SAP2000® Version 21.1.0
Release Notes

Notice Date: 2019-08-21

This file lists all changes made to SAP2000 since the previous version. **Most changes do not affect most users.** Items marked with an asterisk (*****) in the first column of the tables below are more significant.

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

Changes from v21.0.2 (Released 2019-02-19)

Analysis

Enhancements Implemented

*	Ticket #	Description
*	2045	A new feature is available for running multiple load cases on separate parallel processors, significantly speeding up models with many independent load cases. This can be particularly useful where a large suite of earthquakes need to be considered, such as for performance-based design. This option is turned off by default, since it can affect the performance on machines used for multiple purposes. When enabled, the number of processors to be utilized can be set explicitly or can be determined automatically as the number of physical processors found on the machine. Sequential load cases will be run on a single processor. Parallel load cases will be automatically assigned to processors as they become available, after any prerequisite load cases have been run. This feature requires sufficient memory (RAM) to support the number of parallel instances of the analysis engine. Larger models may run faster with fewer processors if memory is limited. All processors will access the disk, which can become the limiting factor for speed if the disk is slow or if the number of processors utilized becomes too large.

API

Enhancements Implemented

*	Ticket #	Description
	2442	A change was made for the digital signing of the installed files to improve security. This does not affect the behavior of the software except with respect to using the Application Programming Interface (API). External applications and plug-ins that reference SAP2000v20.dll or CSiAPIv1.dll will need to re-reference the new installation and be re-compiled. No other changes are required. This is a one-time change and should not be necessary in future versions.

Data Files

Enhancements Implemented

*	Ticket #	Description
	2313	An enhancement has been implemented to allow v12 and older model files to be opened in the 64-bit version.

Database Tables
Enhancements Implemented

*	Ticket #	Description
	2331	An enhancement has been implemented to increase the amount of data that can be imported for group assignments. Previously some models would run out of memory when trying to use interactive database or import a model text file that contained a large number of group assignments.

Design – Concrete Frame
Enhancements Implemented

*	Ticket #	Description
*	2553	An enhancement has been made to the Eurocode 2-2004 concrete column design to more accurately calculate the slenderness ratio and slenderness limit. This includes consideration of the reinforcement for calculating the slenderness limit. The current algorithm assumes symmetrically reinforced sections. The changes made should remove previous overconservative second-order effects. Additional design preferences and overwrites have also been added for more user control of the member design. The corresponding design verification column examples have also been updated to demonstrate the use of both the nominal-stiffness and nominal-curvature second-order moment.

Design – Steel Frame
Enhancements Implemented

*	Ticket #	Description
*	2380	An enhancement was made to update the default load combinations for Chinese design codes based on recent changes to National Standard for Reliability of Building Structures.
*	2459	An incident was resolved for steel frame design per the Russian code "SP 16.13330.2011" which corrected the following issues: (1) The sign of axial force N is now taken as negative for compression for the calculation of delta in equation (108) of section 9.1.3 and in equation (122) of section 9.2.10. Previously the factor delta was always 1.0 (unity) for compression. Now it is always greater than 1.0 for compression. The factor delta was and still is taken as 1.0 for positive N. This factor is not used when the member is in tension. The previous results were over-conservative. (2) The equation eta = (0.75 + 0.05*m) – 0.01*(5.0 - m)*lambda_bar is now changed to equation eta = (0.75 + 0.05*m) + 0.01*(5.0 - m)*lambda_bar by changing the subtraction to addition for minor axis bending of I-shapes (Section type 8) per Annex E, Table E.2, Section type 8 for Af/Aw = 0.25. The net effect is that eta for this case will have an increased value, the factor m_ef will have an increased value per equation (110) of section 9.2.2, the stability factor phi_e will have a reduced value per Table E.3, 9.2.2, and the PMM ratio will have a slightly increased value. Previously the design was slightly unconservative. However, the overall effect was usually small since the minor-axis bending moment for I-shaped members is normally small; for larger moments in minor direction, the effect was null since the affected equation does not apply in that case. (3) For the stability check of axial compression with flexure for box (tube) and pipe sections, only Section 9.2.10 Equations (120) and (121) are now being checked. The following interaction equations are no longer checked for this case: Section 9.2.4 Eqn. (111), Section 8.2.8 Eqn. (59) and (60), Section 9.1.1 Eqn. (106), and Section 9.1.3 Eqn. (107a). The previous results were over-conservative. (4) When the Eqn. (107) of section 9.1.3 governed, the reporting of this equation and the ratios was not correct. In some cases, M_y was being reported instead of M_x. In addition, for singly-symmetric I-sections, Double-Angles, and T-sections, the minor axis bending is now ignored. For Double-Angles and T-sections, this interaction equation is now only checked if the major moment is positive. In this case, the maximum tension occurs at the bottom tip. For Channel sections, both the minor and major moments are considered as both affect the tensile stress at

