SAP2000® Version 18.2.0
Release Notes

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

Changes from v18.1.1 (Released 2016-02-26)

User Interface
Enhancements Implemented

*	Incident	Description
	89128	Multiple forms have been enhanced so that they can remain open for making subsequent changes to the display without the need to go back to the menu command. These include forms accessed from the following menu commands: View menu commands Set 3D View, Set 2D View, Set Limits, and Set Display Options; and all Display menu commands under submenus Show Misc Object, Show Misc Element Assigns, Show Object Load Assigns, and Show Element Load Assigns.
	91501	An enhancement was implemented on the Response Spectrum Generation form, accessed from the Define > Named Sets > Joint TH Response Spectra command, to ensure that at least one of the 'Include Frequencies' options is selected when saving the named set.

Graphics
Enhancements Implemented

*	Incident	Description
*	93999	An enhancement has been implemented to allow displaying all loads, within a single load pattern, on all object types, in a single display. The new option is available from the Display > Show Object Load Assigns > Load Pattern command.

Modeling
Enhancements Implemented

*	Incident	Description
	82049	A new Property Modifier assignment has been added for the link objects used to specify a scale factor multiplying the stiffness, damping, and force/moment response of the object. The scale factor applies equally to all six degrees of freedom, as well as the mass and weight. This allows the same link property to be used for multiple link objects that may, for example, represent different size tributary regions supported by the link objects.
	86627	An enhancement was implemented, adding solid rectangular and circular shapes to the choice of steel shapes that can be used to quickly define new frame section properties.
	88921	An enhancement has been implemented to update the Russian material property library to better integrate with the Russian frame design implementation. Numerical values of certain properties have changed from the previous release, but existing models will use the previous values and will not be affected.
*	90364	An enhancement was implemented that allows model settings, such as material properties, frame sections, load patterns, design preferences, and other definitions, to be saved and later used when starting a new model. Each collection of settings is named and stored in the installation folder or the user settings folder, so that appropriate settings can be chosen for different projects.

*	Incident	Description
	91114	An enhancement has been implemented adding a new "Expected Concrete Compressive Strength" to the concrete material property definition. This value is similar to the effective yield strength for steel materials. This new value is used in the stress strain curves and concrete hinge definitions. Creep and shrinkage analysis and concrete design still use the specified or characteristic compressive strength previously available.
	91264	A new property library "Nordic.pro" has been added. This includes a collection of common steel shapes used in the Nordic countries.
	92861	An enhancement has been implemented to the frame object submesh to now divide the object based on the clear length instead of the full length. The clear length is equal to the full length minus any rigid end offsets. This protects rigid end offsets from being overwritten when they are longer than the meshed end elements containing them. This may change the location of output stations of old models such that frame analysis and design results are changed. Previous version results were accurate based on the previously used output stations.

Loading
Enhancements Implemented

*	Incident	Description
	88108	An enhancement has been implemented to add the Russian SP 14.13330.2014 response spectrum function.

Frame Design
Enhancements Implemented

*	Incident	Description
	59504 87310 88301	An enhancement has been implemented for Eurocode 3-2005 steel frame design to allow overwriting the section classification to a higher class. The primary use of this would be to overwrite Class 1 sections to Class 3 to have them designed as elastic.
	74230 82949	An enhancement has been implemented for Eurocode 3-2005 and Italian NTC 2008 steel frame design to allow overwriting the values of Iw, NcrT, and NcrTF on a member-by-member basis.
	87244	An enhancement has been made for the Russian steel frame design code SP 16.133330.2011 in which additional parameters are now reported. These parameters are alpha, psi, phi1, and whether the beam is top loaded or not. These parameters are used in the determination of the factor phib which eventually is used in the interaction equations Eqn. 69 and 70 of section SP 8.4.1.

