

# SAP2000® Version 17.3.0 Release Notes

© Copyright Computers and Structures, Inc., 2015

**Notice Date: 2015-07-02**

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 v17.2.0 (Released 2015-05-20)**

### **User Interface**

#### **Enhancements Implemented**

*	Incident	Description
	78078	An enhancement was implemented to show a tooltip for the object name on the right click object properties form when the name is longer than the input box.

### **Modeling**

#### **Enhancements Implemented**

*	Incident	Description
*	25057 26300 47014 52766 76524	Time-dependent material behavior has been expanded to include the CEB FIP-2010 and ACI 209R-92 codes, as well as to support user-defined curves. Time-dependent behavior includes creep, shrinkage, and stiffness-aging during staged construction analysis.
	18860 29459 30291 42119	An enhancement has been implemented to reinstate and enhance the pipes and plates templates that were removed in v17.0.0.

### **Loading**

#### **Enhancements Implemented**

*	Incident	Description
*	79651	Mass source from loads has been enhanced to exclude vertical loads from self-equilibrating effects, including: temperature, strain, deformation, target force, pore-pressure, and asolid rotate loads. This also includes the self-equilibrating component of force along the chord (joint-to-joint line) of a cable object under transverse load. Only the net vertical load (global Z) from each object in a selected load pattern is now considered as contributing the mass source. Results may now differ from previous versions for models that use such loads in mass source definitions. However, the effect was usually small for cable objects, and the other types of loads are not commonly used in mass source definitions, so most models will not be affected.

### **Analysis**

#### **Enhancements Implemented**

*	Incident	Description
*	79573	The speed of nonlinear static and nonlinear direct integration time-history analysis has been increased for models containing many linear shell elements.

## Application Programming Interface Enhancements Implemented

* Incident	Description
80000	An enhancement was implemented, adding new API functions to define joint time history response spectra named sets and to extract the associated results from these named sets. The new functions added are SapModel.NamedSet.SetJointRespSpec, SapModel.NamedSet.GetJointRespSpec, and SapModel.Results.JointRespSpec.
80455	An enhancement has been implemented in the API to add the ability to get and set additional steel frame design preferences for the AISC 360-05 and 360-10 design codes. Please refer to the API documentation for a list of the additional preference parameters added.
80559	The Application Programming Interface (API) has been modified for handling External Results as follows: 1) API functions for handling External Results have been exposed in the API interface. These were previously available in SAP2000 v16 but were not expose in SAP2000 v17. These functions are highly specialized and not needed by most API users. 2) The API function SapModel.ExternalAnalysisResults.SetFrameForce has been made more efficient for handling multiple calls to process large numbers of external load cases. 3) A new API function has been added, SapModel.ExternalAnalysisResults.SetFrameForceMultiple, that is the same as SapModel.ExternalAnalysisResults.SetFrameForce, but can process multiple frame objects and multiple load cases at the same time.

## Installation and Licensing Enhancements Implemented

* Incident	Description
80321	All significant installed EXE and DLL files from CSI are now digitally signed to avoid sand-boxing and other interference from anti-virus products. It is important to note that there never was a threat from any of the installed files in any previous release, but a few anti-virus products are overly cautious, which could cause them to prevent the software from running. No results were affected.

## Miscellaneous Enhancements Implemented

* Incident	Description
79316	The version number has been changed to v17.3.0 for a new minor release.

## User Interface Incidents Resolved

* Incident	Description
79261	An incident was resolved in which a model window that was made floating would not close when clicking the close button unless the model area was first clicked to activate the window before closing it. This was a user interface issue only.
79539	An incident was resolved where the coordinate values shown at the bottom right hand corner of the main window would sometimes get truncated when using larger fonts.
80098	An incident was resolved in which an abnormal termination error would occur when making a cell selection in the interactive database for certain tables. This was a user interface issue only and did not affect results.
80107	An incident was resolved in which an abnormal termination would occur when using the Advanced > Edit > More > Divide Solids command. This was a user interface error introduced in v17.2.0.
80218 80242	An incident was resolved in which adding a user material property would not immediately update the list of materials on the Define Materials form. This could have resulted in duplicate materials

