SAP2000 v26.0.0 Release Notes

Notice Date: 04-September-2024

This document lists changes made to SAP2000 since v25.3.1, released 11-July-2024. Items marked with an asterisk (*) in the first column are more significant.

API

Enhancements Implemented

*	Ticket	Description
*	10555	Following enhancements have been made to the API: SAP2000 (SAP2000v1.dll) and cross-product API (CSiAPIv1.dll) libraries have been updated to target .NET Standard 2.0, increasing range of compatibility to API clients targeting .NET Standard 2.0, .NET Framework 4.6.1 to 4.8.1 and .NET (Core) 2 to .NET 8. Increased support for complex plugins where dependencies of the plugin might conflict with dependencies of SAP2000. Better error handling for API clients calling API functions that were not implemented by the connected version of SAP2000. The Remote API feature, used to start and/or connect to a running instance of SAP2000 on a Remote Computer, has been disabled with the release of SAP2000 v26.0.0. This functionality may be added back to the program in a future release. Please see API help file for details regarding backward and forward compatibility.
	10745	An enhancement has been made to allow an unallocated array argument to be passed into cPointObject.GetSpring(), cPointObject.GetSpringCoupled(), cPointElm.GetSpring(), and cPointElm.GetSpringCoupled() API methods to store the returned spring stiffness values.

Design – Concrete Frame

Enhancements Implemented

*	Ticket	Description
	7938	An enhancement has been made to ACI concrete codes "ACI 318-14" and "ACI 318-19" for torsion design if redistribution of torsion and forces are identified. The members for which redistribution is identified are designed for a torsion maximum of Tu and phi * Tcr per section ACI 318-14 22.7.3 and ACI 318-19 22.7.3. The members for which redistribution is not identified are designed for a torsion Tu obtained from analysis. If a member is overwritten with a reduction factor for torsional stiffness or if the member is assigned a section for which a reduction factor for torsional stiffness is applied, it is considered to redistribute torsion.

Design – Concrete Shell

Enhancements Implemented

*	Ticket	Description
*	1521	An enhancement has been made to add concrete shell design in accordance with the ACI 350-20.

Design – Steel Frame

Enhancements Implemented

*	Ticket	Description
*	1648	An enhancement has been made to include concrete frame design in accordance with ACI 350-20, Code Requirements for Environmental Engineering Structures. Two new load pattern types, Hydrostatic and Horizontal Earth Pressure, have been added to represent fluid and soil pressure, respectively, in the load combinations generated for ACI-350 design.

Documentation

Enhancements Implemented

*	Ticket	Description
	8421	An enhancement has been made to the steel frame design code AISC 360-22 in which the expression for the Cb factor for singly symmetric I-shapes has been modified to include the effect of singly symmetric I-shape parameter, Rm, per AISC commentary equation C-F1-3. The manual has been updated accordingly. In addition, the manual has been updated to include the effect of axial tension on Cb per AISC section H1.2, where Cb is amplified by a factor sqrt(1+alpha*Pr/Pey). The program was correct regarding the latter effect.

Installation and Licensing

Enhancements Implemented

*	Ticket	Description
*	10627	The version number has been changed to v26.0.0 for a new major release.

Loading

Enhancements Implemented

*	Ticket	Description
	10765	A minor enhancement was made to the iterative scheme used to calculate the wave length using Stokes 5th Order Wave Theory. This allows iteration convergence for a much larger set of wave parameters. Results should not change where the old iterative scheme converged and no iteration failure message was given.

Results Display and Output

Enhancements Implemented

*	Ticket	Description
*	5171	An enhancement was made to display frame force/moment diagrams with colored contours. Mouse hover works to trace the moment value at a specific frame location.

Structural Model

Enhancements Implemented

*	Ticket	Description
*	10741	A new link property 'Sumitomo Viscoelastic Damper' has been implemented to represent the behavior of high-damping rubber vibration control damper devices produced by Sumitomo Rubber Industries. The nonlinear damper behavior is a combination of elastic, plastic, and viscous damping behavior and can be enabled for any of the translational degrees of freedom independently. Information about the damper and its parameters is available in the 'Sumitomo Viscoelastic Damper Link Property' technical note provided with the program.