Analysis
Enhancements Implemented

*	Incident	Description
	30811 91738	Internal improvements have been made to the force equilibrium and deformation compatibility between frame hinges and their parent frame elements. This mostly affects fiber hinges and PMM hinges while dropping load. The effect is generally small, but can be helpful for the new event-to-event strategies that have been added for nonlinear direct integration time history load cases. In addition, multiple hinges in a single frame element will tend to perform better than previously, lessening the need to assign frame hinge overwrites that auto-subdivide the frame object at the hinges. This reduces the size of the analysis model and tends to increase the speed of the analysis. Results for models with these hinges may differ from previous versions, although the difference will generally be within the convergence tolerance for the load case. Models with P-delta may be more significantly affected, particularly for those few cases where the deformations of the hinge and the parent frame element were not fully compatible. For unstable and numerically sensitive models, larger differences may be observed.
	88259	An enhancement was made to speed up the creation of the analysis model for models with large number of area objects, patterns and pattern assignments.

*	Incident	Description
	90244	An enhancement has been implemented to reduce the number of events generated by a layered shell element. Event-to-event stepping can be used by nonlinear static and nonlinear direct-integration time-history load cases to help control stepping and convergence. The use of events for the layered shell element was introduced in version 18.1.0. For models with significant and localized nonlinearity, using events can improve the rate of convergence and speed-up the analysis. For models with widely distributed nonlinearity, a large number of events may be generated and this can actually slow down the analysis compared to not using events. This enhancement will reduce the number of events generated by a single layered shell element when many integration points are defined over the thickness of the layered shell section. Additionally, the event behavior for directional layered shell materials was altered to remove certain types of events. While the number of events generated by a single element has been reduced, models with a large number of shell elements and distributed widely distributed nonlinearity may still run better without event-to-event stepping. Minor changes in results from versions 18.1.0 and 18.1.1 may occur due to this enhancement for models containing layered shell elements and run using events, but the differences should be within the convergence tolerance for well-conditioned models.
*	90374	A pure event-to-event stepping solution strategy has been implemented as an option for nonlinear direct-integration time-history load cases. This is in addition to the iterative event-to-event stepping strategy already available for nonlinear static load cases and nonlinear direct-integration time-history load cases. Time steps will be automatically subdivided where changes occur in the stiffness of nonlinear elements. In contrast to the iterative method, more events will typically be generated, but iteration for equilibrium will not be performed under the assumption that the deviation from linearity will be small between events. Instead, any equilibrium errors are carried forward to the next time step and applied as a corrective load. This is similar to the method used in Perform-3D. This method may not be appropriate in cases with a large degree of geometric nonlinearity. Pure event-to-event stepping can be more efficient than iterative methods for small to medium sized models, but may not be so for large models with many nonlinear elements. Pure event-to-event stepping can also be helpful for models where convergence cannot be achieved with iterative methods, although the results should be reviewed for equilibrium.
	91401	The warning message printed in the analysis log file (.LOG) when negative mass is detected has been strengthened to indicate the potential adverse consequences upon analysis results. This includes inconsistent or divergent results, and poor convergence behavior for nonlinear analysis. Negative mass is usually the result of upward loads present in load patterns that have been specified to define the mass source. The new warning message indicates the need to correct this. Analysis results have not been changed.
	91429	Internal changes have been to increase the speed of nonlinear static and direct-integration time-history analyses, including the use of parallelization of certain element processes. The effect on run-time will be problem-dependent. Results may differ from previous versions due to the change in the order of numerical operations, but the differences are expected to be within the convergence tolerance of the analysis. Larger differences may occur for some very sensitive or poorly conditioned models.
	91678	An enhancement was made to improve the speed of analysis model creation when a large number of wind load patterns are loading a large number of frame members.
	93037	The "Hinge Unloading Method" parameter has been removed from nonlinear static and nonlinear staged-construction load case definitions. This parameter only applied to isotropic hinges, and using a non-default value was rarely useful in recent versions of the software. Now the default value "Unload Entire Structure" will always be used. Models opened in the new version that previously used a different setting may be affected, but this will not be common.
	93318	An enhancement has been implemented to speed up the creation of the analysis model for very large models with many Shell Uniform Load to Frame assignments.

*	Incident	Description
	93756	The multi-threaded equation solver has been changed to provide more consistently repeatable results when the same model is run more than once on the same machine. This change typically only affects very sensitive or ill-conditioned models, which could produce slightly different answers when re-run on the same machine. Previously the multi-threaded solver dynamically changed the number of threads used based on machine conditions, which could change the order of numerical operations and potentially affect sensitive results. Now the number of threads used defaults to the number of physical cores on the machine, and can be changed with the environment variables SAPFIRE_NUM_THREADS or SAPFIRE_NUM_THREADS_SOLVE. Furthermore, the order of operations now is fixed for the same number of threads on a given machine, leading to more consistently reproducible results. Sensitive models may still show differences between different machines with different processors and/or different numbers of cores available. This change will have little effect on most models, with the most significant effects being on long nonlinear time history load cases for sensitive models.

