interactive modification of girder sizes and stiffener locations can be performed for rapid optimization of the design.
*	42689	Design checking has been implemented for concrete superstructure sections according to the India Roads Congress code IRC:112-2011 ("IRC-2011"). 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 using MCFT (modified compression field theory). 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.
*	45735	Design checking has been implemented for U-section steel-girder composite bridge superstructures according to the “AASHTO LRFD 2007” code with the 2008 interim revisions, and the “AASHTO LRFD 2012” code. Design checks are currently available for the Strength, Service, Fatigue, and Construction limit states. Design requests are defined that allow overwriting the code-default values of all input parameters used in the design calculation. The Strength design request may follow either Section 6 of the code or Appendix A; the latter allows qualified sections to take advantage of developing flexural resistance significantly greater then yield moment. 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.

*	Incident	Description
*	47718	The AASHTO bridge superstructure design has been updated to use the latest code: AASHTO LRFD Bridge Design Specifications, Sixth Edition, 2012. The 2007 version has been retained.
*	47719	The AASHTO bridge seismic design has been updated to use the latest code: AASHTO Guide Specifications for LRFD Seismic Bridge Design, Second Edition, 2011.
	47720	The AASHTO bridge load rating has been updated to use the latest code: AASHTO The Manual for Bridge Evaluation, Second Edition, 2011. The previous version has been retained.
*	48142	A new option has been added to the Bridge Modeler to allow specification of the point of inflection (contraflexure) in bridge bent columns for use in determining the hinge length to be used for automated bridge seismic design. This affects the capacity calculations for Seismic Design Category (SDC) = B or C, and affects the pushover results for SDC = D. Separate locations may be specified for the longitudinal and transverse directions, although only one can be used at a time for seismic design, as determined by the bridge seismic design preferences. The default location for new models is at the top of the column. For models created in versions prior to v16, the default location will be set to the mid-height of the column so that top and bottom hinges both use the half the column for the tributary length. This will produce the same results as in the prior version for SDC = B or C. However, for SDC = D the new results will show less ductility because prior versions were using the full height of the column, including the end offset within the bottom half of the bent cap. This can be changed by the user after opening the model in v16. As a further enhancement, each bent column may specify the type of hinge to be used (auto, user-specified) when generating the bridge seismic design model.
	48680	A new design parameter "Do webs include longitudinal stiffeners" has been added for the AASHTO LRFD Steel I-girder Bridge Service design check. This parameter determines the allowable slenderness ratio for the webs. This same parameter was already available for the AASHTO LRFD Steel I-girder Strength and Construction design checks.
	48874	For the AASHTO design and rating of steel I-girder bridges, new capacity parameters have been added to certain design/rating requests to satisfy Article 6.10.6.2.2 of AASHTO 2008 and 2012: Composite sections in kinked continuous or horizontally curved steel girder bridges shall be considered noncompact sections and shall satisfy the requirements of Article 6.10.7.2. Affected are the Steel I Composite Strength Design Check request, and the Steel I NonComposite and Composite Strength Rating requests. The new parameters specify whether the bridge object is curved or straight for positive flexure; this may be user-specified or program determined. If program determined, any change in bearing at any section cut is causes the entire bridge object to be considered as curved. Negative flexure is also affected: Appendix A will only be used if requested by the user, the section is compact, and the bridge is straight.
	50103	For AASHTO Shear Rating, the procedure used to determine amount of provided vertical reinforcement at a section cut has been revised. Previously the amount of vertical rebar over the distance d (effective shear depth) both before and after the section cut was averaged. The new procedure is the same, except that when the distance d falls within an adjacent span the rebar in the adjacent span is not counted towards the average. The impacted rating requests are: AASHTO Multicell ConcBox Shear and AASHTO Precast Comp I Shear.
*	55399	Load combinations have been added for bridge design according to the Indian code IRC:6-2010, Standard Specifications and Code of Practice for Road Bridges, Section II (Fifth revision).

Results Display & Output

Enhancements Implemented

*	Incident	Description
*	32597	Plotting of tendon forces and losses has been enhanced as follows: (1) When defining a tendon object, the distribution of axial force or stress along the length of the tendon may be plotted for each load pattern, showing the values before seating, after seating, and after other losses. (2) After running the analysis, for tendons modeled as elements, the force or stress response can be plotted for any load case and compared with the previous plots for the load pattern. The response from the analysis load case inherently includes all losses.

*	Incident	Description
	35419	Analysis results for staged-construction load cases are now identified by a step label as well as the step number. The step label includes the name or number of the stage, the step number within the stage, and the age of the structure for time-dependent load cases. The step label is shown in the window title for plotted results, as a new column in the database tables, and is available through the new Open API function SapModel.Results.StepLabel.
	47598	Mass participation ratios for the rotational acceleration loads (RX, RY, and RZ) have been changed so that they are now reported with respect to the centroid of the structure. Previously they were reported with respect to the global origin, which meant that the values could be different for different locations of the structure. With this enhancement, the rotational mass participation ratios are more meaningful because they do not include any contribution from the translational accelerations. This change also affects the participation factors and the modal load participation ratios reported for the rotational accelerations. Participation factors and ratios for the translational acceleration loads (UX, UY, and UZ) are not affected. The results of response-spectrum or time-history load cases that use the modes are not affected.

Application Programming Interface
Enhancements Implemented

*	Incident	Description
	40323	New Open API functions have been added to set and get the definition of sections cuts, as described in the CSI_OAPI_Documentation Help file under topic CSi OAPI Functions > Definitions > Section Cuts. Open API functions to get section-cut results were already available.

External Import/Export
Enhancements Implemented

*	Incident	Description
	50342	The import of StruCAD*3D models has been enhanced to allow the import of the Cb, Cm, and unbraced-length design overwrites from the GRUP and MEMBER cards.

Installation & License
Enhancements Implemented

*	Incident	Description
*	41627	Licensing has been upgraded to the latest SafeNet version, providing support for virtual servers, and allowing more flexibility for using commuter licenses.

User Interface and Display
Incidents Resolved

*	Incident	Description
	40181	An incident was resolved where an error message was generated when clicking in a graphics window after using the command Orb > Report > Report Setup if that graphical window had the model displayed with the Object Shrink Toggle turned on. No results were affected.
	42524	An incident has been resolved where selecting objects by material property did not select nonprismatic frame objects if the material(s) selected were not being used in the first segment of the nonprismatic frame section property. No results were affected.
	43792	An incident has been resolved where moment-type loads specified in the "Bridge Xxx Load Distribution Definition Data" form, where "Xxx" is "Point", "Line", or "Area", were not being properly converted for length units. Moment loads were being converted as if they were force loads. The per-unit-length for line loads and the per-unit-area of area loads were being properly converted, but not the moment-arm length for moments. The error was obvious when the loads were displayed in database units, i.e., the units used for analysis and for which the model was initially defined.