*	Ticket #	Description
		the tips. (5) For some T-sections, there was a discrepancy between the reported Lambda_bar from its hand calculated value even though the Lambda (KL/i) matches exactly. This was caused by inconsistency of radius of gyration and Sqrt(I/A) where all of these three quantities (I, A, and i) are taken from the section-property database file. Now the radius of gyration i from the section database is used to calculate KL/i rather than using Sqrt(I/A).
	2607	The following enhancements have been made to the Russian SP 16.13330.2011 steel frame design: (1) The new parameter "Allow Plastic Strain" has been added as a design preference and also as an overwrite item which can take a value "Yes" or "No". This parameter controls which interaction equation is to be checked. (2) The design process now determines whether the bending-buckling check needs to be performed based on sections SP 16.13330.20118.4.4 and 8.4.6 and SP 16.13330.2011 Table 11. (3) The design process now checks the interaction equation Eq.10 of section SP16.13330.2011 7.1.5 for only channel sections. This equation was previously checked for all sections. (4) The design process no longer checks the interaction equation Eq.109 of section SP 16.13330.2011 9.2.2for box sections. This is still used for all other sections. (5) The design process no longer checks the interaction equation Eq.107 of section SP 16.13330.2011 9.1.3 for members with tensile force. This is still used for all sections with compression force. (6) While checking the interaction equationEq.43 of section SP 16.13330.2011 8.2.1, the design process now uses Wn,min. For single-symmetric I-shapes, T-shaped and double angles, Wn,min is the smaller value of Wn between the tension side and compression side. For doubly symmetric sections, this change has no effect. (7) The shear areas AvMajor and AvMinor are not recalculated based on the web and flange areas for I, channel, box, double channel, and T sections. Previously the areas were slightly different based on the corner radius. (8) The design process now reports the values of Tau. This is used in the determination of shear-stress ratio (Tau/Rs) which is used in calculating beta and beta_m factors per section 8.2.3 and in the calculation of cm factors per SP 16.13330.2011 section 8.2.3 and Eq. 53. (9) The design process now reports the slenderness (lef/I, or Kl/r) limit related parameters in the tables.

External Import and Export
Enhancements Implemented

*	Ticket #	Description
	2466	An enhancement was made to the import of DXF and DWG CAD drawing files. When importing a .dxf or .dwg file, the user now has the option to select several drawing layers for each importable category of SAP2000 objects, and all the corresponding drawing objects on all the selected layers are imported. Where previously a single SAP2000 group was created for the imported object, several groups, corresponding to the various selected layers are now created, with each group now named after the original layer of the objects it contains.

Installation and Licensing
Enhancements Implemented

*	Ticket #	Description
*	2318	The version number has been changed to v21.1.0 for a new intermediate release.
	2444	The software and installation have been updated to use the Microsoft .NET Framework 4.7.1.

Results Display and Output
Enhancements Implemented

*	Ticket #	Description
*	2440	The display of results from modal time-history load cases, including FNA, has been made faster for large models. This improvement will most notably affect modal time-history load cases using a large number of modes for models with a large number of joints. Speed will be improved for the graphical display of displacements, forces and stresses, section cuts, and other response quantities; for producing tabular output; and for running design.

Structural Model
Enhancements Implemented

*	Ticket #	Description
	2660	The New Zealand material property library has been updated to include AS/NZS3678:2016 Grade 450PL steel materials, and the cold-formed materials have been renamed to include both the AS and NZS designation.