Application Programming Interface
Enhancements Implemented

*	Incident	Description
	91976	An enhancement has been implemented to improve the performance of importing frame section properties from section libraries via the SapObject.SapModel.PropFrame.ImportProp API function.
	93811	An enhancement has been implemented to add new API functions, GetResultsAvailable, for steel, concrete, aluminum, and cold formed frame design to determine if design results are available.

Documentation
Enhancements Implemented

*	Incident	Description
	89613	An enhancement has been implemented to add a note to the Analysis Reference Manual and the Generate Edge Constraints help topic that describes the potential issues with assigning an edge constraint along an edge that shares the same location as a frame, cable, tendon, or link object.

Miscellaneous
Enhancements Implemented

*	Incident	Description
	88994	The version number has been changed to v18.2.0 for a new intermediate update.

User Interface and Display
Incidents Resolved

*	Incident	Description
	76332	An incident was resolved where clicking the keyboard "Alt" key did not always bring up or cancel menu shortcuts as expected. No results were affected.
	89296	An incident was resolved where the command Display > Show Load Assigns > Load Case could be extremely slow depending on the types of objects and load present. This same behavior could occur displaying all loads for a given load case when using the command Display > Show Load Case Tree. No results were affected.
	89353	An incident was resolved where the software could terminate abnormally when trying to show the load-case tree if there was a linear or nonlinear modal time-history load case in the model. In addition, any load patterns assigned to a modal load case were not able to be displayed in the load-case tree form. No results were affected.
	89609	An incident was resolved on the Object Model - Area Information right-click form in which an incorrect caption was displayed next to the area local axes rotation value when assigned. This was a user interface issue only and did not affect results.
	90125	An incident was resolved in which the Response Spectrum Generation form would show mismatched content for the selected tab when first opened using the Display > Show Response Spectrum Curves command. Selecting another tab would correct the issue. This was a user interface issue only.
	90179 90258	An incident was resolved where the Select By Joint Support Assignment command could cause an error.
	90233	An incident was resolved in which an abnormal termination could occur in the Define Grid System Data form if the Display Grids As option was switched to Spacing when no gridlines were defined. This was a user interface issue only.
	91089 91471	An incident was resolved where re-opening the Select Labels form after having selected by labels using the Multiple Object from List option and then closing the form would cause an error.
	91278	An incident was resolved to correct two items with the new floating forms. (1) Some of the new forms would not close when the ESC key was pressed. (2) When using the tab key on forms with multiple input fields it would move to the next input field but did not select or highlight the content as was previously done in the old forms.
	93508	An incident was resolved in which the Extrude Lines to Areas form would have the incorrect tab selected when it was opened if the form had previously been used with either the Radial or Advanced tab selected. This was a user interface issue only and did not affect results.
	93801	An incident was resolved in which the file picker for a time history function from file was using a default extension of *. instead of *.*.

Modeling
Incidents Resolved

*	Incident	Description
	89298 90246	An incident was resolved where extra joints were sometimes being created for the analysis model when hinge auto-subdivide overwrites were assigned to frame objects. These extraneous joints could be inside the frame object or beyond its length. In addition, joints created for frame hinge overwrites did not always properly consider the end offset at the starting end of the member. These extra joints usually did not affect analysis results, or else the effect would be limited changing the stiffness used for strength loss in frame hinges during nonlinear analysis.
	89550	An incident was resolved in which assigning a group to objects when the model was locked did not work when clicking the OK button on the Assign to Groups form. Using the Apply button before clicking OK would correctly assign the group to the objects.
	89673	An incident was resolved where in certain cases attempting to convert a load combination to a nonlinear static load case would cause an error.