*	Incident	Description
	44383	An incident was resolved for the Construction Scheduler where an exception (runtime error) error was generated when trying to edit load scale factor in an environment that uses decimal comma instead of decimal point. No results were affected.
	49093	An incident has been resolved where an exception (run-time error) could be generated when clicking the button "Show Stages in Tree View" on the form for defining a stage-construction load case that was using the operations "Flag Composite" and/or "Unflag Composite". No results were affected.
	49513	An incident was resolved where the stress-strain curve for concrete materials did not display when using the command Components > Type > Material Properties and choosing the Mander confined option for the stress-strain display under Advanced Property Display > Nonlinear Material Data. This was a display issue only. No results were affected.
	49684 51462	An incident was resolved where an exception (runtime error) was sometimes generated when changing concrete frame-design preferences in a model that contained moving load cases. Results were not affected.
	54876	An incident was resolved for the Bridge Modeler where the definition of a bridge object could become corrupted if parametric variations assigned to it are subsequently deleted. When this occurred, updating the bridge object would cause the application to become nonresponsive, and no results were available.

Graphics and Drafting

Incidents Resolved

*	Incident	Description
	37020 43734	An incident was resolved where the extruded view of a steel girder bridge section was not correct for nonprismatic steel girders when the bridge object was updated as a spine model. This was a display issue only and no results were affected.
	39782	An incident was resolved in which, for certain models, bridge point loads were not able to be displayed in the graphical user interface, even though they were properly acting on the model. No results were affected.
	40851	An incident was resolved where the shape of a cable object was not immediately recomputed when one of the end joints was moved. This was a graphical issue only, since the shape data were correctly recomputed when analysis was performed.
	42190 43159 47844 49020 52463	An incident was resolved where the extruded view of nonprismatic frame sections was not always correctly shown. This was a display issue only and no results were affected.
	45926 49002	An incident was resolved where the extruded view could fail to display for certain models containing area objects with shell overwrites for thickness or joint offset. Results were unaffected. For models created in versions prior to v16, it may be necessary to save the model after first opening it in v16 to clear the condition that caused this display issue.
	47403	An incident has been resolved where changes to the joint connectivity of a cable object made in the Line Information form by right-clicking on the cable were not immediately shown in the graphical display of the model. However, the changes were actually effective and were updated graphically when the analysis was run. No results were affected.
	49312	An incident has been resolved where adding or modifying a lane directly from the ribbon after displaying the lane loading points did not show the modified lane loading points until after the analysis was run or the model was saved and reopened. Similarly, the updated lane loading points were not shown after modifying the bridge object and updating the linked model. This was a display issue only. It did not affect the case where lanes were added or modified using the Define Lanes form. The correct lane loading points were always being used for analysis and results were not affected.
	49364	An incident was resolved where joints were not displayed at high zoom levels. This only affected displays where the option for the joints to be invisible was turned off. No results were affected.

Modeling
Incidents Resolved

*	Incident	Description
	41901	An incident has been resolved where the backbone curve calculated for FEMA 356 concrete beam and column flexural hinges using Tables 6-7 and 6-8 may have been based on an incorrect value of V / (bw * d * sqr(f'c)) ratio, depending on units being used. When calculating the ratio, all items in the ratio were converted to lb and inch units except for V which was in the database units for the model. Thus if the database force units were lbs the ratio was being calculated correctly.
	49678	An incident has been resolved for M2-M3 frame hinges where the incorrect sign of the axial force was being used to generate the hinge from the full PMM surface. The error was obvious by looking at the generated hinge property.

Section Designer
Incidents Resolved

*	Incident	Description
*	39090	An incident has been resolved for Section Designer in which very small overlaps between two shapes could cause the incorrect calculation of the section properties, depending on the angle of rotation of the section. This error was very rare.
	46470	An incident was resolved for Section Designer where Caltrans sections drawn with the height greater that the width and having two or more cores could generate incorrect fiber layouts. When this occurred, fiber-based PMM surfaces and fiber-based moment-curvature relationships were affected, as well as fiber hinges However, section properties, fully-integrated PMM surfaces, and fully-integrated moment-curvature relationships were not affected. Concrete frame design is based on fully-integrated PMM surfaces, and thus was not affected. This error was obvious when it occurred because the displayed section in Section Designer showed extraneous black lines indicating the incorrect polygons used to generate the fiber layout.
	49255	An incident has been resolved for Section Designer where an exception (run-time error) was generated when assigning a concrete material to a shape if that concrete material was defined with the strain at f'c less than or equal to f'c/E, where f'c is the concrete strength and E is the modulus of elasticity. Similarly, shapes could sometimes not be drawn in Section Designer if such a concrete material was defined. No results were affected.
	51464	An incident was resolved for Section Designer where any Caltrans sections defined with zero cover for the confinement rebar would produce a frame section with all zero section properties.
*	52385	An incident was resolved for Section Designer where the plastic modulus for a section with multiple materials was computed using transformed areas based on the Young's moduli of the different materials rather than based on the yield strengths. The plastic modulus has no effect on analysis results but could affect steel-frame design results for the rare case where a steel Section-Designer section uses mixed materials. Bridge superstructure design and rating are not affected by this error.

Bridge Modeler
Incidents Resolved

*	Incident	Description
	35102	An incident was resolved for the bridge modeler where the overhang was not properly connected to the main slab in the linked bridge model for a flat slab section that was updated as areas when (1) the fillet dimension f1 and/or f2 was zero, and (2) different thicknesses were specified for the main slab and the overhang. The error was obvious and the results were consistent with the model as generated. This error affected versions 15.0.0 to v15.1.1 and was corrected for versions 15.2.0 and later. However, it was inadvertently omitted from the v15.2.0 Release Notes.

*	Incident	Description
	37195	An incident was resolved for the bridge modeler where the analysis model created for a bridge object with invalid parametric variations and updated as a solid model could, in certain cases, contain invalid solid elements that prevented the analysis from completing. Now these invalid solid elements are detected when the analysis model is created but before the analysis is run, and an error message is provided to help the user locate where the problem is. In either case, the parametric variations must be corrected by the user for the analysis to run.
	37334	An incident was resolved where negative haunch heights were allowed to be specified for bridge deck sections of type Precast Concrete I and Precast Concrete U, resulting in a double-counting of concrete material. This behavior was not intended to be permitted, but the effect was generally small. Specifying a negative value now results in an error message and is not allowed. This error affected versions 15.0.0 to v15.1.1 and was corrected for versions 15.2.0 and later. However, it was inadvertently omitted from the v15.2.0 Release Notes.
	38125	An incident was resolved in the bridge modeler where the bridge object mesh was not correctly generated at the supports (bents or abutments) in the following uncommon cases: (1) The layout line runs approximately north-south near the support, and either (2a) The layout line curves to the west near the support, the support has a skew angle in the north-west or south-east direction, and the bridge deck section has a negative horizontal offset, or (2b) The layout line curves to the east near the support, the support has a skew angle in the north-east or south-west direction, and the bridge deck section has a positive horizontal offset. When this occurred, the meshing error was obvious and the results were consistent with the generated mesh.
	41056	An incident has been resolved for the bridge modeler in which the bent cap beam was be created with incorrect elevation if the cap beam was assigned a nonprismatic frame section such that the depth of the section varied along the length. The depth of the beginning section was being used to determine the cap-beam elevation. Now an insertion point is assigned to the generated cap-beam frame object having cardinal point 8 (top center) and a vertical joint offset at both ends equal to the weighted average of the nonprismatic cap-beam depth. The results were consistent with the model as generated.
*	41653	An incident was resolved for the Bridge Modeler where, for certain bridge objects modeled as solids, the negative superstructure moments at an interior bent decreased significantly with increased refinement (smaller solids), whereas the expected behavior is that the negative superstructure moment should increase gradually with increased refinement.
	41816	An incident was resolved for the Bridge Modeler where nonprismatic sections used for bent columns had the nonprismatic variation defined over a shorter length than expected. This had the effect of compressing the variation toward the bottom of the column by an amount proportional to the clear length of the column to the total length of the column. The clear length is less than the total length by half the depth of the capbeam. The actual cross-section properties were correct, only the lengths of the segments were shortened. The top-most section property (the end of the last nonprismatic segment) was extended prismatically to the bottom of the bent cap. For the common case where the column is larger at the top than bottom, this has the effect of stiffening the column. The actual definition used could be seen by displaying the extruded view of the model.
	41837 42733 44384	An incident was resolved for the bridge modeler in which the bridge group definition had the following problems: (1) For bridge group types that use a pair of spans (Begin Span and End Span) and span-distances (Begin Distance and End Distance) to locate objects within in the group, it was not possible in the graphical user interface to specify an End Span distance that was greater than the length of the N-th span, where N = Begin Span number – End Span number + 1; (2) When editing this same bridge group data for a pair of spans in the interactive database editor, the modified range data was added the original range after applying changes to model, resulting in doubling the number of ranges for the bridge group. The affected bridge group types were: Section, Top Slab, Beam, Web, Bottom Slab, Diaphragm/Crossframe, Tendon and Mixed.

