SAP2000 v26.2.0 Release Notes

Notice Date: 03-February-2025

This document lists changes made to SAP2000 since v26.1.0, released 25-October-2024. Items marked with an asterisk (*) in the first column are more significant.

Analysis

Enhancements Implemented

*	Ticket	Description
*	10974	The rotation of link-element local axes with large displacements is now controlled by the P-delta factors defined for the link property. This new behavior only affects nonlinear static, direct-integration, and staged-construction load cases where the geometric nonlinearity parameter has been set to "P-Delta plus Large Displacements". Previously the local-1 axis was always oriented along the deflected line from joint I to joint J. Now the local-1 axis can be specified as determined by the rotation at joint I, the rotation at joint J, the deflected line from joint I to J, or a linear combination of these, all in direct proportion to the specified P-delta factors for the moment at end I, the moment at end J, and the shear-force couple, respectively. The behavior is specified separately for the local 1-2 and local 1-3 planes as part of the link-property definition. While the use of the deflected line is appropriate for braces and truss-like members, the use of end rotations rather than the deflected line is better for gap elements, as well as for certain devices (like friction isolators), where the axial behavior does not change with shear deflection. Note that for zero-length elements, only the joint rotations are used. For one-joint links, the rotation at joint I is assumed to be zero. Previously no large-displacement effect was considered for zero-length or one-joint links. For all links, the local-2 and local-3 axes rotate about the local-1 axis with the average torsional rotation of the two ends, which was the previous behavior as well.

Data Files

Enhancements Implemented

*	Ticket	Description
	11112	An enhancement has been implemented to update the material library for the New Zealand region. Previously, the materials from Australian standards that are commonly used in New Zealand had to be imported separately from the material library for Australian region. This enhancement updates the library for New Zealand region so that all requisite materials from the Australian standards are included in the New Zealand material library in addition to all materials per the New Zealand standards.

Database Tables

Enhancements Implemented

*	Ticket	Description
*	10336	The floor vibration analysis feature, based on AISC Design Guide 11 (Frequency Response Method), now includes input tables for excitation sets and output tables for results. Additionally, excitation sets are accessible in the Model Browser, simplifying their definition and enhancing usability.

Design – Slab

Enhancements Implemented

*	Ticket	Description
*	8880	An enhancement has been made for the Eurocode 2-2004 concrete shell design to add design requests and overwrites. In addition, the design forces in the reinforcement have also been corrected to be calculated using the membrane forces that are adjusted by the correction forces (i.e. DeltaN11Top, DeltaN22Top, DeltaN11Bot, and DeltaN22Bot) arising from determination of forces in the reinforcement at its actual location in the last design iteration for convergence of layer thicknesses. Previously, design forces in reinforcement were calculated using the membrane forces without the correction forces.

Design – Steel Frame

Enhancements Implemented

*	Ticket	Description
	512	An enhancement was made to show the principal moment of inertias and the principal direction angle on the properties form for section designer sections. Also a minor fix was made to the shear area calculations for sections comprising of other multiple rolled sections.
	1825	An enhancement has been made to the steel frame design optimization, where the program now gives users a choice in the Preferences regarding whether to ignore the warnings during optimization. Previously, the program rejected sections that introduced a warning. From now on, the program may or may not reject the member based on this choice. The program categorically rejects all sections that introduce an error.
*	10689	An enhancement has been made to add the new EN 1993-1-1:2022 steel frame design code.
	10949	An enhancement has been made to steel frame design codes "EN 1993-1-1:2005/A1:2014", "Italian NTC 2018", and "Italian NTC 2008" and cold-formed steel frame design code "Eurocode 3 1-3 2006", in which the program now allows the fillet radius for web and flange connections for I-shapes, Channels, and Double-Channels to be less than the flange plate thickness. The change affects the b/t ratio and might affect the moment capacities. The previous implementation was slightly unconservative when the specified fillet radius was less than the flange plate thickness.

Documentation

Enhancements Implemented

*	Ticket	Description
	1082	The CSI Analysis Reference Manual has been updated to include content for minor existing features that were previously only described in the Help, as well as for style and improved ability to search within the PDF file.

Drafting and Editing

Enhancements Implemented

*	Ticket	Description
	1160	An enhancement was made to improve the meshing of warped four-noded area objects.

Installation and Licensing

Enhancements Implemented

*	Ticket	Description
*	10970	The version number has been changed to 26.2.0 for a new intermediate release.

Section Designer

Enhancements Implemented

*	Ticket	Description
	10972	An enhancement has been implemented to improve the efficiency of section property calculations for complex cross-sections. In addition, the notional size calculation for metal material section objects is now skipped.