*	Incident	Description
	90300	An incident was resolved in which the default modulus of elasticity value for a newly added user region concrete material property was incorrect if the database units of the model were not kip-inch units. The actual default value used was clearly visible and could be changed by the user. Results agreed with the model.
	90778	An incident was resolved where in certain unusual conditions radial replication of 4-noded area objects with 3 nearly co-linear points could fail. Also a condition was fixed where selection by group might select objects that had recently been deleted.
	91075	An incident was resolved where the time variation of stiffness was incorrectly applied for "User" type time-dependent properties (command Define > Materials > Time-Dependent Properties > Modify/Show Stiffness Curve). Rather than using the values of the Stiffness Multiplier specified by the user, the square-roots of these values were being used instead. The value of modulus actually being used in analysis could be seen using the Show Plot button available while defining the time-dependent properties.
	91514	An incident was resolved where deleting an existing joint constraint and then adding a new one with the same name as the deleted one would not allow the new one to be assigned until the model was closed and reopened.
	91598	An incident was resolved for three of the I-sections in the ChineseGB08.pro section database file which had incorrect web and flange thickness values. The affected sections were HN650x300x10x15, HN650x300x11x17, and HN650x300x12x20. Analysis and design results would have matched the sections as imported.

Loading
Incidents Resolved

*	Incident	Description
	84902 86698 90107	An incident was resolved in which notional loads were not being included in the automatically generated load combinations. This was an inadvertent error introduced in v18.
	89430	An incident was resolved where a load case based on an auto seismic load pattern would not run in a particular model. Some minor database table issues were also resolved.
	89619	An incident was resolved where the uniform to frame shell load would sometimes apply a two-way load even though it appeared you were assigning a one-way load.
	90423	An incident was resolved in the NBCC 2010 auto wind load in which the generated loading was larger than required by the code when rough terrain was specified.
	91181	An incident was resolved in which the Assign Loads form accessed by right clicking on a solid object, going to the Loads tab, and then clicking the Assign Load button, would bring up the incorrect load assignment form for the option chosen. The load applied would reflect the form displayed.
*	91696	An incident was resolved where API 4F (2008 and 2013) open-structure wind loads were not correctly applied to cable objects. The error was significant and obvious, and could affect the analysis and design results for load cases and load combinations that these loads. The loading on frame objects was correct, only cable objects were affected. Affected models should be re-run with the new version to check the results. All previous versions with API 4F open-structure wind loads were affected.
	94033	An incident was resolved for the "Costa Rica Seismic Code 2010" response-spectrum function definition where the Overstrength Factor, SR, was being taken from the specified value for "Ductility Overstrength". A new parameter has now been added to specify an explicit value "Overstrength Factor".

Analysis
Incidents Resolved

*	Incident	Description
	86424	An incident was resolved where mass-proportional damping specified on the materials was incorrectly applied to the model for frame and solid elements in linear and nonlinear direct-integration time-history load cases. For frame elements, the mass damping forces were incorrectly applied to the element, which tended to underestimate the amount of damping. In addition, for a frame element with non-zero insertion points, the damping force was applied at the insertion points rather than at the joints where the mass is located; the effect of this on the results was generally inconsequential. For solid elements with only material-based mass-proportional damping specified, stiffness-proportional damping was also erroneously being included in the damping force. This tended to overestimate the amount of damping, and also caused convergence issues when running the nonlinear direct-integration time-history cases.
	88354	An incident was resolved in which errors during creation of the analysis model could occur if wind pressure coefficients were assigned to area objects for a wind load pattern which did not consider exposure from area objects.
	92664	An incident was resolved where the stiffness-proportional damping matrix computed for line springs and area springs was not being scaled by tributary length or area for nonlinear load cases. For nonlinear direct-integration time-history load cases, the calculated damping was correct to within the convergence tolerance, but the convergence behavior could be poor. For linear direct-integration time-history load cases using the stiffness from a nonlinear load case, this caused the damping to be overestimated for springs with smaller tributary regions and to be underestimated for larger tributary regions. Linear direct-integration time-history load cases starting from the unstressed (zero) state were not affected. Modal time-history analysis, including FNA, was not affected.
*	93487	An incident was resolved in which linear springs assigned to line, area and/or solid objects sometimes provided stiffness along directions other than the chosen tension and compression direction. The affected linear line/area/solid springs were only those specified as "Tension and Compression", not "Tension Only" or "Compression Only". This error only happened when the user displayed a linear link property that had non-zero stiffness along any of the directions other than the tension/compression direction of the line/area/solid springs before running the analysis. Displaying other types of link properties, even after initially displaying a linear link property, did not affect the line/area/solid springs. Closing and re-opening the software temporarily resolved the issue, but did not prevent it from reoccurring if a linear link property was displayed again before running the next analysis. This was not a common problem, but when it occurred the error may not have been obvious. Correct results were always obtained by opening the software and model, unlocking the model (if locked), and running the analysis.