*	Incident	Description
	42490	An incident was resolved for the bridge modeler which affected the creation of staggered diaphragms (cross frames) in the following two cases: (1) When more than two staggered diaphragms connecting a pair of adjacent girders were located between two section cuts, only the first two diaphragms were being generated for the linked model. (2) When a staggered diaphragm connecting a pair of adjacent girders was located close to a skewed section cut at a distance on-the-order-of the merge tolerance, and the super-elevation of the superstructure was non-zero at that location, the generated model could contain a narrow gap in the slab mesh between the staggered diaphragm and the section cut. Results agreed with the model as generated.
	42820	An incident was resolve for the Bridge Modeler where the link elements generated for an in-span hinge were not in the correct location when the bridge section had a non-zero offset for the insertion point and the bridge object was updated as a spine model. This did not affect models updated as area or solid objects.
	42874 43300	An incident has been resolved where the Construction Scheduler sometimes opened an existing schedule very slowly when there were a large number of multiple dependencies present in the schedule. The schedule data was correct and no results were affected.
	43307 45488 50065	An incident was resolved for the bridge modeler where the bearings at a single-bearing bent did not connect to the superstructure in the following case: (1) The grade is horizontal or has negative slope, and (2) The total superstructure deck-section depth is different on the two sides of the bent, and (3) The deck section before the bent is modeled as areas, including the girders if it is of a composite section type, and (4) The deck section after the bent is of composite type and the girders are modeled as frames. All four of these conditions had to be present in order for the error to occur. Results were consistent with the model as generated by the bridge modeler.
	43697	An incident has been resolved for the bridge modeler where error messages were generated when trying to run the analysis, and the analysis failed to start, in the following case: (1) Frame hinges had been manually assigned to frame objects that were generated by the bridge modeler and (2) The linked bridge model was cleared before being updated, and either (3a) There were user-defined frame objects in the model in addition to those created by the bridge modeler or (3b) Changes to the bridge object caused the number of generated frame objects to change when the linked model was updated. All three conditions (with either 3a or 3b) had to be present for the error to occur. No results were available.
	43710 46049 46053 46199 46399 46488	An incident has been resolved for the Bridge Modeler where updating the linked bridge model sometimes exhibited problems in the following case: (1) The skew angle at a bent is non-zero, and (2) The span immediately after the skew bent had a deck section where the reference point X-offset was specified to be greater than the half-width of the bridge deck. If both these conditions applied, then either of the following problems could occur: (A) When the deck section was a concrete box girder or a T-section and the bridge object was updated as an area or solid model, the generated model could exhibit an unexpected discontinuity in the superstructure in the span right after the skewed bent. (B) The linked bridge model could not be updated at all for any deck section updated as a spine model, or for any composite section (with steel or precast concrete girders) when updated as an area model. In case (A) the results agree with the model as generated by the bridge modeler. In case (B), the program would become unresponsive and no results were available.
	44404	An incident was resolved where link objects drawn by the user that connect to the abutment of a bridge object could cause bearing links at that location to be created incorrectly when the bridge object is next updated.
	44481	An incident was resolved for the Bridge Modeler where, in some cases, the local axes for the foundation spring joint (at the base of a bent column) were not correctly aligned with the skew of the bent. When this occurred the error was obvious by plotting the local axes for the joints, and the results were consistent with the model as generated.

*	Incident	Description
	45186	An incident was resolved for the bridge modeler where the program would become unresponsive when updating the linked model from a bridge object in the following case: (1) The superstructure deck section before a bent is of composite type (steel girder or precast concrete girder) with the girders modeled as frames, and (2) the superstructure deck section after the same bent is of T-section type, and (3) The T-section has more girders than the composite section. All three of these conditions had to be present in order for the error to occur. No results were available in this case because the model could not be generated.
	45490	An incident was resolved for the bridge modeler where the location of the bearings at the bents was not correct for composite deck sections with steel U-girders having sloping sides. For a U-girder with two bearings, the horizontal location of the left bearing (when looking up-station) was aligned with the top web-flange junction rather than the bottom web-flange junction. For a U-girder with single bearing, the horizontal location of the bearing was shifted left (when looking up-station) by a distance equal to half the horizontal distance between the top and bottom web-flange junctions of the left web. The bearings remain vertical and were properly connected to the girder. Only their location on the bent cap was incorrect. Single- and double-bearing bents were affected. The bearings at the abutments were not affected. Results were consistent with the model as generated by the bridge modeler.
	45729	An incident was resolved for the Bridge Modeler where the bearings at an abutment did not always connect properly to the grade beam, resulting in the superstructure being unsupported or partially supported at the abutment. When this occurred the error was obvious from the response of the structure. This error did not affect abutments that did not use grade beams.
	46620	An incident was resolved for the Bridge Modeler where the linked model sometimes could not be updated from a steel-girder bridge object that had multiple staggered diaphragms that were very closely, but not perfectly, aligned at adjacent girders. No results were available when this occurred.
	46697	An incident was resolved where, for certain models, the Bridge Modeler would become unresponsive when updating a bridge object containing two different types of bridge deck sections (steel girder and concrete box girder) as an area model. When this occurred, the analysis could not be performed and no results were available.
	46839	An incident was resolved in bridge diaphragm assignment in which for a bridge with skewed supports, a staggered diaphragm could not be assigned to the bridge if the distance is within any all-spaces diaphragm by the distance of 100 times the auto merge tolerance. Results agreed with the model as generated.
	47263 47911 50919	An incident was resolved for the Bridge Modeler where the bearing links could be incorrectly generated for the spine model of an advanced concrete box section with either a non-zero insertion point location in the transverse direction or certain parametric variations assigned. When this occurred, the location or connectivity of the abutment bearings could be incorrect, often leading to analysis warnings of numerical instability. The error is obvious when looking at the generated model.
	49089 49816 50068	An incident was resolved for the Bridge Modeler where bridge point loads applied directly at a bent station were being duplicated, resulting in twice the expected load being applied.
	49454	An incident was resolved that addressed two issues related to staggered diaphragms in the Bridge Modeler: (1) When a single-bearing bent or "None" was assigned to the start abutment and there was a staggered diaphragm assigned within the first segment of the bridge (between the first and second section cuts), the diaphragm assigned to the superstructure at the abutment (if any) was not being created. (2) When two staggered diaphragms are attached to either side the same girder at the same location, the one on the left hand side of the girder was sometimes not oriented correctly. Results agreed with the model as generated.
	49611	An incident was resolved for the Bridge Modeler where the bridge deck section of type "Box Girder - Advanced" was not correctly generated for the fillet parameters f11 to f14 when the two specified angles theta1 and theta2 were not equal. When this occurred the effect of the error was obvious in the generated model.