Analysis
Incidents Resolved

*	Ticket #	Description
	1653	An incident was resolved where a modal time-history load case would not start during an analysis if it used the modes from a modal case having a nonzero frequency shift that was run at the same time. The modal time-history load case would complete during a subsequent analysis if the prerequisite modal case had been run in a previous analysis. This was an inconvenience only. No results were affected.
	2198	An incident was resolved where the nonlinear behavior of a Directional-type layer of a layered shell defined with a material property that has a non-zero friction angle did not behave as documented in the Analysis Reference Manual. The behavior is now changed so that the friction behavior uses the average of the axial force in the S11 and S22 directions of the layer, if both directions are active; this is suitable for materials like sand where there is no distinct slip plane. If only one direction is active in the layer, the axial force of the active direction is used for computing the friction behavior; this is suitable for the case where the slip plane is perpendicular to the axial load. The shear-friction behavior is modeled as a Wen hysteresis model where the force-deformation relationship is smooth between the initial shear stiffness and sliding behavior. This change does not affect the behavior of Directional shell layers defined using a material property that has a zero friction angle, which is the default for all materials. Likewise, the behavior of Coupled layers is not affected.
*	2339	An incident was resolved where nonlinear static, staged-construction, and nonlinear direct-integration time-history load cases could exhibit inconsistent convergence behavior for models containing link elements when the analysis was parallelized. Due to the inconsistent convergence behavior, results could differ from one run to the next, or the analysis could fail to converge in some runs. Converged results should differ within the convergence tolerance unless the model is very sensitive or ill-conditioned. The number of threads used for parallelization of links is reported in the analysis log file (.LOG). This will normally be greater than one unless the machine has less than four cores (two physical cores), or unless the environment variable SAPFIRE_NUM_THREADS has been set to 1 before starting the software.
*	2374	An incident was resolved where the program could terminate when attempting to run a moving load case in a model containing a large number of vehicles and/or lanes.
	2396	An incident was resolved where a model with many parametric PMM hinges running multiple time history load cases may cause the SAP2000 analysis process to consume a large amount of memory or, in some cases, to terminate with an "Out of Memory" error. This issue could be mitigated by manually running the load cases in several batches with the Analysis Process Options set to "Separate Process". The accuracy of results obtained from analysis were not affected.
*	2496	An incident was resolved where a model with joints that have both local axes not parallel to the global axes and also non-isotropic mass assignments (i.e., with different values along the local axes) would give incorrect results for linear and nonlinear direct-integration time history load cases. When this issue occurred, the dynamic response would typically diverge, resulting in very large displacements. This issue was particular to direct-integration time history load cases and does not affect modal time history load cases or static load cases.
	2565	An incident was resolved where an error message would be generated at the start of analysis for models containing a layered shell property having a layer with "Coupled" behavior and using a concrete material property where the last point of the stress-strain curve on the compression side had zero stress. This would occur because the Darwin-Pecknold model used for coupled concrete behavior requires non-zero stress values for the compressive material behavior. When this error occurred, no analysis results were available. The behavior has been changed so that all compressive stress values in the stress-strain curve that are smaller in magnitude than 0.0001 times the peak compressive stress will be set to that small limiting value. This change only affects the behavior of the material when used in a Darwin-Pecknold model for "Coupled" shell layers.

*	Ticket #	Description
*	2609	An incident was resolved where an abnormal termination error occurred when a nonlinear direct integration time history case with ground displacement loading was run separately from the nonlinear case it was continuing from. The results for the nonlinear direct integration time history case were not available.
*	2633	An incident was resolved where nonlinear static and staged-construction load cases could converge to the wrong answer under the following circumstances: (1) The nonlinear solution parameters were set to use line search, which is not the default setting, (2) the line-search iteration was able to find a solution without further iteration, and (3) the unbalance force in the first step of line search is significantly larger (by orders of magnitude) than the applied load. All three conditions were necessary to cause this issue. This error was not common. Situations that could cause item (3) include load steps where the stiffness becomes much larger, such as the closing of gaps with non-zero initial opening. This does not apply to gaps with zero initial opening, such as at the base of a structure. Displacement-controlled nonlinear static load cases, such as for static pushover, do not use line search and were not affected. Nonlinear direct-integration load cases were not affected, even when line search was used.

API

Incidents Resolved

*	Ticket #	Description
	2284	An incident was resolved in which the API function cPointObj.GetMass would sometimes return an error code when attempting to retrieve the mass for certain points.
	2317	An incident was resolved for the Application Programming Interface (API) where the three distance arguments in the function cEditGeneral.Move were incorrectly interpreted as being in database length units rather than in present units.
	2332	An incident was resolved in which the GetLateralBracing API function would fail and return a value of 1.
	2343	An incident was resolved in the API, where the SetInitialCase and GetInitialCase API functions for load cases attempting to set or get a staged construction load case as the initial case did not work. This issue was inadvertently introduced in v21.0.0.
	2579	An incident was resolved for the Application Programming Interface (API) where the functions GetDampProportional and SetDampProportional in the DirHistNonlinear and DirHistLinear interfaces did not correctly set or get the proportional-damping coefficients, but they were instead operating on the modal damping coefficients of the load case. These functions have been revised to operate on the proportional damping coefficients of the load case. Additionally, new linear and nonlinear direct-integration time-history load cases created through the API function SetCase will have modal damping disabled, to be consistent with the behavior of the graphical user interface.
	2622	An incident was resolved in which the API function SapObject.SapModel.PropMaterial.GetOColdFormed was retrieving data from the steel material properties instead of the specified cold-formed material property.