Frame Design
Incidents Resolved

*	Incident	Description
	86857 88264	An incident was resolved for steel frame design according to AISC 360-10 in which pipe sections were always classified as compact. This could generate warning messages when the section actually satisfied the seismic compactness criteria. In other cases it could be unconservative if the section was actually non-compact or slender. This issue existed in v18.0.0 through v18.1.1.
	87238	An incident was resolved in Russian steel frame design code SP 16.133330.2011 in which the determination of the parameter phib (SP Table G1) was done incorrectly for cases with one bracing point exactly at the middle. Other cases were correct. The phib parameter is used in the interaction equations Eqn. 69 and 70 of section SP 8.4.1.
	87239	An incident was resolved for Russian steel frame design code SP 16.133330.2011 in which the n factor was being calculated as 1.5 for section type 6 (H shape) when the major axis moment was zero. According to Table F.1 a value of 3.0 should have been used. The error was conservative.

*	Incident	Description
	87240	An incident was resolved for Russian steel frame design code SP 16.133330.2011 in which the interaction equation Eqn. 107 of section SP 9.1.3 was being used for all shapes with Ryn > 440 N/mm^2 for both symmetric and unsymmetric sections. According to the code (SP 9.1.3) this equation should be checked only for unsymmetric sections. Since the symmetry is checked for both axes bending in the program, only affected sections are T-shapes, Double-Angles, and Channels. This extra check is now removed for all doubly-symmetric sections. The error was conservative.
	87242	An incident was resolved for Russian steel frame design code SP 16.133330.2011 in which the determination of the parameters alpha and beta was done correctly per SP Table 7 except the exception clause as given in the note under the table was not implemented. Affected shapes are rolled I-shapes with depth greater than 500 mm. Previously all I-shapes were treated as class "b" (α= 0.04; β = 0.09). Now these rolled I-shapes with depth greater than 500 mm will be treated as class "a" (α = 0.03; β =0.06). Also the reporting of beta has been corrected. The alpha and beta parameters are used in Eq. 7. Error was conservative.
	87243	An incident was resolved for Russian steel frame design code SP 16.133330.2011 in which the determination of the parameter phib (SP Table G1) was done incorrectly for C-shapes. For C-shape sections: Phi_b = 0.7 * Phi_1 per the code (SP G7). SAP2000 used the factor 0.75 instead of 0.7. All other cases were okay. The phib parameter is used in the interaction equations Eqn. 69 and 70 of section SP 8.4.1.
	88779	An incident has been resolved for concrete frame design for the Russian SP 63.13330.2012 code that addresses the following issues: (1) The modulus of elasticity of concrete was referred to as "Ec". It is now referred to as "Eb". Reporting issue only. (2) The long term and short term interaction equations were being used in reverse for cases of gravity load only cases and cases with lateral load. (3) The "Relative Humidity" term is now input and reported as percentage. Previously it was being input and reported as fraction. (4) The short term and long term strain limits are being taken correctly. This is consistent with the Relative Humidity chosen in the preferences. (5) The strain limits for reinforcements are displayed correctly. It was a display only issue. (6) The Section Designer now responds correctly to the choice of number of interaction curves and number of interaction points. (7) The eta factor and its associated variables are reported in the details window now. (8) The phin_n factor and its associated variables are reported in the details window now.
*	88001	An incident has been resolved in the steel frame design codes Eurocode 3-2005 and Italian NTC 2008 where the drift from the analysis was directly used to calculate the rotation of the EBF. This analysis drift is now multiplied by the behavior factor q as the design spectrum has been reduced by this factor. The program was unconservative for checking drift rotation. The documents have been updated.
	89316	An incident was resolved for the Russian SP 16.13330.2011 steel frame design in which an error could be generated when running the design, depending on the number of load combinations defined in the model and the number of load combinations selected for design.
	89868	An incident was resolved for steel frame design in which an error was generated when running the design for auto-generated design combinations and a user-defined design combination that contained a seastate load case.
	90666	An incident was resolved in steel frame design per the NTC 2008 and EC 3-2005 codes where for certain conditions the reported maximum span moment was taken as zero. This reduces the stress ratios for the stability cases. This happened when one or both end moments are close to zero but not identically zero. This also happens when the unbraced length ratio is overwritten and the value is too small to contain any output station within the short length.
	91820	An incident was resolved for steel frame design according to AISC 360-10 in which the calculation of the web plastification factor, Rpc, was not considering the case when Iyc/Iy <= 0.23 and therefore setting Rpc=1.0. This could result in unconservative moment capacities when Iyc/Iy was less than 0.23.