*	Incident	Description
	50684	An incident was resolved for the Bridge Modeler where error messages were, rarely, generated when creating the analysis model for bridge objects with a steel I-girder bridge section having non-prismatic frame sections in the case where one of the nonprismatic segment lengths was very small compared to the other segments in the section property definition. When this occurred, the error was obvious from the messages.
	51809	An incident has been resolved where deleting the first bridge layout line after two or more layout lines have been defined could have generated an exception (runtime error) or caused bridge objects to use the wrong layout line. In either case, the error was obvious when it occurred.
	51901	An incident was resolved for the Bridge Modeler where the extruded view of the model sometimes did not display the bottom segment of bent columns with nonprismatic properties assigned. This was a graphical issue only. Results were not affected.
	51942	An incident was resolved for the Bridge Modeler where link objects representing bridge hinges were not being included in the bridge groups of type Mixed that were specified to include hinges. This had no effect on the results except where groups may have been used in staged-construction load cases.
	51996 52180	An incident was resolved for the Bridge Modeler where the expected joint constraints were sometimes not correctly generated at a superstructure hinge between two span segments (without a bent) when the bridge sections on either side of the span were significantly different. When this occurred, the link elements representing the bearings at the hinge were not connected to the structure and the desired continuity was not achieved. The effect of this was obvious, and the results agreed with the model as generated.
	52011 52357	An incident was resolved for the Bridge Modeler where the diaphragms specified at the end of any span (span segment) were not being generated when no bent was specified to be present at the same location. The results were consistent with the model as generated.
	52143	An incident was resolved where the number of spans for a single bridge object was limited to 100 such that a bridge object with more spans could not be updated as a linked model. This limitation has been removed, subject to available machine resources.
	52629	An incident was resolved for the Bridge Modeler in which lane loading points were sometimes not properly created for the special modeling case where bridge objects overlap. When the lanes were defined to load Program Determined objects, the lane load points may be incorrect, and this is expected behavior. However, when a user-defined group was specified that included both bridge objects, this also generated incorrect loading points, and this has now been corrected. Lane loading points can easily be seen using the command Home > Display > Show Lanes.
	52788	An incident was resolved where, in certain rare cases, bridge groups did not properly create general groups when the bridge object was updated as a linked model. This appeared to be related to how the general groups were modified after the previous time the bridge object was updated. Now each bridge group will always create a separate general group when the bridge object is updated.
	52856	An incident was resolved where the bridge-superstructure moment diagram could be jagged in regions of a steel-girder bridge where staggered diaphragms were assigned. The displayed moment diagram fluctuated above and below the expected values. This was due to the detailed meshing of the slab near the staggered diaphragms. This has been resolved by using a simpler mesh that provides more uniform section cuts at which the moments are calculated.
	53351	An incident was resolved for the Bridge Modeler in which the calculation of girder length could be incorrect between section cuts that were nearly parallel to the global X axis, but where one section cut made a positive angle with respect to the Global X axis, and the other section cut made a negative angle. This situation could occur where the bridge longitudinal axis was tangential to the global Y axis. The girder length is used to calculate non-prismatic section properties, locate rebar, and locate staggered diaphragms. When this occurred, the effect was obvious in the model.
	54214	An incident was resolved for the Bridge Modeler where, in certain cases, a bridge object using the Advanced Concrete Box section would extend the bottom soffit of the section past the exterior web when updated as an area object model. Results agreed with the model as generated.

*	Incident	Description
	54830	An incident was resolved for the Bridge Modeler where the bridge object could not be updated as an area model in the following case: (1) There were multiple spans in the bridge object, (2) The number of girders was not the same in every span, (3) Non-prismatic steel I-sections were assigned to one of the spans that had a fewer number of girders, and (4) The girders were model as mixed (frame and shell). When this error occurred, results were unavailable.
	55650	An incident was resolved for the Bridge Modeler where applying a parametric variation for the distance between girders in a steel U-girder bridge section did not always produce the expected variation. In particular, the change in the distance was less than specified by the applied variation. Results agreed with the model as generated.

Loading
Incidents Resolved

*	Incident	Description
*	40313 41645 48910 50001 50068 51184	An incident has been resolved for the Bridge Modeler where bridge line loads and area loads applied in the bridge local coordinate system were not being applied correctly, such that the magnitude and direction of the applied loads could be incorrect. This error did not affect bridge line load and area loads applied in the global coordinate system. 1FADC
*	42315	An incident was resolved in which bridge line loads and area loads were not being applied to bridge objects during analysis in the case where a load station used to assign any bridge line or area load to a bridge object matched a diaphragm location in the bridge object. When this occurred, the error was obvious because an error message was produced during creation of the analysis model, and no bridge line or area loads were applied to any bridge objects in the model.
	43715	An incident was resolved for the Chinese 2010 auto-lateral seismic load where the loading was calculated using the response-spectrum curves of the 2002 code rather than the 2010 code. This only had an effect on the loading of very long-period structures, and the effect was small.
	49107	An incident has been resolved where a generic error message was generated during the analysis-model creation stage when running the analysis if a zero-length lane was present. Such a zero-length lane could be caused by defining lanes from frames that get deleted when updating a linked bridge model. The cause of the error message was a user action. Now a clear warning message is provided. No results were affected.
*	50048	An incident was resolved for auto wind load generated from Eurocode 2005 that included the following separate items: (1) Loading generated for the leeward side, whether applied using the exposure from rigid diaphragm extents or from area objects, should be constant and based on the structure height, but was actually being generated as decreasing toward the base of the structure. As a result the total load generated was significantly smaller than expected. (2) Loading generated for the windward side, when using the exposure from area objects, should be constant for elevations (Z coordinates) below the specified value of Zmin, but was actually being generated as decreasing linearly from Z=Zmin to Z=0. As a result the total load generated was smaller than expected, but not usually significantly so. This error did not affect loads applied using the exposure from rigid diaphragm extents. (3) The exponent of the term kr was omitted in the documentation. This documentation error had no effect on the results. The first two items may have produced results that were incorrect but that could easily be interpreted as valid.
	51002	An incident was resolved where lanes defined from layout lines could be created shorter than expected in the case where the referenced layout line contained three or more control points and the lane contained three or more of these control points. In this case, the lane may end at the last contained control point rather than at the full length specified by the user. The lane as created could be viewed using the command Display > Show Lanes, and the results agreed with the model as generated.

