CSiPlant v5.2.0 Release Notes
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Notice Date: 13-March-2020

This document lists changes made to CSiPlant since v5.1.2, released 30-October-2019. Items marked with an asterisk (*) in the first column are more significant.

API
Enhancements Implemented

*	Ticket	Description
	3520	An enhancement has been implemented to allow import of models and the export of support reactions to/from SAP2000 v22. Additionally, CSiPlant now supports the version independent SAP2000 API allowing compatibility with future releases of SAP2000.

Data Files
Enhancements Implemented

*	Ticket	Description
	3184	An enhancement has been implemented for time history and response spectrum functions defined using the "From File" option. When using the "From File" option, a function file containing the function definition is specified using absolute file path. If the function file is not found in the specified absolute path location, the software will now also check whether the function file exists in the model file directory and, if so, use the function file from model file directory. Previously, only the absolute file path location was supported.

Design – Piping
Enhancements Implemented

*	Ticket	Description
*	29	An enhancement was added which allows the user to assign design properties to multiple objects of the same type within the model. The assignment can be made to selected objects using the command Design > Assign Design Properties.
*	338	An enhancement was made to implement piping design checks in accordance with ASME B31.8-2016.
	2772	An enhancement was added to allow the specification of a custom thickness for elbows that can be used to make adjustments to the SIF/Flex of that object for all SIF methods (B31.1 Appendix D, B31.3 Appendix D, B31J and B31.8 Appendix E). The custom thickness is used only for the SIF/Flex calculation and does not change the section properties of the object.

Documentation
Enhancements Implemented

*	Ticket	Description
	3335	Documentation for Verification Examples 9-004 and 9-005 has been enhanced to include detailed explanation of how the independent values were obtained, including hand calculations where applicable.

Drafting and Editing
Enhancements Implemented

*	Ticket	Description
*	2762	The following enhancements have been made to pipeline labeling: 1) The Define Pipelines form has been removed and all functionality is now available in the Relabel form.2) All pipeline names must now follow the following format: "Pipeline-{Prefix}" where the "Pipeline-" portion of the name cannot be changed.

*	Ticket	Description
		3) All points and pipes must now follow the following format: "{Prefix}{Separation String}{Pre-Station String}{Station}" where the Prefix is set by the objects' associated pipeline. 4) Changing the prefix will automatically relabel all points and pipes along the pipeline with the specified prefix.
	3191	An enhancement was added to update the default values of Pipe Lining to 50 lbs/ft^3 and Pipe Cladding to 400 lbs/ft^3 in the Pipe Property Set form.
*	3345	The following enhancements were made to the Relabel form and the execution of the relabel command: 1) Selecting a new relabel object type updates the Relabel form to display the correct relabeling scheme. The relabeling scheme displayed in the form is based the selected objects' current label control. 2) When a custom relabeling scheme is used to edit the labels of a specified range of objects, the correct labels are displayed in the "Proposed labels" section of the form. If the specified relabeling scheme will create illegal labels, such as duplicates, the proposed labels are updated in the form and presented as "Conflict: " + the new label which will be applied. The proposed label will then be based on the labels that already occur in the model. 3) Points added to a pipeline will have labels based on the point which occurs before it on the pipeline. 4) When a pipe is divided, the labels of the new pipes will be based on the original pipe's label. 5) Non-meshed points now will all have the prefix "Point", while the rest of the label remains editable. Therefore, "Point" is no longer permitted as a pipeline prefix.
	3505	An enhancement was added in the Relabel form to allow Undo and Redo operations to be performed after relabeling has been applied.
	3735	An enhancement was added to include selection options in the menu that appears when the user right-clicks within the model view. The added menu items are Select All, Get Previous Selection, and Clear Selection.

External Import and Export
Enhancements Implemented

*	Ticket	Description
	3815	An enhancement was implemented allowing users to specify the version of SAP2000 that should be used when importing to new/existing CSiPlant models or exporting CSiPlant support reactions.

Graphics
Enhancements Implemented

*	Ticket	Description
	3793	An enhancement was made to the color of structural frame objects and flange objects allowing them to more easily be differentiated from piping objects and valves.

Installation and Licensing
Enhancements Implemented

*	Ticket	Description
	3164	The version number has been changed to v5.2.0 for a new minor release.