*	Incident	Description
	92873	An incident has been resolved for steel frame design for the Russian SP 16.13330.2011 code that addresses the following issues: (1) The interaction equation Eq. 10 is no longer checked for all sections. It is now only checked for welded channel section as this applies only for PI-type sections (SP 16.13330.2011 7.1.5). Its effect is significant. (2) The condition that c must be less than c_max is now applied only when Lambda_bar > PI. Previously, c was always imposed to be less than or equal to c_max (SP 16.13330.2011 9.2.5). Its effect is minor. (3) The calculation of c_max has been enhanced by considering differing values of h per different sections: the full depth, the clear depth, mid-flange to mid-flange depth (SP 16.13330.2011 Eqn E.1, Annex G, Table E6). Its effect is minor. (4) There was an error in the evaluation of the stress ratio while checking Eq. 70 for Channel shapes as the section properties Wcy (minor direction) was not calculated right (SP 16.13330.2011 8.4.1). This caused a dramatically large stress ratio. This was an obvious error. (5) There was an error in the evaluation of whether the member is a cantilever or not. The program does this evaluation based on the bending moment and shear force diagram. This caused the Psi, and eventually Phi_b, to be incorrect (SP 16.13330.2011 Eqn G.2 and G.3, Table G.2). (6) The detailed output has been improved to provide more information.

Results Display and Output
Incidents Resolved

*	Incident	Description
	59382	An incident was resolved where single degree-of-freedom frame hinges using the Takeda hysteresis model could sometimes indicate that yielding had occurred at force or moment values lower than the specified yield value (point B). This could occur the first time the force value changed sign. Only the reported state (past point B) was affected, not the actual force-deflection or moment-rotation behavior. No other results were affected. This error did not affect other hysteresis types (isotropic, kinematic, Pivot).
	89116 89935	An incident was resolved in which the advanced report writer was generating a report containing values that did not correspond with the table column headers which showed the current display units. Now the advanced report writer always generates the report in database units irrespective of the current display units.
	89912	An incident was resolved where the plotted potential and hysteretic energies for FNA load cases are wrong for certain types of link objects: Multilinear Elastic, Gap, Hook, Plastic (Wen), Rubber Isolator, and all three Friction-Pendulum Isolators (the first three types exhibit potential energy only). When this error occurred the effect was usually obvious from the unrealistic plots, which could include negative energies. No other results were affected. Versions 17.2.0 to 18.1.1 were affected.
	90523	An incident was resolved where the static and dynamic modal load participation ratios were not being reported in table "Modal Load Participation Ratios" for link-object degrees of freedom (DOF). The static and dynamic ratios for link DOF should be reported for Ritz modal cases that apply Link - All load, but only for those link objects that have at least one nonlinear DOF. This was a reporting omission only in versions 18.1.0 and 18.1.1. No results were affected.
	90977	An incident was resolved where the reaction forces at restrained joints was still being reported even after the joint was removed from the structure in a staged construction load case. The reaction was being reported at the removed joint and included in the base reactions. Overall structural response was unaffected. No other displacement, force, moment, or stress response was affected. This error only occurred at restraints, not at spring or one-joint link supports.
	91795	An incident was resolved in which the user-defined contour range for shell results displays was not working. This was a graphical display issue only and did not affect the analysis or design results.
	93035	An incident was resolved in which the Overwrite Loads option for pictures defined in a report contents XML file was not working.
	92808 93262	An incident was resolved where the StepType field in some database tables for analysis results would not display in a report even though it would display using the Display > Show Tables command.

