

CSiPlant v7.2.0 Release Notes

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Notice Date: 07-September-2022

This document lists changes made to CSiPlant since v7.1.0, released 07-March-2022. Items marked with an asterisk (*) in the first column are more significant.

Design – Piping

Enhancements Implemented

*	Ticket	Description
*	8032	An enhancement was made adding GB 50251-2015 as an available design code. Key features include: Restrained and Unrestrained Piping Appendix C method for considering circumferential stresses in elbows.
*	8442	An enhancement was made adding B31.8-2020 as an available design code. Key differences from B31.8-2018 include an updated Tresca criterion when calculating the combined stress for Offshore piping.
	8462	An enhancement was made to the B31.8-2016 and 2018 design codes. Previously, no manual calculation for longitudinal stress due to pressure was being performed. Therefore, the only way to consider longitudinal stress due to pressure was by enabling pressure elongation. The updated behavior will now perform a manual calculation to determine the contribution of pressure to longitudinal stress. For restrained piping, the manual longitudinal stress due to pressure is calculated as Poisson's ratio times hoop stress ($\nu * S_h$). For unrestrained piping, the manual longitudinal stress due to pressure is calculated as 0.5 times hoop stress.
*	8650	An enhancement was made allowing individual design requests to apply a multiplicative friction factor on all support properties with Gap behavior. This factor can be used to study sensitivity to the assigned friction property values.
	8815	An enhancement was made to the SIF calculation for reducers. If the start and end diameters are equal, then the Reducer SIFs are set to 1.0. Additionally, the following SIFs are used for Cone Angle: ASME B31J - If the Cone Angle is less than 5 degrees, SIFs are set to 1.0. All Other SIF Methods - If the Cone Angle is equal to zero, SIFs are set to 1.0.

External Import and Export

Enhancements Implemented

*	Ticket	Description
*	8215	An enhancement was made to the import of CII Neutral Files to allow for minor deviations from the published CII specification and to provide more information following the import. These enhancements include: (1.) Recognize any of the following groups of characters as a new line character: LineFeed (\n), CarriageReturn (\r), CarriageReturn + LineFeed (\r\n). Previously, only CarriageReturn + LineFeed (\r\n) was recognized as new line character. (2.) Implemented parsing of unit conversion factors and unit labels using white space separators in the case where parsing based on fixed width fails due to extraneous or missing white space characters. (3.) Improved the algorithm for locating and ordering groups of nodes representing pipelines, such that the CSiPlant model is created correctly when node groups with known reference locations are provided after node groups without reference location and the two node groups share a common node. (4.) Added new "CII Neutral File Import" form that enables generation of a human readable HTML report representing the contents of the CII file. The above enhancements enable the import of many user CII files that do not exactly conform to the CII specifications and for which the import had previously failed.

* Ticket	Description
8545	An enhancement has been implemented to provide several options for exporting CSiPlant model data into a human-readable text file. Model definition data can be exported via "File > Export > CSiPlant Model Text File". Any subset of tables in the model can be exported via "File > Export All Tables > To Text" menu command on the "Table Display" form (the "Table Display" form can be opened by using "Display > Show Tables" menu command followed by selecting the desired tables to be included in the export and by clicking the OK button). The user can choose from several formatting options which control how the data in the exported text file should be formatted.
8567	An enhancement was made to allow the import of version 12 of CAESAR Neutral Files.

Installation and Licensing Enhancements Implemented

* Ticket	Description
8219	The version number has been changed to v7.2.0 for a new intermediate release.

User Interface Enhancements Implemented

* Ticket	Description
7727	An enhancement was made to improve the responsiveness of the graphical user interface when specifying the Automesh option with a small relative stiffness factor for distributed supports. Even with this improvement, it is recommended to start with the default relative stiffness factor applied to evaluate the appropriateness of the support spacing. Then, if further refinement is necessary, dividing the pipes based on regions requiring refinement will allow more localized assignment of Automesh properties. This will minimize the generation of an excessive and unnecessary number of supports.