User Interface

Enhancements Implemented

*	Ticket	Description
	8466	A change has been made to keep user defined stress-strain curves for materials unchanged if later revisions are made to the Young's Modulus and/or material strength. This allows users to experiment with different effective Young's Modulus and material strength for linear analysis and design without disturbing the user defined stress-strain curves used for nonlinear analysis. Earlier versions would scale the user stress-strain curves when the Young's Modulus or material strength were modified. Parametric stress-strain curves are unaffected by this change.

*	Ticket	Description
*	10543	SAP2000 has been updated to support Microsoft's .NET 8. This does not affect most users directly, except perhaps by associated changes to the Application Programming Interface (API), either by explicit use of the API by the user or through the use of third-party applications or Plug-ins. API programmers should see Ticket 10555 for more information. Users experiencing problems with third-party applications or Plug-Ins should contact the supplier for an updated application or Plug-In that will work with SAP2000 v26.0.0.

API

Incidents Resolved

*	Ticket	Description
*	10767	An incident was resolved where Python scripts accessing the API via COM (comtypes library) failed to run due to misnamed eHingeDistributionType enumeration values. Python scripts accessing the API via .NET (pythonnet library) were not affected.
*	10828	An incident was resolved where the cross-product API (CSiAPIv1.dll) versions 2.0 and 2.1 (released with ETABS/SAFE v22.0.0 and v22.1.0, respectively) caused an exception when used to interact with any version of SAP2000/CSiBridge (including v26.0.0 and future versions) by accessing the following properties of the cLoadCases interface from an external API client/script: cLoadCases.HyperStatic As cCaseHyperStatic cLoadCases.ModalEigen As cCaseModalEigen cLoadCases.ModalRitz As cCaseModalRitz cLoadCases.ModHistLinear As cCaseModalHistoryLinear cLoadCases.ModHistNonlinear As cCaseModalHistoryNonlinear cLoadCases.ResponseSpectrum As cCaseResponseSpectrum cLoadCases.StaticLinear As cCaseStaticLinear cLoadCases.StaticNonlinear As cCaseStaticNonlinear cLoadCases.StaticNonlinearStaged As cCaseStaticNonlinearStaged cLoadCases.ExternalResults As cCaseExternalResults cLoadCases.Moving As cCaseMovingLoad cLoadCases.PSD As cCasePowerSpectralDensity cLoadCases.StaticLinearMultistep As cCaseStaticLinearMultistep cLoadCases.StaticNonlinearMultistep As cCaseStaticNonlinearMultistep cLoadCases.SteadyState As cCaseSteadyState The API version 2.2 (released with SAP2000/CSiBridge v26.0.0) is fully backwards compatible with previous versions of SAP2000/CSiBridge, but the cross-product API (CSiAPIv1.dll) should not be used to interact with ETABS/SAFE v22.0.0 and v22.1.0 by accessing the aforementioned properties of the cLoadCases interface from an external API client/script to prevent run time errors.

Database Tables

Incidents Resolved

*	Ticket	Description
	8342	An incident was resolved where the Plot Function Trace table may not have been available if only steady state and/or power spectral density plot functions existed. Additionally, an issue was also fixed where the database table did not have the StepType and StepNum fields populated if the named set plot function trace was for a steady state or power spectral density load case.
	10672	An incident was resolved in the Auto Seismic - NBCC 2015 database table, where the StructType value was always populated with Steel MF even when the value selected in the load pattern definition was something else. This was an issue in filling the database table and did not affect the calculated loads applied to the structure.

Design – Steel Frame

Incidents Resolved

*	Ticket	Description
	10665	An incident has been resolved in Canadian steel frame design codes “CSA S16-09”, “CSA S16-14”, and “CSA S16-19” in which the program made an error in calculating the effective area, Aeff, when the section is a Class 4 section in the axial compression mode for the web being slender (h/tw > 670/sqrt(Fy)). The reduction in area for the web is b_reduction * t, where t should be taken as tw, while SAP2000 used t=tf. Since tf is typically greater than or equal to tw, this correction will increase the value of Aeff slightly, and the program was conservative. This change affects the axial force capacity of slender I-shapes when the web is slender. All other sections remain unaffected.