*	Incident	Description
	80420	being defined. This was a user interface issue and did not affect results.
	80320	An incident was resolved in which an abnormal termination error would occur when trying to use the context sensitive help (F1) while the Modify Undeformed Geometry form was open. This was a user interface issue only and did not affect the results.
	80600	An incident was resolved in which the steel, aluminum, and cold-formed frame design preferences forms incorrectly named the Demand/Capacity Ratio Limit as Max Number of Auto Iterations. This was only an issue with the item name on the form. The value input would have changed the demand/capacity ratio limit.
	80764	An incident was resolved in which the Modify/Show and Show Table buttons on the Create Custom Report form are disabled, preventing these actions from being used. This was a user interface issue only.

## Drafting

### Incidents Resolved

*	Incident	Description
	68625	An incident was resolved where the onscreen reshaper tool would sometimes not work correctly when the display was not in the Global coordinate system.
	79457	An incident was resolved in which an error would occur when drawing secondary beams and specifying a spacing of 0.5 database length units or less.

## Graphics

### Incidents Resolved

*	Incident	Description
	70676	An incident has been resolved where multiple mouse actions done simultaneously (for instance pan and zoom) while drawing could cause the onscreen behavior to be erratic.
	79058	An incident was resolved where removing partial fixity assignments would still display a label on the model indicating the assignment. This was a graphical issue only. The assignment was actually being removed and the results were correct.

## Modeling

### Incidents Resolved

*	Incident	Description
	77704	An incident was resolved where the FEMA 356 auto hinge properties for steel beams could have used the wrong parameters for ductility if the database units for the model were not kip-inches.
	79144	An incident was resolved in section designer in which a section designer section could be lost when using the interactive database to edit any data that was not pertaining to the frame sections. This error was introduced in v17.2.0.
	79313 79815 80203 80439	An incident was resolved in which the section properties for general sections were reset to zero when adding or modifying a general section via the forms. It was possible to use the interactive database to avoid this problem. This only affected v17.2.0.
	79447	An incident was resolved in which an error would occur when radially replicating certain models with advanced local axes specifications. This was only an issue in v17.2.0.

## Section Designer

### Incidents Resolved

*	Incident	Description
	79430 80111 80244	An incident was resolved in which section designer would not keep a predefined section that was selected from the dropdown box when right-clicking on a standard shape. This was introduced in v17.2.0.

* Incident	Description
79820	An incident was resolved in section designer for rectangular and polygon sections, in which editing the edge reinforcement of the section could result in an error message that could not be closed after entering an invalid Bar Spacing or Bar Cover value to the Edge Reinforcing form.
79922 80090	An incident was resolved in Section Designer in which an unexpected error message would occur when trying to view the report form by clicking the "View or Print" button in the material stress-strain curve form and the "Details..." button in the section moment curvature curve form.
80374	An incident was resolved in section designer where a stress point could not be edited by right-clicking after it was drawn on the solid shape. Right-clicking the stress point(s) always brought up the form to edit the underlying solid shape. This was a user interface issue only.
80525	An incident was resolved for Section Designer in which right-clicking on a reference line would not display the Shape Properties form to allow editing of the reference line. This was a user interface issue only, and no results were affected.
* 80679	An incident was resolved for Section Designer where the moment-curvature relationship could not be calculated for sections that contained an opening. This would cause an error message to be displayed when trying to plot the moment-curvature relationship within Section Designer, and would also affect the generation of Caltrans hinge properties for such a section. In addition, the automated calculation of the cracked-section properties for bent columns as implemented in the bridge seismic design could produce incorrect results that may affect the demand and capacity results. Only version 17.2.0 was affected by this error, and only Section Designer sections with openings.

### Loading Incidents Resolved

* Incident	Description
* 79242	An incident has been resolved for the auto lateral wind loading according to ASCE 7-02, 7-05, and 7-10 when overwriting the diaphragm widths while considering ASCE Case 3 and specifying the wind to occur at 90 degrees. When considering this case, the diaphragm widths for the primary direction (Global Y) were set per the user specified values as expected, but the widths used for the perpendicular direction (Global X) were incorrectly taken as the program determined widths in the Global Y direction instead of the Global X direction. This could result in unconservative loading for certain structure geometries. This was not likely to affect the overall design of structures that considered all of the ASCE cases, as the other cases would likely have enveloped the effects of wind on the structure.