Structural Model

Enhancements Implemented

*	Ticket	Description
*	10334	An incident was resolved where the program was not able to perform meshing by dividing areas due to memory limitations.

Analysis

Incidents Resolved

*	Ticket	Description
	798	An incident was resolved where the forces and/or stresses reported in frame, cable, area (shell, plane, asolid), and solid objects did not include the internal forces or stresses due to loads applied to that element in linear direct-integration time-history, steady-state, or power-spectral density (PSD) load cases. For these same load cases, section cuts did not include loads applied directly to the frame, cable, or shell objects that were cut, although loads carried by these elements from the rest of the structure were included (section cuts through plane, asolid, and solid objects were not affected). These errors did not affect the overall structural response or any other reported response quantities, only the reported response for element loading on the element itself and containing section cuts. Joint reactions and base reactions were not affected. This did not affect nonlinear static, staged-construction, or nonlinear direct-integration time-history load cases; it did not affect linear static or linear static multi-step load cases; it did not affect linear or nonlinear (FNA) modal time-history load cases. The response for modal, buckling, and hyperstatic load cases do not include element loading and were not affected.
	5944	An incident was resolved that addressed an inconsistency in section-cut results reported for different types of load cases. Linear load cases, as well as nonlinear (FNA) modal time-history load cases, included loads and accelerations applied to the elements in the section-cut forces in addition to element-stiffness forces. On the other hand, nonlinear static, staged-construction, and linear/nonlinear direct-integration time-history load cases included the loads and stiffness forces from the elements, but excluded the accelerations; for Link elements, the gravity loads were also omitted. This difference was generally insignificant for most models, and the difference would get smaller with further meshing of affected models. Now all accelerations and loads applied to the elements are included in section cuts for all load cases. Loads applied directly to the joints are not included in the section cuts, and are not affected by this change. This was a reporting inconsistency only. No other results are affected.
	9428	An incident was resolved where frame objects assigned a nonprismatic section property with non-zero shear-center eccentricity (e.g., channel sections) could generate eigen modes with negative period and frequency, or could generate negative masses when the mass source included loads from that element. This was due to the inconsistent variation between the eccentricity and the torsional constant J along the length. Now, the average shear-center eccentricity will be used for the length of the element, while the torsional constant will maintain its variation. This is an approximation that produces very good results, and can be improved by meshing or dividing the frame object if deemed necessary.
*	10148	An incident was resolved where change section/modifiers/releases operations acting on group 'All' in a staged-construction load case inadvertently acted on program-generated link elements (for panel zones, line/area/solid springs) and frame elements (for area edge constraints).
	11179	An incident was resolved where section-cut forces and base reactions for nonlinear modal time history (FNA) load cases did not include the loads (gravity or acceleration) applied to link objects. Section-cut results could be affected by links included in the section-cut group. Base reactions could be affected by links connected to ground. Results for analysis Verification Example 6-010 show a very small, though expected, change in the reported base reaction for the FNA load case. Documentation and the Excel spreadsheet for running the analysis Verification suite have been updated accordingly. No other results were affected for the Verification examples included with the software.

API

Incidents Resolved

*	Ticket	Description
	11180	An incident was resolved wherein the Tools menu dropdown could overlap a user-created plugin. This was a user interface issue only.

Database Tables

Incidents Resolved

*	Ticket	Description
	10967	An incident has been resolved for the Norsok N-004 2013 steel frame design in which the Steel Design 2- PMM Details - Norsok N-004 2013 and Steel Design 3- Shear Details - Norsok N-004 2013 are now displayed properly. Previously, these two tables could not be displayed.
	11081	An incident was resolved where the spherical-coordinate directions for specifying the axis and plane directions in Advanced Local Axes assignments were not displayed correctly in the database tables and in the right-click information form for the objects. In particular, directions SR and SB were switched. The plane directions affected all object types. The axis directions affected joint, solid, and link object types.

Design – Concrete Shell

Incidents Resolved

*	Ticket	Description
	10934	An incident has been resolved for the ACI 350-20 concrete shell design in which an error message was displayed for some shell elements not being designed. Additionally, the Concrete Shell Design Information form displayed using right-click showed incorrect values for the top and bottom As and shear Av reinforcement due to an incorrect unit conversion. Also, the design result display table did not show any values when selecting a particular shell element nor could it be generated when no shell elements were selected. All of these items are now resolved.
*	11083	An incident has been resolved where the program would terminate when attempting to use the Display > Show Tables command while the concrete shell design code was set to ACI 350-20. This was a user interface issue only and did not affect results.