Data Files

Incidents Resolved

*	Ticket #	Description
	2336	An incident was resolved where importing a model file containing IBC 2006 or 2009 auto seismic load patterns with program calculated Fa and Fv factors would reset the values to unity after the import, even if the imported site class should have resulted in other values. The incorrect values were shown in the form and database tables and were used for generating the loading. User defined Fa and Fv values were imported correctly.
	2476	An incident was resolved in which the AusNZv8.pro section properties file was missing several sections that were previously contained in the library prior to v21. The missing sections have been reinstated.

Database Tables
Incidents Resolved

*	Ticket #	Description
	2362	An incident was resolved in which certain database tables could become unavailable for display even when the model contained information to populate the table. This was a database table issue only and did not affect results.
	2389	An incident was resolved to correct an error during import of models containing steel parametric PMM hinge definitions. The UseYldForce field was previously not being imported. Additional warning messages for the FDType field of steel and concrete parametric hinges were also corrected.

Design – Concrete Frame
Incidents Resolved

*	Ticket #	Description
	2086	An incident was resolved for concrete frame design based on Eurocode 2-2004 where, for certain rare model files, an incorrect fyk value was used for concrete shear design when the section was defined as a section designer section. The design was using a minimum rebar yield strength which could be different from what was specified in the material definition. This did not affect the PMM interaction design. This was only detected in a single model file. This error will be corrected for any model files opened in a new version.
	2373	An incident was resolved where in rare cases concrete column design could use an incorrect interaction diagram for the check. This happened when the structure was first designed and then unlocked and another section was added using the Copy command and then edited and assigned to some column members. The interaction diagram may not have been updated.

Design – Steel Frame
Incidents Resolved

*	Ticket #	Description
	2416	An incident was resolved where performing frame design on a model with a large number of load combinations defined, but only a small number of combos selected for design, could take longer than expected. This only affected the speed of performing the design. The results were not affected.
*	2455	An incident was resolved for steel frame design per the "Eurocode 3-2005" code where the demand-capacity ratio (D/C) computed for closed pipe and tube (box) sections could be unconservative in the presence of significant torsion. For the design of pipe sections, the shear stress (tau) due to torsion was being calculated using c = t/2 instead of c = d/2 in the formula tau = T*c/J. A similar error occurred for tube sections, where the computed stress was proportional to the wall thickness rather than to the exterior dimensions of the section. This error affected the calculations of the strength reduction factor, reduced shear capacity for the presence of torsion, and reduced flexural capacity for the presence of torsion. The resulting D/C ratios were smaller than their correct values in the presence of torsion. Only pipe and tube sections were affected. In the absence of torsion, the D/C ratios were correct.
	2472	An incident was resolved for AISC 360-10 and AISC 360-16 steel frame design where the compression flange local buckling capacity was underestimated for I, channel, and double-channel sections with a slender web and noncompact flanges.
	2477	An incident was resolved for AISC 360-05 and AISC 360-10 steel frame design in which a tee section under compression was incorrectly classified as compact when it should have been non-compact or slender.
	2606	An incident was resolved for steel frame design per the Russian code SP 16.13330.2011 affecting pipe sections where the interaction equations of section p9.2.2 were calculating the parameter phi_e based on the major- and minor-axis bending moments separately. Now the parameter phi_e is based on m_ef for the resultant bending moment M = Sqrt(M22 + M32). The previous results were under-conservative regarding this.