*	Incident	Description
	94642	An incident was resolved where the user-specified range for various types of plotted response contours was always being set in database units rather than user-selected display units. This affected the contour display for displacements; soil pressures; frame stresses; shell resultants, stresses, and design results; and the stresses for plane, asolid, and solid elements. Only contour results were affected. All other results were correct, including the values shown under the mouse cursor and in the right-click details forms. Contour results were only incorrect when the display units selected in the lower-right corner of the graphical user interface were different from the database units, which are the units selected whenever the model is opened.

Database Tables
Incidents Resolved

*	Incident	Description
	88223	An incident was resolved where the fiber hinge relative length value was not being imported in the database tables.
	89317	An incident was resolved where equal constraints did not edit correctly in the interactive database editor.
	89439 90989	An incident was resolved where an abnormal termination occurred while editing a format file using the Options > Database > Edit Format File command.
	92153	An incident was resolved where an abnormal termination occurred while editing a format file using the Options > Database > Edit Format File command.
	93804	An incident was resolved where editing the Load Case Definitions table in the interactive database could cause nonlinear static staged construction cases in the model to be converted into regular nonlinear static cases.
	94127	An incident was resolved where an error occurred when editing Mass Source data using the interactive database editor.

Application Programming Interface
Incidents Resolved

*	Incident	Description
	87454 90524 93005	The Application Programming Interface (API) help documentation has been updated to provide new example code for connecting to Matlab. The new code shows how to use Matlab's .NET interface rather than its COM interface. This helps to avoid memory errors that can occur when passing arrays from Matlab that may be re-dimensioned in SAP2000/CSiBridge.
	89069 89446 91921	An incident was resolved where some API users creating 32-bit COM clients were experiencing 'Runtime error "429": ActiveX component can't create object', when attempting to use the 64-bit program via the API. This has been resolved as part of the installation process.
	89961	An incident was resolved in which the API for the v18.0.0 and v18.0.1 64-bit version still used the same GUIDs as v17 and these GUIDs were different than v18 32-bit API. This could cause an issue for COM clients in the following scenarios. 1) If v17 and v18 64-bit were installed on the same machine, the API client may connect to the wrong instance of SAP2000. 2) A v18 API client couldn't work with both the 32-bit and 64-bit without having two different versions of the client, compiled against the different API assemblies. This issue was resolved in v18.1.0 but was inadvertently omitted from the Release Notes.
	93143	An incident was resolved in which the API function SapObject.SapModel.Results.ModalPeriod was always returning 0 for the StepNum value.

External Import/Export
Incidents Resolved

*	Incident	Description
	91931	An incident was resolved where Revit walls and floors with a compound structure made of several layers of different materials were imported with "None" properties in the case of walls or not imported at all in the case of floors. When this occurred, the results agreed with the model. Walls and floors are now imported with their SAP2000 section materials and thicknesses determined by the thickness of the thickest concrete layer in the Revit compound structure, or in its absence, the thickness of the thickest steel layer, or in the absence of both of these, the thickness of the thickest layer.
	93659	An incident was resolved in which the export to SAFE *.f2k Text File command would generate an invalid *.f2k file if the name of a SAP2000 object or property contained the quote (") character, as sometimes used to indicate inch units. The resulting *.f2k file would then import into SAFE with error messages and use default values where these errors happened.

Documentation
Incidents Resolved

*	Incident	Description
	90758	An incident was resolved in which the API documentation was not updated for specific functions which experienced a breaking change between v16 and v17. The breaking change was generally documented in the API help.
	92175	An incident was resolved in which the steel frame design manuals for AISC 360-05 and 360-10 incorrectly documented the equation for Fez in section 3.5.2.1.2.3.4. This was a documentation issue only and did not affect design results.
	92252	An incident has been resolved in the concrete frame design manual for ACI 318-14 code in which the expression of T_th had a term $(A\_cp/p\_cp)^2$ instead of (A_cp^2 / p_cp). This was a documentation issue only and did not affect design results.

Installation
Incidents Resolved

*	Incident	Description
	75222	An incident was resolved in which an error message regarding port 80 could be generated when performing a silent uninstall if the port was not open. This check is now ignored when using the SHOWACTIVATE=0 parameter during the silent uninstall.