Design – Steel Frame

Incidents Resolved

*	Ticket	Description
	1673	An incident was resolved where design sections were not being copied to analysis section for the next time analysis was run when auto-select section assignments were set to null and the design and analysis sections had not converged to be the same. This was inconsistent with the message given when the command to set auto-select section assignment to null was made. Instead, the last analysis section remained and the design section was set to it.
	10929	An incident has been resolved in the Chinese steel frame design code "Chinese 2018," in which the program now uses the negative sign as given in the interaction equation "GB50017 8.2.1-4" instead of a positive sign. The previous implementation of the code was overly conservative.
	10988	An incident has been resolved in the Chinese 2018 steel frame design code, where for certain conditions, the equivalent moment coefficient βmx output by SAP2000 was inconsistent with GB50017-2017 for members with end moments and simultaneous span loads. Cantilever and simply supported members were not affected. Frames with pipe or circular sections were not affected. The program was slightly unconservative for the affected cases.
	10989	An incident has been resolved in steel frame design code Chinese 2018 in which the bending stability reduction coefficient (ϕb) was inconsistent with the Standard for Design of Steel Structures GB50017-2017, Appendix C, for cantilever beams. This affected the PMM ratios. The program was sometimes conservative for relatively short cantilevers and sometimes unconservative for relatively long cantilevers.
	11155	An incident has been resolved in steel frame design code “Chinese 2018,” where an error message appears when displaying the design details of frame steel elements for which “Ignore Beam PhiB” is set to Yes in the Design Preference. This issue is a display-only error. The design results are not affected.

Documentation

Incidents Resolved

*	Ticket	Description
	1863	The help topic Area Loads - Uniform to Frame (Shell) has been updated to clarify the behavior when applying area uniform-to-frame loads within a staged-construction load case. Specifically, the loading is dependent upon adding/removing and loading the frame objects to which the loads have been transferred rather than the area objects to which the loading was originally assigned. This is a documentation change only, no results are changed.
	11139	An incident was resolved to correct a typo in the AISC 360-22 design manual, documenting the ASD load combinations. This was a documentation error only and did not affect the design combinations or the design algorithm.

External Import and Export

Incidents Resolved

*	Ticket	Description
	10892	An incident affecting the import of objects from DXF files was resolved. Deleting objects from the model and then importing objects from a DXF file before saving the model in between the two operations would result in objects located at the same locations as the deleted objects not being imported. Saving the model before importing the DXF file avoided the issue. When this occurred, the error was visually obvious and the results agreed with the model. This issue affected SAP2000 v24.1.0 and greater.

Graphics

Incidents Resolved

*	Ticket	Description
	2653	An incident was resolved where the frame position between deformed and undeformed displays was inconsistent when end offsets were present and the view option was to show the frame in the offset position.
	3390	An incident was resolved where one joint links were not displayed after drafting until the view was refreshed.
	4888	An incident was resolved where editing a cable or a curved line object by moving it applied the move twice.
	5304	An incident was resolved where a joint drawn at 0,0,0 in DirectX graphics mode caused joints and the global axes symbols to disappear from the view.
	7423	An incident was resolved for very large models where joints are closely spaced and a mouse trail could be seen in DirectX graphics mode as the mouse was moved and was snapping to the joints.
	7618	An incident was resolved where frame shading was not correct in DirectX extruded view.
	8422	An incident was resolved to display frame lateral offsets from joints in DirectX graphics similar to what is shown in standard graphics. Note, the offset view is turned off for both graphics modes if releases are shown in the same display.
	8838	An incident was resolved to display area selection at the deformed position when deformed display option was used.
	9139	An incident was resolved to display the correct shading for 3-node faces of solid objects.
	9175	An incident was resolved where frame distributed loads did not follow the color specified in the Assign Display Color form. Now point and line loads use the color specified in the Assign Display Color form.
	10825	An incident was resolved where in some cases developed elevations saved as named views could get corrupted. This was a display issue only.
	10871	An incident was resolved where the x-axis arrow was displayed in the wrong direction when the 2D view was set to view from the back face. This was a display issue only when using DirectX graphics mode.
	10872	An incident was resolved where the Line Connectivity form option to toggle joint labels did not always work as expected.

*	Ticket	Description
	10875	An incident was resolved where solid elements in a deformed shape or stress contour display were missing some faces when adjacent solids were removed in a staged construction load case.
*	10938	An incident was resolved where AVI creation was crashing the program. There are two options now available to create movies i.e. AVI and MPEG format. No compression is performed for AVI format,

Loading

Incidents Resolved

*	Ticket	Description
	6522	An incident was resolved where in some rare cases loads assigned to areas to be transferred to adjoining frames would miss transfer to some frames. The loads instead would be added to joints. No loads were lost. When this happened the load display would show the issue.
	11178	An incident was resolved for NBCC 2020 auto seismic load where the diaphragm eccentricity could not be set as zero or a negative value.