*	Incident	Description
*	55240	An incident was resolved where the uniform load value used for the Eurocode vehicles of Load Model 1 (LM1) and Load Model 4 (LM4) that is given in the code on a per-unit-area basis was being applied on a per-unit-length basis and distributed across the width of the lane. This means that for a typical 3 meter wide lane, one third of the expected uniform load was being applied. This has been changed so that the load is now assumed to act on a 3 meter wide lane, and the magnitude of the load per-unit-length has been increased so as to give the correct per-unit-area value for that width. When applied to lanes that are wider or narrower, the vehicles will need to be manually modified to adjust the specified uniform load. A future enhancement will allow the direct specification of uniform load on a per-unit-area basis.

Analysis
Incidents Resolved

*	Incident	Description
	32558 46188	An incident was resolved where the moving load response for components (reactions, column forces, etc.) that had been assigned vehicle response components (VRCs) intended for interior supports and subjected to vehicle loading intended only for interior supports was, in certain cases, zero at interior supports and non-zero at exterior (end) supports. This was due in some cases to an internal indexing error. In other cases, the cause was the shape of the influence line for the particular response component, which could be misinterpreted as to whether or not it represented an interior support. In either case, the error was obvious when it occurred due to the zero response. When non-zero response was reported, it was correct. Starting with v16, the influence line will not be used for this purpose any more. Instead, all response quantities assigned VRCs for interior supports will report non-zero values if loaded. Furthermore, under enhancement incident 52066, the Bridge Modeler will automatically assign such VRCs to the bearings, columns, caps, and ground supports for all bent properties, but not the abutment properties. Bent properties assigned at the end of a bridge object will be assumed to be part of a larger bridge and will be treated as interior.
	35828 43305	An incident was resolved where the calculation of length effects for distributed vehicle loads in a moving-load load case could be very slow for shorter length units, such as inch and mm, because the discretization of the span was on the order of the length unit. Results for shorter spans could also depend slightly on the length units used, but the difference was insignificant. The discretization used is now on the order of one meter, and is independent of the length units used. Other efficiencies have been implemented to speed up the calculation of length effects.
	37774 40211 44123 48667 50646	An incident was resolved in which the analysis could, under certain circumstances, terminate with an error and fail to produce results when running a moving-load case where one or more of the vehicles was using the British or similar length effects for uniform loads with different axle-width profiles.
	40877 49368	An incident was resolved where the tolerance used to determine if a tendon ended at an abutment was too small and could sometimes fail to properly connect the tendon to the end of the bridge object. This could lead to unexpected displacements or forces at the abutment. When this occurred the tendon would connect to the bridge object within the span so that equilibrium was maintained.
	42547	An incident has been resolved where multi-step vehicle live load cases could fail to run in certain cases where it should not due to an overestimation of the amount of memory needed to create the analysis model. This primarily affected loads on long lanes with slow vehicle speeds, even though the duration of the loading was short. When this occurred, no results were available.
	43631 44641	An incident was resolved where memory usage sometimes increased gradually during direct-integration time-history analysis, possibly leading to an out-of-memory error before the analysis completed. No results were affected for load cases or parts of load cases that had run.
	43896	An incident was resolved where the analysis would immediately terminate with an error for models having a zero value of target force assigned to any cable or frame member, even though zero is a valid target-force value. Results were not available in this case.

*	Incident	Description
	44247	An incident was resolved where link deformation response for moving load cases was reported as zero in certain cases due to a tolerance used to determine zero influence lines. This was more likely to affect models using mm and inch length units. When this occurred, the error was obvious because it was identically zero. In rare cases other types of response could be affected, although this has not been reported.
	45183	An incident has been resolved where, in very rare cases, target-force iteration fails during analysis with a file-open error. This could occur when analysis-results files reached a certain size and results had not been requested to be saved at the beginning of the nonlinear static load case or at the beginning of each stage of a staged-construction load case. When this error occurred, subsequent results were unavailable.
*	45382	An incident was resolved where joint patterns used to assign thickness and/or offset overwrites to shell-type area objects were not being properly applied in the following two cases: (1) If the analysis was run out-of-process, the joint pattern values were ignored (set to unity) for calculating shell element stiffness, mass, loads, and the force/stress response. (2) If the analysis was run in-GUI-process, the joint pattern values were correctly used for calculating shell element stiffness, mass, and loads. The joint patterns were also correctly used for displaying the force/stress response after running the analysis, but were ignored (set to unity) for results displayed or exported in tables, and for all force/stress response displayed after the model was closed and reopened without re-running the analysis in-GUI-process. For analyses run out-of-process, the effect on the stiffness, mass, and loads could affect the analysis results of the entire model. For analyses run in-GUI-process, the displacement/force/stress response of the entire model was correct except for the force/stress response of only the shell elements using joint patterns for thickness and/or offset overwrites. For the common case of shell thickness and/or offset overwrite assignments that do not reference joint patterns, the results were correct. Models generated from a bridge object often use shell thickness and offset overwrites, but these do not reference joint patterns and therefore were not affected by this error.
	45660 51284 52320	An incident was resolved where moving load analyses that used the stiffness from a nonlinear load case could fail to complete for larger models. When this occurred an error message was produced in the .LOG file indicating that an internal file error had occurred, and the results were not available.
	45633	An incident was resolved where the use of modal damping interpolated by period in a response-spectrum or modal time-history load case was actually using interpolation by frequency between the specified values. This means that the damping values were correct at the specified period values, but the interpolation between the specified values was proportional to f = 1/T, rather than to T. Here T is period and f is cyclic frequency. The effect of this error upon the results was generally insignificant.
	46123	An incident was resolved where the calculation of length effects for distributed vehicle loads in a moving-load load case could be very slow for shorter length units, such as inch and mm, because the discretization of the span was on the order of the length unit. Results for shorter spans could also depend slightly on the length units used, but the difference was insignificant. The discretization used is now on the order of one meter, and is independent of the length units used. Other efficiencies have been implemented to speed up the calculation of length effects.
*	46380	An incident has been resolved where a nonlinear direct-integration time-history load case that was continued from the end of a previous nonlinear direct-integration time-history load case did not produce the correct response unless the structure was at rest at the start of the second load case. The effect of inertial and mass-proportional damping forces were not being correctly represented in the initial conditions of the second load case. All other initial conditions were correct. Nonlinear modal time-history (FNA) load cases behave correctly and were not affected by this error.
*	46910 47828 48637 51979	An incident was resolved for the Bridge Modeler where the error message "Error in creating Analysis Model" was sometimes generated when running the analysis for a bridge object with parametric variations. This occurred when the parametric variations caused triangular shell objects to be created for the deck and when bridge tendons or bridge line/area loads were defined that fell within the bounding box of these triangular objects. When this occurred the analysis would run but the results could be incorrect.