Loading
Enhancements Implemented

*	Ticket	Description
	3193	An enhancement was added to update the default values for the weight of valves from 0 to 1.5 kips and the weight density of insulation from 1,728 lbs/ft^3 to 14 lbs/ft^3 in order to

*	Ticket	Description
		make these values more realistic.
*	3430	The following enhancements were made to pressure loading options in CSiPlant: 1) added the ability for the user to specify external pipe pressure assignments 2) added the ability for the user to specify pressure loading that varies along the pipe length. There are four load options available from the Assign Pipe Loads -> Pressure form (for both internal and external) 1) Constant. A constant pressure value is user-specified along the entire pipe length. 2) Linear. A linearly varying pressure based on user-specified start and end values. 3) Spatial. A linearly varying pressure based on the general form Ax+By+Cz+D, where A, B, C and D are user-specified constants. 4) Z gradient. A linearly varying pressure based on a user-specified fluid weight density and z-coordinate of zero pressure. The analysis now considers internal and external pressures and linear variation along the pipe. The Internal and External pressure states at a given station and step can be viewed from Display Table -> Analysis Results -> Pipes -> Pipe Load States. Some analysis effects due to these enhancements are: 1) In pipes free to elongate, end cap forces are carried by the pipe. Internal pressure tends to cause tension and External pressure causes compression. 2) In pipes restrained from elongating, stress due to the restraint of Poisson elongation are created. Internal pressure tends to cause compression and External pressure causes tension. Internal and External Pressure assignments can be viewed separately as either values or contours. In addition, the net pressure assignment (calculated by CSiPlant as the difference of all internal pressure loads and external pressure loads within the selected load case) can be viewed separately as either values or contours. The net pressure is always displayed as an internal load. Design checks consider the internal and external pressure as a net pressure, defined as internal pressure minus external pressure. The exception is in API RP 1111 checks which considers Net External Pressure and is defined as External Pressure – Internal Pressure.

Results Display and Output
Enhancements Implemented

*	Ticket	Description
	44	An number of enhancements were made to the displacement checks to display the design tables in a more consistent manner between B31.1, B31.3 and B31.8 such as: 1) Distilled load cases now have the following name convention "[n0] - [n1]" where n0 and n1 are the defined load case numbers listed in the same table. 2) The displacement details table contains the design results for all defined displacement cases. Distilled results are only presented if the controlling case is a distilled case, in which case the controlling distilled case details are reported. 3) The handling of previous case results for Tee objects was updated where the branch meets the main run. The previous case results on the I and J side of the branch are considered when calculating the range. This change only affects a displacement case that was not defined as a combination. Due to the restructuring, previous models should be redesigned. There may be some minor changes in design results if the displacement cases were not defined as combinations.

Structural Model
Enhancements Implemented

*	Ticket	Description
*	2975	The "Assign Local Axes" form as been enhanced as follows: 1) When assigning local axes to points, two options "Align with Global Axes" and "Advanced Orientation" are now available and additional rotations can be specified for either option. 2) When assigning local axes to frames, 1-joint links and 2-joint links, two options "Default Orientation" and "Advanced Orientation" are now available and an "Angle from Default Orientation" can be specified for either option. 3) When assigning local axes to supports, three options "Align with Associated Pipe", "Align with Global Axes" and "Advanced Orientation" are now available and additional rotations can be specified for any of these options. Using the "Align with Associated Pipe" option aligns the support local axes with the local axes of the associated pipe object. If the support is not associated with any pipe object, the "Align with Associated Pipe" option will align the support local axes with the Global axes. 4) The form has been revised to label the rotations as Rotation about 3, Rotation about 2' and Rotation about 1'' to make it clear that the rotations are performed in sequence about local axes. Local axis 2' designates local axis 2 resulting from applying rotation about local 3 axis, and local axis 1'' designates local axis 1 after rotations about local axes 3 and 2' are applied. 5) The "Standard" option for local axes has been removed from the form. This option is no longer needed, because it became redundant after implementing the new options described above. These changes also resolved a previous incident where supports connected to non-horizontal members did not rotate as specified.

User Interface
Enhancements Implemented

*	Ticket	Description
	3128	An enhancement has been implemented to list all properties alphabetically rather than by the order in which they were defined. The change has been applied to all applicable forms in the program, except for the forms that are used to defined Load Patterns and Load Cases.