### Analysis Incidents Resolved

* Incident	Description
60803	An incident was resolved where force-controlled axial hinges with strength loss did not always lose strength at the specified limit force, but would instead continue to exhibit strength after the limit is exceeded. When this occurred the error was obvious. This incident was resolved with version 17.2.0 but was inadvertently omitted from the Release Notes.
* 71544	An incident was resolved where the behavior of kinematic hysteresis model could exhibit strength loss more rapidly than expected from the specified stress-strain or force-deformation curve. This did not affect the behavior for strain or deformation levels where the stress or force was increasing, only strain or deformation levels where the stress or force value was decreasing, beyond the maximum stress or force value. Kinematic hysteresis can be specified in multi-linear plastic link properties, single-degree-of-freedom (non-interacting) frame hinge properties, and in material stress-strain curves affecting frame fiber hinges and nonlinear behavior in layered shells. Any link, frame, or shell object using one of these properties could be affected by this error if strength loss is expected in a given nonlinear load case. This error affected version 16.1.0 to 17.1.1. This incident was resolved in version 17.2.0 but inadvertently omitted from the Release Notes.
74604	An incident was resolved where the analysis was unable to run using the advanced or multi-

*	Incident	Description
		threaded solvers on certain machines that use an AMD CPU chip branded as APU (accelerated processing unit). Such machines are not commonly used for engineering purposes. When this occurred, results were not available. If the analysis was run in the GUI process (typical for smaller models), a message was shown and the software was closed. If the analysis was run as a separate process (typical for larger problems), only the analysis was terminated and the user could continue working with the model. This error did not affect analyses run using the standard solver. Setting the environment variable MKL_DEBUG_CPU_TYPE = 2 using the Windows Control Panel before starting the software could be used to avoid this error, but this is no longer required with the new version.
*	77488	An incident was resolved where link elements of type "Damper - Exponential" could add negative stiffness to the structure in a nonlinear modal time-history (FNA) load case if it was based on mode shapes from a modal case that was used the stiffness from the end of a nonlinear static or nonlinear direct-integration time-history load case. This included modes calculated using the Preset P-delta option "Iterative - Based on Loads". When this occurred, the effect was generally obvious, and was more pronounced for larger stiffness values used in the damper property. This affected versions 17.0.0 to v17.2.0.
*	77550 80054	An incident was resolved where the results of linear direct-integration time history analysis with stiffness-proportional damping could become unstable for models with spring supports. When this occurred the error was obvious because the displacement, force and stress results would diverge and become unrealistically large. Models without spring supports were not affected. This error affected version 17.0.0 to 17.2.0.
	79627	An incident was resolved where sometimes the analysis could not be canceled, but would instead continue to run even after clicking the Cancel button and selecting the Yes option. No results were affected.
	79710	An incident was resolved where the analysis could fail to run, terminating with an error message, when running models containing plane or asolid elements with both 3 and 4 nodes. When this occurred, results were unavailable.
	80318 80421	An incident was resolved where replicating frame elements after design defaults had been set and running the analysis may in very rare cases reassign the sections of the replicated elements. Viewing the sections after analysis showed the sections used in the analysis.

**Frame Design**  
**Incidents Resolved**

*	Incident	Description
	80240	An incident was resolved in which the design overwrite "Framing Type" for all members were being reset to default framing type for any concrete frame design codes when design preference values were viewed and the OK button was clicked, even if any of the preference items were not modified. However, the design results agreed with the reset design overwrites. Now the members maintain the overwritten values of framing type and many other overwrites when the preferences are viewed and the user clicks okay. However the framing types will get overwritten if the design code is changed.