Results Display and Output

Incidents Resolved

*	Ticket	Description
	6566	An incident was resolved where inactive frame members were considered in calculating the automatic scaling factor for displacement plots when cubic curve option was used. This was a display scaling issue only and no results were affected.
	10869	An incident was resolved where the on-screen display of absolute virtual work per unit volume was ignoring the display units.
	10896	An incident was resolved where, in some cases, frame force envelopes were drawn with an offset from the frame location in standard graphics mode.
	10939	An incident was resolved where in some cases solid element models could not be viewed in 2D analysis model displays when internal meshing was used. When this issue occurred an error condition would result. The 3D display did not have this issue. This was a display issue only and no results were affected.
	11068	An incident was resolved where fiber-hinge status results included tension acceptance criteria when the fiber material property enabled the 'Ignore Tension Acceptance Criteria' options in the Material Data definition (Define menu>Materials). This was a reporting issue only affecting the status (IO, LS, CP) of fiber hinges and their individual fibers, and it did not affect the overall response of the fiber hinge or other analysis results. This issue only affected SAP2000 versions 26.0.0 to 26.1.0.
	11100	An incident was resolved where the reported force, stress or strain response for a shell element could be incorrect for a modal time-history load case (linear or nonlinear FNA) when loads from multiple load patterns were applied to that shell in that load case. Similarly, the force or displacement response for a cable element could be incorrect for a modal time history load case when multiple load patterns were applied to that cable in that load case. When this occurred, the error was generally very large and visually obvious. No other results were affected by this behavior.
*	11159	An incident was resolved where SAP2000 would sometimes terminate unexpectedly after displaying analysis results for area (shell, plane, asolid) or solid elements for a single mode number greater than 1, or requesting these results via tables or the API for a range of modes with starting mode number greater than 1. This did not occur when the requested results included all the modes, such as for response-spectrum or modal time-history load cases, or for any load combinations that included these types of load cases. When this error occurred, any results obtained before the software terminated were correct, and results obtained after restarting the software were unaffected.

*	Ticket	Description
*	11193	An incident was resolved where a model with restrained joints that have rotated local axes may report incorrect joint-reaction and base-reaction forces for nonlinear static, staged construction, or direct-integration time-history load cases that continue from another nonlinear load case that has non-negligible reactions at the rotated joint. This issue only affected SAP2000 v26.0.0 to 26.1.0, and only affected the reporting of reaction forces.

Section Designer

Incidents Resolved

*	Ticket	Description
	10870	An incident was resolved where importing a DXF file into section designer was not converted correctly when the section designer units were different than the default database units.
	11009	An incident was resolved for Section Designer where the section properties Z22, Z33, d33pna and d22pna calculated for sections imported from DXF files could be incorrect if the section base material was a metal-type material instead of concrete. A simple workaround was to right-click on the imported section in Section Design and click the OK button to correct the section properties.
*	11011	An incident was resolved where the frame stresses displayed for section designer sections (Display > Show Forces/Stress > Frames/Cables/Tendons) could be for the incorrect locations within the frame cross section. The locations were computed with respect to the origin of the section designer coordinate system rather than with respect to the centroid of the section. Doubly-symmetric sections with the section designer origin located at the centroid of the section were not affected. This was a display issue only and did not affect design results.
	11064	An incident was resolved where the extruded view in a model window could not be displayed for any frame object assigned a Section Designer section that contained a double-angle section. This was a display issue only and did not affect any analysis or design results.

Structural Model

Incidents Resolved

*	Ticket	Description
	1069	An incident was resolved in which merging multiple area objects did not generate the expected result for certain models.
	10945	An incident has been resolved where the information from the user specified existing model, especially the material definitions, was getting lost when a model was created through pipes and plates template using the option to initialize model from an existing file.

User Interface

Incidents Resolved

*	Ticket	Description
	9667	An incident was resolved to remove the Auto Hide button for dock-able modal forms to avoid the DirectX rendering conflicts.
*	10653	An incident is resolved where menus dropdowns are disabled when program is active.
*	10980	An incident was resolved where an abnormal condition occurred when modifying output options on the Report Setup form. This did not affect results.
	10994	An incident was resolved on the Built Up I-section With Cover Plates form where unchecking the overwrite Fy checkboxes was not retained when closing the form. Results will have reflected the settings shown in the form when it was reopened.
	11007	An incident was resolved where the data pasted into the interaction data form for a P-M3 hinge was not saved.
	11107	An incident was resolved where clicking tree nodes on Table selection form for text export and showing all tables resulted in an error condition for a particular large model on some machines.