*	Incident	Description
	46972	An incident was resolved where, for certain rare models, the analysis model generated by auto-meshing the area objects created invalid shell elements that could not be analyzed. When this occurred, no results were available.
	47520	An incident was resolved where groups containing area objects that were auto-meshed and that also had edge constraints assigned did not always include the effect of the edge constraints when used in a nonlinear static staged-construction load case. This could have affected the local connectivity of the area objects, but overall equilibrium was maintained.
	47795 51533	An incident was resolved where the bounding box of frame elements did not properly account for the cardinal point when used to determine if a tendon was contained within the element. Instead, the bounding box was used as if the insertion point was at the centroid of the frame element. Tendons joints that fell outside the expected bounding box were connected to the nearest element, resulting in visible jumps in the tendon force response.
	49053	An incident has been resolved for the membrane behavior of layered-shell elements, whether linear or nonlinear, where the in-plane bending behavior could be too stiff when the size of the element was very small compared to the database length units. When this occurred, the displacements could be too small and the reported membrane stresses could be too small. Equilibrium of joint forces between elements was not affected. Transverse (plate) bending behavior was not affected. The error in displacements and reported stresses was on the order of 0.00001/V, where V is the volume of the element in database length units. This rarely affected elements used in modeling slabs and walls of structures, but could have affected detailed models of components such as girders, connections, or machine parts when using the larger length units of meters or feet.
	49926	An incident was resolved where the operation Change Section applied to a frame or shell object in a stage with non-zero duration of a staged-construction load case had the effect of removing creep and/or shrinkage strain from that object for that stage. It is expected for the Change Section operation to remove time-dependent strain for previous stages, but not for the same stage. Now for a given object in a given stage, the Change Section operation is applied first, followed by loading, followed by time-dependent strain as expected.
	51529	An incident was resolved where moving-load analysis could fail with an error message when the size of any response file (joint displacement, frame forces, shell response, etc.) exceeded 2 GB. When this occurred, no moving load response was available. Other load cases were not affected.

Frame Design

Incidents Resolved

*	Incident	Description
*	43713	An incident was resolved that corrected the following issues for concrete frame design using the Chinese 2010 code: (1) The rebar strength was being limited to 300 MPa when calculating the P-M-M interaction surface. Now the actual rebar strength is being used even when it is greater than 300 MPa. The effect of this error was conservative. (2) The design strength for rebar with characteristic strengths of 500 MPa or greater was being calculated using a material factor of 1.1, which only applies to strengths below 500 MPa. Now the correct material factor of 1.15 is being used above 500 MPa. The effect of this error was unconservative. (3) For the flexural design of circular columns, the additional eccentricity was being miscalculated and had the effect of overestimating the amount of rebar required when the rebar was to be designed. The effect of this error was conservative. This problem did not affect the design when the rebar was to be checked.
	43716	An incident was resolved for steel frame design using the Chinese 2010 code where, in some cases, stability failure was reported incorrectly as strength failure. The stability failure was being correctly detected, just not correctly reported.
*	44260	An incident was resolved for concrete frame design using the Chinese 2010 code where the seismic moment magnification factor was only being applied to the first half-length of the beam (relative distance 0.0 to 0.5). For the second half of the beam length the seismic moment was not being scaled, in other words the factor was 1.0, which was unconservative. The seismic shear magnification factor was not affected.

*	Incident	Description
	46116	An incident has been resolved where the command Design > Lateral Bracing could be used to reset the lateral bracing back to "Program Determined" (no lateral bracing) once user-defined bracing had been specified for a given member. The values of effective length actually being used for minor bending and lateral torsional buckling were being correctly reported and the design results produced were consistent with these values.
*	46457	An incident has been resolved for steel frame design where, under certain conditions, the steel frame member color displayed after design that represents the stress or failure condition was not always consistent with the detailed design information shown after right button click. Similarly, the overall Ratio value presented in the "Steel Design 1 - Summary Data ..." database table was sometimes inconsistent with the detailed design information. The detailed design information was always correct. This error would occur in the following case: (1) The steel frame member in question had been loaded with seismic load, (2) The design code used has special provisions on the beam/column capacity ratio check and joint doubler-plate and continuity-plate design, and (3) The beam/column capacity ratio for the member in question had exceeded a limit or a joint design failure had occurred for at least one column anywhere in the structure. All three conditions must be true for the error to have occurred. The affected codes were "AISC360-05/IBC2006", "CSA-S16-09", and "CAN/CSA-S16-01". Non-seismic design was not affected. Any seismic design for which all the joints passed and all the beam/column capacity ratios passed was not affected. When the error did occur, it was conservative in that the reported ratio was too high. The error would correct itself for any member after viewing the detailed design information using the right-button click for that member.
	48615	An incident was resolved for steel frame design using codes "AISC 360-05" and "AISC-LRFD99" where all T-sections were being classified as Seismically Not Compact even when that was not true. The error was obvious and conservative.
	49852	An incident has been resolved for steel frame design where the adjustment factor for moment capacity due to the lateral-torsional-buckling limit state could be inaccurate for cases where the end offsets at the two ends of the frame object were not exactly the same. This factor is called Cb in AISC codes, Alpha_m in Australian codes, n factor in BS codes, Omega2 in CSA codes, and C1 in Euro, Italian and Indian codes. This error was of a roundoff/truncation type and primarily affected the case where one of the end offsets was set to zero and the other to a large value relative to the length of the member. Results were usually unaffected for members where the end offsets are similar at the two ends. When the error did occur, it was small and led to over-conservative results. Results were unaffected if user-specified lateral bracing was specified using the command Advanced > Frame Design > Lateral Bracing.

Bridge Design and Rating

Incidents Resolved

*	Incident	Description
*	40262	An incident was resolved for superstructure design of concrete box-girder deck sections where the principal stress values reported for the principal stress checks were incorrect when the current units selected were not the same as the database units. Database units are those in effect when the model was first created, and to which the model defaults whenever it is opened. This affected the principal-stress design request for the "AASHTO LRFD 2007" code and the two principal-stress design requests for the Chinese "JTG-D62-2004" code.
	42299	An incident has been resolved where bridge seismic design requests were sometimes not properly updated when changing or clearing a bridge object, which could cause the design request to run for the wrong bridge object or not to run at all. When this occurred the error is obvious.
	45133	An incident was resolved for AASHTO steel I-girder superstructure design where some design requests, for certain models, may generate an error message "Error reading Results" and fail to complete. When this occurred, no results were available for those design requests.