* Incident	Description
80638	An incident has been resolved for the Italian NTC 2008 steel frame design code in which the following issues have been addressed: 1) Two preference items, namely "Combinations Equation" and "Reliability Class" have been removed. 2) The default value for preference item Pattern Live Load Factor is now set to 0 instead of 0.75. 3) The preference item "Interaction Factor Method" is renamed as "Method Used for Buckling under P-M-M" with possible values "Method A" and "Method B". 4) The options for Framing Types in the preferences have been changed to DCH-MRF, DCL-MRF, DCH-EBF, DCL-EBF, DCH-CBF, DCL-CBF, Inverted Pendulum, and Non Dissipative. All DCM* items have been removed. 5) The descriptions of the preference items have been updated to reflect the NTC code and equations instead of Eurocode 3. 6) The reference to Psi factor that is used in the expression of M <sub>cr</sub> was C1. Now it is referred to as Psi. 7) The details output has been updated to better represent the governing interaction equations used. 8) Some of the interaction equations were referring to Eurocode. The references to the equations are now made to NTC and Eurocode as appropriate. 9) The documentation has been updated to reflect these changes.

## Results Display and Output

### Incidents Resolved

* Incident	Description
78522	An incident was resolved where the max-min shown in the status bar was only for the last window plotted and was not being updated when the active window was changed.
78740	An incident was resolved where the section cuts drawn on screen when saved were for the wrong side if the display was a plan view or the elevation view was set to show the reverse face.
79399 80279	An incident was resolved in which the output using the File > Print Tables command was in the incorrect units if the current display units were different than the database units. The results displayed on the model or when using the Display > Show Tables command were correct. This only affected v17.2.0.
79585	An incident was resolved in which the number format settings defined with the Options > Set Program Default Display Units command were not applied to generated reports. This did not affect the results.
80539 80693	An incident was resolved in which the report created using the File > Create Report command was in the incorrect units if the current display units were different than the database units. The results displayed on the model or when using the Display > Show Tables command were correct. This only affected v17.2.0.

## Database Tables

### Incidents Resolved

* Incident	Description
79550 79982	An incident was resolved in which using the interactive database and exporting a table to Excel for editing could result in Excel changing the field format (i.e. a label of '2-1' would become '1-Feb') which in turn would cause issues when bringing the data back in from Excel. This affected version 17.2.0 only.
79964	An incident was resolved where in some cases items overwritten or deleted in the interactive database were not deleted in the model.
80034	An incident was resolved in which the tables tree form layout could become messed up in certain rare cases. This was a user interface issue only and did not affect results.

## External Import/Export Incidents Resolved

*	Incident	Description
	80220	An incident was resolved, correcting two issues which affected the import of STAAD .std files. 1) When processing several STAAD commands which apply to lists of STAAD elements, SAP2000 did not recognize group names provided in lieu of explicit lists of elements. When this occurred, no model was created. 2) SAP2000 did not recognize the SELF WEIGHT command when it was spelled in two words instead of one and accordingly did not set the SAP2000 self-weight multiplier for the corresponding load pattern. SAP2000 recognized the SELFWEIGHT command spelled in one word. When this occurred, the results agreed with the model. Both issues affected all versions capable of importing STAAD files.

## Data Files Incidents Resolved

*	Incident	Description
	79337	An incident was resolved in which importing a model from *.s2k, *.\$2k, *.xls, or *.mdb with Solid Auto Mesh Assignments data would result in an error and terminate the import.
	79350	An incident was resolved in which importing a model containing friction spring damper link elements would cause an error and terminate the import. This included importing from *.s2k, *.\$2k, *.xls, or *.mdb files, using v17.0.0 through v17.2.0.
	79383	An incident was resolved in which certain Microsoft Access (*.MDB) model files that had tables with no records would generate an error when imported.
	80401	An incident was resolved in which an exception message was displayed when trying to open a model created in the evaluation version in the commercial version, or vice versa. Models are not cross compatible between the evaluation and commercial versions. Detailed error messages are now displayed to indicate that the model is not compatible.

## Documentation Incidents Resolved

*	Incident	Description
	52424	An enhancement has been made to the steel frame design manual for Eurocode 3-2005 to document the procedure for calculating C1 for members when the moment gradient is non-uniform. This is a documentation change only and does not affect design results.
	79433	An incident was resolved in which the API documentation for the DesignSteel.SetCode and DesignSteel.GetCode functions was out of date and did not provide the latest list of supported steel design code names.

## Installation and License Incidents Resolved

*	Incident	Description
	79348	An incident was resolved in which the SAPTRANSv161.exe file was being flagged by certain virus scanners as a threat. This was a false report.