**Analysis
Incidents Resolved**

*	Ticket	Description
	8325	The "Solution Control" tab of the "Nonlinear Parameters" form for nonlinear static and nonlinear direct-integration time history analysis has been enhanced as follows: (1) The "Use Event to Event Stepping" and "Use Iteration" parameters have been consolidated into a single parameter called "Solution Scheme" for which the following options are available: (a) Iterative Only; (b) Iterative Event-to-Event; (c) Event-to-Event Only. (2) The "Use Line Search" option is applicable only for the "Iterative Only" and "Iterative Event-to-Event" solution schemes and is thus exposed only for those two solution schemes. The following enhancements and fixes were implemented for nonlinear static load cases with "Quasi-Static (run as time history)" load application control type: (1) Mass Proportional Damping was defaulted to 10. (2) Fixed an issue where the input time step was ignored and always treated as 1.0. (3) Added Context Help topic "Nonlinear Parameters" that explains the applicable parameters for the "Quasi-Static (run as time history)" load application control type.

**Database Tables
Incidents Resolved**

*	Ticket	Description
*	8252	An incident was resolved that corrected the following issues related to Valve and Flange properties: (1) The Pipe Designation column of the "Component Properties - Flanges" and "Component Properties - Valves" tables did not show the correct value. This was a reporting issue only. (2) Importing flange or valve properties from the .XML libraries shipped with the software did not import the correct NPS values when the CSiPlant model was initially created in metric database units. The NPS values for such imported flange and valve properties would be typically initialized to the default value of NPS 14, as was shown on the the "Define Component Properties" form. The NPS values shown on the "Define Component Properties" form were those used for analysis and design. (3) Importing flange or valve properties from a user-generated .XML library file with length units other than inches did not import the correct NPS values. The NPS values for such imported flange and valve properties would be typically initialized to the default value of NPS 14, as was shown on the the "Define Component Properties" form. The NPS values shown on the "Define Component Properties" form were those used for analysis and design.
	8308	An incident was resolved where an incorrect Cold Load value was reported in the "Spring Hanger Sizing - Summary" table. This was a reporting issue only and the correct Cold Load value was available in the "Spring Hanger Sizing - Details" table. Now both tables report the correct and matching Cold Load value.

**Design – Piping
Incidents Resolved**

*	Ticket	Description
	8210	An incident was resolved where Flange Leakage design reports were unavailable when opening a previously run and saved model. Only the design reports were affected by this issue.
*	8274	An incident was resolved where expansion joints included in the design group would cause all design results to be unavailable, requiring the user to define a group that excluded expansion joints. The updated behavior allows the default group <All> to be specified, even when expansion joints and other non-piping objects are included.
	8276	An incident was resolved that addressed the following typographical errors issues with the B31.4-2019 design manual: (1.) In the Design Preferences section, the Consider Sustained Stress, Stress Factor Calculation Method and Stress Factor settings had incorrect equation references. (2.) The References section contained documents that were not referenced in the manual and therefore have been removed.