Design – Piping
Incidents Resolved

*	Ticket	Description
*	3142	An incident was resolved where two changed items in the ASME Errata to B31J-2017 (11-9-2017 Record# 17-1814 SC Proposal - Errata to B31J-2017) were not implemented in the B31J design check: the SIF equations in Sketch 2.2 for Reinforced Branches (Run SIF inplane) and in Sketch 2.4 for Extruded Outlets (Run SIF inplane). The other corrections from the Errata were already correctly implemented.
*	3389	An incident was resolved where the Tee branch internal forces were incorrectly reported in the ASME B31.3-2016 Occasional design checks. Internal forces for the Tee main branch were reported for both the main and the branch of the Tee instead of reporting the respective results for the main and branch. For common situations where the pipe property set of the tee main was stiffer than the tee branch, the internal forces reported would generally result in larger stresses and therefore would have been conservative for the branch; however, there may be scenarios where the previously reported stresses for the branch were unconservative.
*	3438	An incident was resolved related to the calculation of displacement results as used for design. The following situations presented incorrect results and previous design results should be reviewed: 1) For the design of Tees in B31.1 and B31.3, if the displacement load case being checked continued from a previous case, the results at relative station of 0.5 (midpoint of the pipe object) did not correctly consider the results from the previous case. This was not a problem if the displacement case being checked was a load combination. 2) Under certain situations it is possible to have discontinuous force/moment diagrams, for example application of point loads, at spring/friction supports or at Tee intersections on the Main run. In older versions, the design results considered the 'before' and 'after' results together, which did not guarantee conservative results. The displacement check in this release design the 'before' results and 'after' results separately. 3) B31.1 returned DCR = 0 for all members if using load combinations to define the displacement load cases.
*	3787	An incident was resolved where design load cases would not run if there was an instance of a nonlinear modal time history load case that was dependent on a previous case that was also a nonlinear modal time history case (i.e. when a nonlinear modal time history load case did not start from zero initial conditions).

Drafting and Editing
Incidents Resolved

*	Ticket	Description
	3069	An incident was resolved for the "Assign Loads" form where assignments made using the "Replace" option would remove all loads on selected objects in the same Load Pattern as the assigned load regardless of the load type. Now assigning loads with the "Replace" option selected will only replace loads of the same load type within the specified Load Pattern, and the rest of the loads will remain on the selected objects.
	3353	An incident was resolved where attempting to move a pipe that contained more than one support or special joint would have no effect. No feedback was provided to alert the user when this occurred.

Loading
Incidents Resolved

*	Ticket	Description
	3754	An incident was resolved in the Pipe Property Set form where the specific gravity of a custom Pipe Content was not properly updated when the weight density or the mass density of the content was changed. While the weight and mass density used for analysis

*	Ticket	Description
		were correct immediately after the change, the specific gravity is saved in the model file and used to recalculate the densities when the model is reopened. Therefore, models from versions prior to 5.2.0 whose pipe contents densities were changed should be checked for consistency and re-run if needed. Due to the nature of pipe contents, the effect on analysis and design results is expected to be minimal.

Results Display and Output
Incidents Resolved

*	Ticket	Description
	3082	An incident was resolved where design reports for the B31.1 and B31.3 design checks would not be displayed when there were no load cases with the Pressure design category included in the design request. Note that the Design Tables were unaffected by this issue and displayed the appropriate information.
*	3171	An incident was resolved where the plotted deformed shape for mode-based load cases was incorrect at joints having local coordinate systems different from the default (global axes). The displacement values plotted and shown in local coordinates (U1, U2, ..., R3) were actually the values in global coordinates (UX, UY, ... RZ). This affected the plotted shape, the values displayed when the mouse was moved over a joint, the values shown when right-clicking on a joint, and videos made of the deformed shape. Similarly, the joint displacements reported in the two database tables "Joint Displacements" and "Joint Displacements - Absolute" were always the displacements in global coordinates rather than the expected joint local coordinates. Plot functions were not affected. This error affected modal, response-spectrum, and linear and nonlinear (FNA) modal time-history load cases, as well as load combinations containing these load cases. No other types of load cases were affected. All other response quantities (displacements, forces, stresses) and design results throughout the model were correct and unaffected. This reporting error only affected versions 5.1.1 and 5.1.2 of CSiPlant.

User Interface
Incidents Resolved

*	Ticket	Description
*	3132	An incident was resolved where the force/deformation curve definition for Multi-linear Elastic and Plastic link properties was improperly rounding values inputted by the user. This would manifest itself by numbers changing immediately after they were entered. For example. If the model was initially created with the units of inch-lb and the display units were set to ft-kip and a value of 1000.0 was entered for the force at a particular deformation, the value would be changed to 1.0. Values shown in the form were used by the model.
	3221	An incident was resolved with the "Assign to Groups" form where clicking OK with the "Replace Group" option chosen but with no objects selected in the model would remove all objects from the selected group.
	3240	An incident was resolved that relates to viewing the design assignments on a Tee. When right-clicking on a tee and viewing the design tab, the following properties were sometimes not displayed: Mean branch radius, Mean main radius and Main Nominal Wall thickness. The form has been updated so that for all design codes and tee types, these properties are now displayed as read-only fields. Design results are unaffected by this incident.