*	Ticket	Description
*	10670	An incident has been resolved in steel frame design code AISC 360-22 in which the D/C ratios displayed in the main window did not match with the D/C ratios in the Steel Stress Check Information (AISC 360-22) and the Steel Stress Check Data AISC 360-22 windows. This problem only occurred when the design was performed with parallel processing (multi-threaded) and when the model units (database units) differed from the design code units. The D/C ratios in the Steel Stress Check Information (AISC 360-22) and the Steel Stress Check Data AISC 360-22 windows were correct.
	10690	An incident has been resolved in steel frame design code “AISC 360-22” in which the program shows error messages while displaying the design details in the “Steel Stress Check Data” form after clicking the Details button in the “Steel Stress Check Information (…)” form.
	10787	An incident has been resolved in steel frame design code Chinese 2018 in which the allowable fy values for grade Q460 have been modified as follows: (a) thickness <= 16 mm, fy = 460 MPa (no change), (b) 16 mm < thickness <= 40 mm, fy = 450 MPa (previously 440 MPa, (c) 40 mm < thickness <= 63 mm, fy = 430 MPa (previously 420 MPa), and (d) 63 mm < thickness <= 100 mm, fy = 410 MPa (previously 400 MPa). All other allowable values for fy remain unchanged.

Drafting and Editing

Incidents Resolved

*	Ticket	Description
	10581	An incident was resolved to fix the correct location while drafting when inputs for length and angle were specified.

Graphics

Incidents Resolved

*	Ticket	Description
	10453	An incident was resolved to correct the location of point labels in 2D views when the selected coordinate system was not Global.

Results Display and Output

Incidents Resolved

*	Ticket	Description
	9542	An incident was resolved where the color of arrows in results displays were not correct when a user defined min/max contour range was applied. This was a display issue only.
	10625	An incident was resolved where the fiber status results reported for individual fibers in a Fiber P-M2-M3 hinge in the Fiber Results form (Display menu>Hinge Results>"Show Individual Fiber Data" button) and the "Frame Fiber Hinge States 02 - Individual Fibers" database tables were incorrect. This issue only affected SAP2000/CSiBridge v25.1.0-25.3.0. This issue is a reporting issue for individual fibers and did not affect the overall results of the Fiber Hinge or other analysis results.
	10717	An incident was resolved where, for nonlinear static, staged construction, and nonlinear direct-integration time-history load cases, joint loads applied to restrained degrees-of-freedom applied in previous load cases/stages were not being reported in the base reactions and joint reactions output. Joint loads applied in a load case/stage would be reported correctly in that load case/stage but left out in any subsequent load case/stage which continued from it. This is a reporting issue.

Section Designer

Incidents Resolved

*	Ticket	Description
	10697	An incident has been resolved for displaying idealized Caltrans moment-curvature curves where the program could display an error message and not be able to plot the curve when the units Tonf-m were selected such that the magnitude of the moment value was too big to be handled. This error was a display issue due to unit conversion and did not affect the results.

Structural Model

Incidents Resolved

*	Ticket	Description
	10355	An incident has been resolved for the super-T frame section property calculations in which the section properties would be calculated incorrectly when the super-T frame section was defined with a closed flange. In this case, the section properties were larger than expected and the analysis results were calculated based on the section properties calculated and displayed within the program

User Interface

Incidents Resolved

*	Ticket	Description
	10647	An incident was resolved in the NBCC 2020 auto seismic load pattern definition form where some of the parameters were not correctly recovered when opening the form for an existing definition. This was a user interface issue only and the loading and analysis results were consistent with the last values on the form when the OK button was pressed. The values displayed in the database tables were correct and consistent with the loading and analysis results.
	10696	An incident was resolved in the Section Cut Data form, where the advanced axes option would be selected upon clicking OK on the form when the selected coordinate system was Global. This issue was introduced in v25.2.0. Results would correspond with the defined section cut definition shown in the database tables.