*	Ticket	Description
	8277	An incident was resolved that addressed the following two issues with the B31.8-2016 and B31.8-2018 design manuals. (1.) In the Design Preferences section for both B31.8-2016 and B31.8-2018 manuals (Page 23 and Page 24 for B31.8-2016 and B31.8-2018, respectively), the Stress Factor Calculation Method and Stress Factor settings had incorrect equation references. (2.) In B31.8-2018, the References section contained documents that were not referenced in the manual and therefore have been removed.
	8463	An incident was resolved addressing the use of pipe tolerance and material allowances when calculating design section properties in B31.8-2016/B31.8-2018. Previously: Hoop checks always used nominal dimensions, regardless of pipe tolerance or material allowance settings. Longitudinal/Combined stress checks considered both Pipe Tolerance and Material Allowances when calculating Area and Section modulus. The updated behavior for design checks is as follows: Hoop Checks (Pressure and HydroTest design categories) always consider Pipe tolerance. Material allowances are considered if "Consider material allowances" is enabled in the Design Request settings for the Pressure Check. To neglect Pipe tolerance on Pressure Checks, the pipe tolerance needs to be set to zero. Longitudinal/Combined stress checks (Sustained, Occasional, Displacement and Hydrotest stress categories) do not consider any specified pipe tolerance when calculating section properties (Area and Section Modulus). Material allowances are considered if "Consider material allowances" is enabled in the Design Request settings. Rerunning design in the new version may produce results that vary slightly from previous versions, depending on whether pipe tolerances were specified or not, and on the status of the "Consider material allowances" settings.
*	8465	An incident was resolved when designing to B31.4-2019. Previously, the Pressure Elongation setting (which indicates if the analysis should automatically include elongation forces due to pressure loads) was incorrectly being used to determine if manual longitudinal temperature stresses should be included for design. Previous design results will be affected when the Temperature Elongation and Pressure Elongation settings are different, and the piping is identified as restrained.
	8761	An incident was resolved addressing a variety of minor fixes and changes to B31.8-2016 and B31.8-201: Updated descriptions for the displacement check settings "Consider Sustained Stress" and "Consider Temperature Scaling" in the design request form to remove erroneous code references. Corrected the units in the column header for Hoop stress in the Pressure Details Table. Allowed offshore piping to be assigned as restrained or unrestrained (both in the Design Request and on the pipe overrides). Permitted the occasional checks to set "Consider Material Allowance" to Yes or No when the Piping Type is "Riser or Platform". Updated the design manuals to indicate that Displacement checks for offshore piping only consider M_E/Z; the axial force is not considered.
*	8793	An incident was resolved affecting the calculation of the peak sustained longitudinal stress, S _L , for use in determining the allowable expansion stress used in displacement checks. Previously, compressive longitudinal stress was not considered when calculating the peak stress. The updated behavior uses the peak longitudinal stress magnitude for use in calculating the allowable expansion stress, accounting for compression or tension. Previous models should be re-run to confirm results. Note that unrestrained systems are typically governed by bending stress as it is uncommon for significant axial compression to develop, so checking positive values was generally sufficient. On the other hand, restrained systems can develop large axial compressive stress, however they are often not controlled by displacement checks.

**Drafting and Editing
Incidents Resolved**

*	Ticket	Description
	8390	An incident was resolved where an error occurred when a new tee, which had been automatically added, had a branch that was the exact length of an existing pipe in the same location. The new tee now replaces the existing pipe without any error..

*	Ticket	Description
	8425	An incident was resolved where incorrect pipeline repair occurred which removed existing assignments when a new pipe was drawn such that it connected to the common point of an existing pipe and an existing reducer, and the reducer had assignments such as supports, loads, or non-default properties. Now, the reducer's assignments remain even as pipeline repair occurs according to the orientation of the new pipe.
	8429	An incident was resolved where drafting a new pipe such that it overlapped an existing pipe and had the same end point as the existing pipe was incorrectly handled. Now, if the new pipe has a start point that is not on the existing pipe but the end points are the same, the resulting configuration will be two pipes: one pipe from the new pipe's start point to the old pipe's start point, while the existing pipe remains.
*	8667	An enhancement has been implemented to store coordinates with higher precision. This change makes the model more resilient to correctly establishing element connectivity where previously elements may have been handled as disconnected due the precision of the stored joint coordinates being smaller than the tolerance used for comparing joint coordinates. This was a very rare issue and the disconnected elements could be identified either by reviewing analysis results or by reviewing the model geometry immediately after performing various replicate operations.
*	8673	An incident was resolved where it was not possible to delete pipes or joints connected to previously deleted pipes. This was due to some of the pipes in the model not being associated with a pipeline. Pipeline repair is now performed upon opening the model to associate all pipes and joints to a pipeline and to remove pipes that cannot be associated with any pipeline. Pipeline repair can also be performed on demand after the model has been opened via the "File > Check and Repair Model > Repair Model > Repair Pipelines". This was a very rare issue caused by model corruption which resulted in losing association between pipes and pipelines.
*	8783	An enhancement was made to rebuild the list of points that lie inside of each frame and pipe element upon opening the model. This helps to resolve a rare issue where the list of such points became corrupted and subsequently resulted in errors when creating analysis model. Additionally, the model checker (available via "File > Check and Repair Model") has been enhanced to provide the following new functionality: (1) Select Disconnected Points. (2) Select Disconnected Frames. (3) Print a list of points located inside of each pipe and frame. Once selected, disconnected points and frames can be inspected and then either deleted or their connectivity corrected. Inspecting list of points located inside of each frame or pipe is useful to check and troubleshoot the geometry of the model to ensure that the expected connectivity will be created.