*	Ticket #	Description
*	2608	An incident was resolved for steel frame design per the Russian code "SP 16.13330.2011" that corrected or improved several issues: (1) The parameter I_t is now taken as the sum of (K/3)*b*t^3 where K = 1.29 for doubly-symmetric I-sections, 1.25 for singly-symmetric I-sections, 1.12 for channel-sections, 1.2 for T-sections, and 1.2 for double-angle sections, all based on the 2017 specification SP 16.13330.2017 Annex G. Previously the value of I_t was taken from values specified in the section database. This parameter affects the calculation of phi_b and c_max. (2) The expression for phi for doubly-symmetric sections (such as standard I sections and double-channel sections) is calculated differently from singly-symmetric sections (such as singly-symmetric I sections, double-angle sections, and T-sections). Previously the value of psi was always calculated following the case of doubly-symmetric section per SP 16.13330.2011 Table G.1 and Table G.2. For singly-symmetric section, the parameter psi (or psi_a) is now calculated based on SP 16.13330.2011 G.4 Eq. (G.9), section G.4, section G.5, Table G.4, and Table G.5. All conditions of G.6 and G.7 are used. If the parameter n is larger than 0.9 (0.9 < n < 1.0), interpolation is used for the value of n between those for pure T-sections and singly-symmetric I-sections to determine the value of psi. The parameter psi is used to calculate phi_b. The detailed design report now provides more information on the calculation of these values. (3) The following changes apply for the calculation of Cmax: (3a) The parameter h is taken as the distance between the two centers-of-gravity of the top and bottom flanges for I-sections, channel sections, and double-channel sections. It is taken from the bottom of T-sections and double-angle sections to the center-of-gravity of the top flange following the 2017 specification SP 16.13330.2017 Annex E. Previously it was taken as the clear distance to the flanges for I-sections, channel sections, and double-channel sections; and from the bottom of T-sections and double-angle sections to the bottom of the top flange. (3b) The parameter n is taken as n = I1 / (I1 + I2) where I1 and I2 are the moments of inertia of the major and minor flanges about the section minor axis per SP 16.13330.2017 Annex Eq G.8. Previously the expression n = Iy / (I1 + I2) was used following the code, which was incorrect. The parameter n for double-angle sections and T-sections is now taken as 1. (3c) The parameters omega, alpha, and mue are now calculated differently for the major and minor bending axes of channel sections based on the specification SP 16.13330.2017 Annex E and Annex G. Previously the expressions for omega, alpha, and mue did not differ for the major and minor bending axes of channel sections. (4) If the shear-stress ratios (tau/Rs) for both the major and minor directions are small (less than 0.01, essentially pure shear), then cm for the major and minor directions is calculated based on equation SP 16.13330.2011 8.2.3, Eq. (53). Otherwise, cm is taken as c. Previously these same equations were used, but the limiting condition used was different. It used to be applied for singly-symmetric beams. (5) The parameter c is now only calculated for singly-symmetric I sections, doubly-symmetric I sections, double-channel sections, channel sections, double angle sections, and T-sections per SP 16.13330.2011 9.2.5, Table 21. For all other sections, it is taken as 1.0. Previously it was calculated for all section types using the same expressions that are applied for the flanged sections named above. (6) For I-shaped sections buckling in the minor direction, the assumed column curve has changed. For major-axis bending, column curve “a” is used for rolled sections with a section depth larger than 500m, and column curve “b” is used for all other cases. However, column curve “c” is now used for minor-axis bending per the new 2017 specification SP 16.13330.2017 7.1.3, Table 7. Previously column curve “b” was used for minor-axis bending. (7) For singly symmetric sections, the interaction ratios calculated for Eq. 105 and Eq. 106 of SP 16.13330.2011 section 9.1.1 now consider different compression-side or tension-side section modulus, as appropriate. Previously the minimum section modulus was always used, which could have been over-conservative. (8) The interaction equations Eq. 41 and Eq. 43 of SP 16.13330.2011 section 8.2.1 are now only checked if the axial force in the member is small, specifically if N < (0.1 * Ry * A). Previously these equations were checked regardless of the axial force, and the design could be over-conservative for larger axial force.

Documentation
Incidents Resolved

*	Ticket #	Description
	2586	An incident was resolved where the help documentation for the Application Programming Interface (API) had a typographical error for the function SapObject.SapModel.PropLink.GetPDelta, showing additional parameters in the method signature. This was a documentation error only and did not affect the API function.
	2617	An incident was resolved where the help documentation for the Application Programming Interface (API) had a typographical error in the syntax of the functions SapObject.SapModel.LoadCases.StaticNonlinearStaged.GetStageData_2, .GetStageDefinitions_2, .SetStageData_2, and .SetStageDefinitions_2. This was a documentation error only and did not affect use of these API functions.