*	Incident	Description
	45825	An incident has been resolved where the automated bridge seismic design failed to run in certain distinct cases: (1) When an in-span hinge was present in the bridge object, the seismic design sometimes failed to start and no results were available. (2) When any loads were applied to any joint at the top of a bearing or to any joint where a bearing was connected to the superstructure in any load pattern of type Dead, the pre-pushover load case _bGRAV_xxx sometimes failed to converge. Here "xxx" is the name of a seismic design request. This caused the pushover load cases used to determine the bent capacities to not start, so that the seismic design request did not complete and results were not available. Loads that could cause this problem included directly assigned joint loads as well as bridge point, line, and area loads.
	45846	An incident was resolved where, in certain rare cases, a design request or rating request for a steel I-girder bridge section would fail with an error message while processing the section properties of nonprismatic spans. This could occur due to a tolerance error for very short nonprismatic segments. When this occurred, no results were available for the design or rating request.
	46200	An incident has been resolved for the superstructure design and rating of steel I-girder bridges with composite slab using the AASHTO code where the section modulus for the composite section in positive bending was not correctly calculated when the neutral axis fell within the composite slab. This could occur for sections with shallow steel I-beams. When this occurred, the error was obvious: The section was classified as yielding under Mdnc and Mdc or the composite section modulus for steel top fiber was reported as negative number. This error was not common.
	46750	An incident was resolved for the AASHTO 2007 Steel I-girder composite strength design request where the D/C ratios for positive moment could, in certain rare conditions, show spuriously large values in the zero moment region. When this occurred the error was obvious because the numbers were many orders of magnitude larger than the meaningful D/C ratios where the positive moment was non-zero.
*	47409	An incident was resolved for bridge seismic design using the AASHTO 2007 code where the displacement capacity for Seismic Design Category (SDC) B and C was always being calculated in inch units rather than the in database units for the model. This in turn affected the D/C ratio. In particular, the D/C ratio presented should have been multiplied by the factor [in]/L, where L is the database length unit. For example, if the database units were mm, the presented D/C ratio should have been multiplied by 1 / 25.4. Database units are those in effect when the model is created. This error did not affect SDC = A or D.
	48646	An incident was resolved for the AASHTO Strength Design Check of the steel I-Girder section where an unclear error message was reported when the design was unable to determine maximum required stiffener spacing d0 from equation 6.10.9.3.2-2. This calculation is performed when the capacity of unstiffened web is not sufficient. Now when this occurs, a warning message is provided "Warning. Unable to determine maximum required stiffener spacing d0 from equation 6.10.9.3.2-2. d0 set to zero". The actual results have not changed.
	48834	An incident was resolved for bridge design and rating using the AASHTO LRFD 2007 code for Built-up (Hybrid) Steel I Sections in which the code-based Live Load Distribution Factor (LLDF) for moment was always calculated as zero. No other section types were affected by this error. The following AASHTO design checks were affected: SteelICompStrength and SteelICompService. The following AASHTO rating checks were affected: SteelICompService, SteelICompStrength, SteelINonCompService, and SteelINonCompStrength. The LLDF specified by the user or calculated from analysis were not affected. This error was obvious when it occurred.
	50996	An incident has been resolved where the AASHTO LRFD code limits on the distance from the centerline of the exterior web to the interior of the live-load curb, as used for calculating code-based Live Load Reduction Factors (LLRF) for bridge superstructure design, were based on the SI edition rather than the US Customary edition. The SI edition limits are -300 mm <= d_e <= 1700 mm, whereas the US Customary edition uses the limits -1 ft <= d_e <= 5.5 ft, which is equivalent to -304.8 <= d_e <= 1676.4 mm. Results were correct within the range that was being permitted. Now the US Customary limits are being used, which may restrict certain cases where d_e > 5.5 ft that were previously permitted. User-specified LLRF and those calculated by analysis were not affected.

*	Incident	Description
	50619	An incident was resolved for concrete superstructure flexural design that corrects an error in reporting the location of the vertical distance from the top and bottom fibers of the girder to the center of gravity. The distance from the bottom fiber to the center of gravity of the girder was being reported as the distance from the top fiber, and vice-versa. The affected design checks are: AASHTO Multicell ConcBox Flexure, Canadian Multicell ConcBox Flexure, Eurocode Multicell ConcBox Flexure, and Eurocode Precast I Composite Flexure. No other values reported in the results tables for these design requests were affected by this switch. The reported calculated resistances were correct.

Results Display and Output

Incidents Resolved

*	Incident	Description
	36043 52768	An incident was resolved where an error message was generated when trying to plot the deformed shape for a moving load case when no bridge results were requested to be calculated for any moving load case. Now the plot will show zero response with no error messages. Similar error messages were obtained for displaying other response quantities (reactions, frame forces, shell stresses, etc.) for which none had been requested.
	37512	An incident was resolved where animating the deformed shape for larger models could result in an exception (runtime error) or simply no motion being shown. No results were affected.
*	39130	An incident was resolved where, for certain rare cases, the frame forces or stresses plotted in the graphical model window for a linear load case could be based on the wrong nonlinear stiffness case, which could produce incorrect values. This effect was usually small, and would resolve itself after plotting the results for any other linear load case. Frame forces and stresses displayed and exported in tables were not affected. Design results were not affected. No other response quantity (displacements, reactions, shell response, etc.) was affected.
	39275	An incident was resolved for the AASHTO rating of concrete bridge that addressed two minor issues: (1) In the table "Bridge Super Rating 01 - Rating Result Status" the error message text was incomplete when the error status was "0", indicating no error. The text should have said "Design was performed and results are available, whether or not the design passed or failed." (2) For the AASHTO flexural rating check of concrete box girder sections, the factored moment resistance plot for positive resistance incorrectly showed the negative resistance, and the plot for negative resistance showed zero. The values presented in the tables were correct. The plotting of the factored moment resistance for the flexural rating check of multi-cell concrete box girder sections was not affected by this error.
	42179	An incident was resolved where certain loads applied directly to restrained joints in the first step of a nonlinear static load case were not included in the reported joint reactions or base reactions. Such loads include joint forces and ground accelerations, as well as loads applied to plane, asolid, solid, and link elements. Loads applied to frame and shell elements were not affected. This was a reporting error only. The applied loads were omitted from the reported reactions, but no other structural response (displacements, forces, stresses) or behavior was affected. Design was not affected.
	42871	An incident was resolved where an exception (runtime error) was generated and the application terminated in certain rare cases when displaying the deformed shape for a staged-construction load case. No results were affected.
	43223	An incident was resolved where numerical values in the printed output may have shown round-off error due to formatting the values to the specified number of decimal digits before converting for the specified display units. Instead, the values should have first been converted to the display units, then formatted to the specified number of decimal digits. The effect on the printed output was small. Values shown using the command Display > Show Tables, and results printed or exported from this display were properly converted and formatted and therefore did not have this problem.
	45055	An incident was resolved where exporting to Excel when plotting bridge results using the Bridge Object Response Display form sometimes generated a runtime error, terminating the application. No results were affected.