External Import and Export

Incidents Resolved

*	Ticket	Description
	8216	The following items were fixed or enhanced for the import of CII Neutral Files: (1.) Elbows are defined in the CII Neutral File by associating elbow properties, primarily the elbow radius, with a pipe. Due to varying drafting requirements between CAESAR and CSiPlant, some elbows cannot be inserted in CSiPlant because the given elbow radius leads to an elbow which is larger than space provided. CSiPlant now calculates the allowable elbow radius based on adjacent pipes, and if the given elbow radius is larger than the available length, the elbow radius is adjusted to ensure elbow insert can occur. (2.) When a drafting scenario occurs where a tee is needed, CSiPlant previously set the tee length to the pipe diameter. In some cases, this tee length was larger than the space available for the tee. Now, CSiPlant finds the length of all adjacent elements and sets the tee lengths to the shortest adjacent element to ensure that tee insert does not fail due to inadequate space.

* Ticket	Description
8299	The following enhancements were made to the import of PCF files: (1.) Weld components with length are now added to the previous pipe. If there is no previous pipe, then the weld length is added to the next pipe. Previously, these components were ignored. (2.) All elbows are checked to see that the elbow end points are equidistant from the given elbow center point. If not, the length from the elbow start point to the elbow center point becomes the default and the elbow end point is moved along the elbow tangent so that the elbow side lengths are equal. This change was implemented to allow import of elbows for which the distances were not equidistant in the PCF file due to rounding and import of such elbows would fail in cases where elbow radius was too large to fit between the adjacent pipes. (3.) The import of tees has been enhanced to correctly handle tees for which rounding of the point coordinates in the PCF file caused the tee center point to not be exactly in line with the tee main start and points. Such tees were previously not imported.

Loading

Incidents Resolved

* Ticket	Description
8298	The default soil unit weight has been changed from 2,000 N/m ³ to 15,000 N/m ³ to represent a loose sandy soil material. The previous value was unrealistically low. Results agreed with the value as defaulted or modified.

Results Display and Output

Incidents Resolved

* Ticket	Description
7729	An incident was resolved where the results output (element forces/stresses) for pipes or frames with distributed-support assignments was not consistent with the specified output-station settings. Now, results output is available at the combination of the distributed-support locations and the specified output stations rather than only at the distributed-support locations.
8524	The tables "Support Combined Results - Local" and "Support Combined Results - Global" have been revised to report support displacements relative to the ground instead of absolute displacements. This matches relative joint displacement type reported in the "Joint Displacements" table. Previously, absolute support displacements (obtained by adding ground displacements to relative displacements, with the relative displacements being relative to the ground) were reported in the tables, which may have caused discrepancy when comparing support displacements to joint displacements for time history load cases and nonlinear static load cases with quasi-static load application control. This was a reporting issue only and only displacements for time history load cases and nonlinear static load cases with quasi-static load application control were affected. The column headings of the two aforementioned tables were updated to state that the support displacements are relative to ground.

Structural Model

Incidents Resolved

* Ticket	Description
8388	An Incident was resolved when the default densities for insulation, cladding and lining materials were too high when the model was created in metric units. These were default values only, and could be changed in any case.

User Interface
Incidents Resolved

*	Ticket	Description
	7940	An incident was resolved where only <Base> results were available for a load case even though it was included in a design request. This occurred when the following two conditions were met: (1) The load case was also an intermediate load case for another load case in the design request, and (2) The other load case was created prior to the the current load case. This issue has been resolved and all applicable result sets can now be displayed.
	8887	An incident was resolved where the analysis solver options were not updated if a load case that was in use was deleted, which caused analysis to terminate.