Drafting and Editing
Incidents Resolved

*	Ticket #	Description
	2417	An incident was resolved where, if a frame was replicated and the option to replicate the steel design overwrites was selected, the steel design overwrites may not have been copied correctly and the design overwrites table sometimes showed two entries for that particular frame.

External Import and Export
Incidents Resolved

*	Ticket #	Description
	2385	An incident was resolved where the export of a model to CIS/2 could generate an error when the model contained frames with releases assigned. When this happened, no CIS/2 step file was generated.

Graphics
Incidents Resolved

*	Ticket #	Description
	2253	An incident was resolved where the option Show Active Structure (from the Display menu > Show Load Case Tree) was not working as intended for a staged construction case if the Add or Remove Structure operation was used and the model contained solids. This was a display issue only and did not affect results.

Loading
Incidents Resolved

*	Ticket #	Description
	2473	An incident was resolved for the Russian SP 20.13330.2016 auto wind loading applied to area objects where the pressure coefficient assigned to the areas was not being used, but instead the default pressure coefficient specified in the load pattern definition was used.

Results Display and Output
Incidents Resolved

*	Ticket #	Description
	2270	An incident was resolved where an error was reported when trying to display the right-click details of a steel-frame member designed according to the Italian UNI 10011 code. Affected model files are now corrected when they are opened and an informational message is displayed. This issue was previously resolved and released with version 21.0.0 but was inadvertently omitted from the Release Notes at that time.

*	Ticket #	Description
	2272	An incident was resolved where the state of fiber hinges and their containing fibers were not being reported in the Hinge Results display form or the tables "Frame Fiber Hinge States 01 - Overall Hinge" and "Frame Fiber Hinge States 02 - Individual Fibers". Now the states of the individual fibers are reported in the tables and can be displayed using the command Display > Show Hinge Results. The state of fiber hinges is determined as the most extreme of the states over the individual fibers in the hinge. The states of the fiber hinges are reported in the tables, displayed using the command Display > Show Hinge Results, and shown graphically on the deformed shape as colored dots. Note that the fiber state represents strain values defined for the material stress-strain curve using the notation A, B, C, D and E. Hinge status values IO, LS, and CP are not available for fiber hinges.
*	2478	An incident was resolved in which the software could terminate unexpectedly when attempting to animate the deformed shape of a load combination.
*	2610	An incident was resolved where requests to plot input load history (e.g. input acceleration) from a modal time history case resulted in an error and returned zero response.
	2673	An incident was resolved where linear multi-step load cases defined using the same load pattern for multiple steps could cause the software to terminate. When this issue occurred, results were not available for that linear multi-step load case and any load combinations containing the load case. This was not common, and only occurred when the load pattern was assigned multiple times within the multi-step load case, specifically when it was assigned more times that the total number of load patterns in the model.

Section Designer

Incidents Resolved

*	Ticket #	Description
	2356	An incident was resolved where the moment-curvature results of a steel section designer section reported incorrect steel tension and compression forces in both the display graph and details table. The moment-curvature curve was correct. When the steel section was only one object, the steel tension/compression forces were half of the correct value. Discretizing the section into multiple steel objects improved the behavior. This was a display issue only in Section Designer. No model results were affected.

Structural Model

Incidents Resolved

*	Ticket #	Description
	2237	An incident was resolved where in a particular model using the "Select by Group" command causes an error condition. The group assignments were corrupted in this model imported from a DXF file. The error is now trapped.
	2325	An incident was resolved where the scale factor calculated for the major moment direction of Parametric PMM frame hinges was too small. This affected semi-automated parametric frame hinges where the program was to calculate scale factors for P, M2 and M3 only. Fully automated parametric hinges or fully defined parametric hinges and all other types of hinges were not affected by this issue.

User Interface

Incidents Resolved

*	Ticket #	Description
*	2354	An incident was resolved in which the program could terminate when using the Assign > Frame Hinges command multiple times, depending on the options previously selected on the form.
*	2452	An incident was resolved in which the software could terminate when starting up and checking for the latest version. This was related to interaction with a web endpoint that was being blocked by OpenDNS.

*	Ticket #	Description
	2479	An incident was resolved where a message was presented when editing a precast concrete I-section definition indicating that tendon data was possibly invalidated. This message is not applicable to SAP2000 and was shown in error. This had no effect on the model or results.
	2481	An incident was resolved where the graphical display on the wave plot form was not scaling properly. This was a user interface issue only and did not affect results.