*	Incident	Description
	46472	An incident was resolved where unexpected jumps in the force and moment results sometimes occurred in the bridge response plot for bridge sections with prestress tendons modeled as elements when the option to Include Tendon Forces was chosen and tendon load was present. Jumps in force and moment response on either side of a section cut (discretization point) are expected when a tendon ends or kinks between bridge section cuts because the change in tendon force is interpolated between two section cuts. However, jumps should not be present (or should be very small) when the tendon end or kink occurs directly at a section cut, and this has been corrected.
	47884	An incident was resolved where an exception (runtime error) was generated when displaying frame forces for a model that contained a nonprismatic frame section property having a zero length segment. Zero-length segments are not valid for nonprismatic frame sections, and they will now be deleted when detected.
	48584	An incident has been resolved for the bridge-response display form in which an exception (run-time error) occurred when trying to export bridge object forces to Excel for response-spectrum load cases. No results were affected.
*	49125	An incident has been resolved where the bridge force, moment, and stress response for steel and precast I-girders could be incorrect for superelevated superstructures when the I-girders were modeled as frames. This was due to the use of the superelevated coordinate system for calculating forces and stresses in the girders, which remain vertical. The error was most significant for minor shear and moment V3 and M2, and the lateral bending stress in the flanges. Correct results for these values were obtained directly from the frame elements used to model the I-girders. The error was small for steel I-girders modeled as areas or using a mixed frame/area model. The error did not affect spine models, other types of bridge sections, or non-superelevated cross sections. Now all bridge force, moment, and stress responses for steel and precast I-girder bridge cross sections will be calculated in a coordinate system where the 3 axis is horizontal and the 2 axis is in the vertical-longitudinal plane, parallel to the I-girder webs. For all other bridge cross sections, the 3 axis is parallel to the superelevated deck and the 2 axis is normal to the deck and in the longitudinal plane.
	49297	An incident has been resolved where non-zero force response was reported in database tables for a link element that was not present in a linear static load case that used the stiffness from a staged-construction load case that excluded said link element. The force response should have been zero in this case. This was a reporting error only. The link element was not present in such a linear static load case and had no effect on the behavior or response of the rest of the structure. The error was obvious because the element was excluded from the response plots for the linear static load case.
	49848	An incident was resolved where frame forces and stresses could not be displayed graphically or in database tables for frame objects with nonprismatic precast concrete frame section properties. These particular results were not available for display, but no other results were affected.
	51112	An incident has been resolved where the graphical display of principal stresses for solid elements did not show the correct location or scaling of the stress arrows, although the numerical values shown by scrolling with the mouse were correct. Display of the principal-stress contours was correct. Values provided in the database tables were correct.
	51113	An incident has been resolved where displacement contours plotted on area objects were displayed as stress arrows if stress arrows had previously been plotted for either area or solid objects in the same model window. The error was visually obvious and no reported values were affected.
	52769	An incident was resolved where the Bridge Object Response Display form (command Home > Display > Show Bridge Superstructure Forces/Stresses) did not show moving-load case results for some individual girders of a bridge object with spans that have different numbers of girders. No other types of load cases were affected. Tabular results were not affected.
	54817	An incident was resolved where an error message was generated when plotting joint reactions or displaying the joint reactions table for a hyperstatic load case in a model with joint-spring supports. When this occurred, the reactions for that load cases were not available, but no results were affected.
	56359	An incident was resolved where an error message was generated when trying to display the database tables of design results for bridge superstructure design or rating when the controlling load for a given location was a load case rather than a load combination. This was a display issue only, and did not affect the validity of any results that were displayed otherwise in tables or graphically.

Database Tables
Incidents Resolved

*	Incident	Description
	44277	An incident was resolved where an error message could be generated when writing the database table "Bridge Object Definitions 02 - Reference Line" for certain models. No results were affected.
	47669	An incident was resolved where bridge tendons specified with pure circular layout could not be imported from a database file or through the interactive database.
	50192	An incident was resolved in which displaying or exporting the table "Frame Section Assignments" generated an error message for the unusual case where the model was generated by the Bridge Modeler for a steel girder bridge with the girders model as "mixed" and the frame elements representing the flanges were nonprismatic and the user had reset the steel frame design overwrites for these members. When this occurred the table as displayed or exported was not complete. Results were not affected. To remove this error (if present) from an existing model it will be necessary to clear the linked bridge object, save and re-open the model, and update the model from bridge object again.
	54183	An incident was resolved where an error message was generated when creating the database table "Bridge Group Definition 10 - Bearing - Hinge" in the case where (1) there was more than a single in-span hinge present in a bridge object and (2) there was a bridge group for that bridge object that had more than a single assignment of hinge bearings to the bridge group. When this occurred, the table was not getting initialized properly and only a single girder was getting reported. No results were affected.

Application Programming Interface
Incidents Resolved

*	Incident	Description
	46156	An incident has been resolved for the API functions SapModel.AreaObj.GetLoadUniform, SapModel.AreaObj.SetLoadUniform, SapModel.AreaObj.GetLoadUniformToFrame, and SapModel.AreaObj.SetLoadUniformToFrame where the units were not being converted to present units for Get functions, and to database units for the Set functions.
	47951	An incident has been resolved where the Open API function SapObject.SapModel.PropLink.GetLinear returned a zero value instead of the correct stiffness value for the U3 degree of freedom when the stiffness matrix for that link property was uncoupled. If any off-diagonal stiffness value was non-zero, then the correct values were returned for all 21 stiffness terms. Similarly, the function returned a zero value instead of the correct damping value for the U3 degree of freedom when the damping matrix was uncoupled, but returned all correct damping values if any off-diagonal term was non-zero. This error did not affect any analysis or design results.
	50827	An incident was resolved where the function SetLocalAxesAdvanced for the Point, Frame, Area, Solid, and Link objects could produce an incorrect orientation of the object local axes for the option that uses two joints to define the reference vector for either the plane or axis. (Note that the axis applies only to the Point, Solid, and Link). In the case where joint labels were not sequential, incorrect joints may have been used, resulting in a different orientation of the object local axes than intended. However, the actual joints used could be determined from the model or the corresponding OAPI calls GetLocalAxesAdvanced. Analysis and design results were consistent with the model as actually defined.
	55206	An incident was resolved for the Open API where the function SapModel.PropLink.SetMultiLinearPoints returned a non-zero error code when the specified force (or moment) values were non-monotonic, whereas it should have returned the non-zero error code when the displacement (rotation) values were non-monotonic. When a non-zero error code is returned, the function does not set any values.

External Import/Export
Incidents Resolved

*	Incident	Description
	49922	An incident was resolved in which the import of StruCAD*3D model files was incorrectly defining the elastic and plastic section moduli for frame section properties imported based on a SECT card with a prismatic shape. These incorrect values could easily be identified and did not affect analysis results.
	49934	An incident was resolved in which the import of StruCAD*3D model files would apply an incorrect scale factor to a load case/combo within a defined LDCOMB card if the scale factor was specified as 0.0. In this situation, the imported scale factor was 1.0 as the import was considering this as blank and therefore using the 1.0 default. This would have been detectable when reviewing the load combination definition.
	49936	An incident was resolved for the StruCAD*3D import in which tension/compression limits were not properly imported when generally defined using 'T' or 'C' on the MEMBER card.
	49961	An incident was resolved for the StruCAD*3D import in which WGHT UNIF cards were not read in if the weight was specified to be eliminated in the global x-direction. Error messages were reported during the import.
	51046	An incident has been resolved for the import of STAAD data files that affected two features: (1) The keyword GEOMETRY was not supported for the GROUP DEFINITION block. When present, an error message was generated and no data was imported into SAP2000. Now the GEOMETRY keyword will be recognized, but the group defined using that keyword will be ignored. Similarly, if no group-type keyword is specified, the default is GEOMETRY and the corresponding group definition will be ignored without error. (2) Members listed in an DELETE MEMBERS or INACTIVE MEMBERS (2a) may have generated an error message and failed to import the model, or (2b) may have deleted/inactivated the incorrect joints connected to these members. Cases (2a) or (2b) could occur when joint labels were not consecutive in the STAAD model file. This has been corrected. In cases (1) or (2a), no results were available. In case (2b), the model may have failed to import; if the model did import, any needed joints were being automatically re-created.

Data Files (.EDB, .E2K, .$ET)
Incidents Resolved

*	Incident	Description
	44976	An incident was resolved where the OpenAPI function SetStageData_1 would return an error code and not perform the expected function when trying to set a staged-construction operation that applied a named set for frame property modifiers, area property modifiers, or frame releases. No results were affected.

Miscellaneous
Incidents Resolved

*	Incident	Description
	41649	The version number has been changed to v16.0.0 for a new major release. CSiBridge v16 will be known as "CSiBridge 2014".