

# What's New in CAESAR II

The latest CAESAR II release delivers a number of significant new and extended capabilities in response to current market requirements, as well as direct feedback from the growing CAESAR II user community. The following changes have been made to CAESAR II.

## **CAESAR II 2018, Version 10.00**

### **Piping and Equipment Codes**

- Added support for KHK Level II seismic analysis, including the following features:
  - Redesigned and improved the **Seismic Wizard** with an easy-to-use interface. You can select the KHK design code, choose seismic level 1 or 2, and calculate a seismic load (g).
  - Added new load case **Stress Types** to support level 2 analysis (K2P, K2SA, K2SR, K2L).
  - Added a new **KHK Level 2 Bend Evaluation Report**, which reports on bend behavior in the system.
  - Added a new **Seismic Analysis** section to the **Miscellaneous Data Options** report. The section summarizes seismic input and calculated g factors (magnifiers of gravitational loading).
- Updated the calculations for longitudinal pressure stress in the B31.4 Chapter IX, B31.8 Chapter VIII, Canadian Z662 Chapter 11, and Det Norske Veritas (DNV) offshore codes.
- Added support for B31.3 Chapter IX (high pressure).
- Updated the following codes: B31.3 -2016, B31.8 -2016, B31.8 Ch VIII -2016, and EN-13480 -2014 (Issued 2016).
- Updated to the latest code standards for JPI-7S-77-10 (2010) and HPGSL/KHK (2012).

### **Material and Content**

- Updated to support the latest edition of the JPI and HPGSL codes. The updates include the following improvements:
  - Updated materials applicable to the JPI and HPGSL codes in the **Material Database Editor**. Also, updated Japanese custom material databases (UMAT\_HP&JPI.UMD and UMAT\_MHI.UMD) with new materials.
  - Added an **Unspecified** option to the **Type** field in the **Material Database Editor** for the **HPGSL** and **JPI** piping codes.
- Updated EN-13480 materials and fixed miscellaneous issues:
  - Added new materials from EN 10216-2:2013, EN 10216-5:2013, and EN 10217-7:2014.
  - Updated the content of existing EN 10216-5:2013 materials.
  - Corrected the density for 429 (304L) stainless steel.
  - Added yield stress data and corrected the density for numerous EN materials.
  - Corrected the thermal expansion coefficient and elastic modulus for 1.4462S and 1.4462W.
  - EN 10216-2:2013 (200,000 hr) materials are now available for CODETI.
- Russian materials are available for the B31.1, B31.3, B31.4, and B31.8 codes. The software references these materials from the User Material Database (UMD) file. For more information, see *User Material Database Filename* in the *CAESAR II User's Guide* or Online Help.

- B31.4 Chapter XI, formerly B31.11, uses the same materials as B31.4 and B31.4 Chapter IX.
- Improved display of **Maximum (FX, FY, FZ, MX, MY, MZ)** values in the **Static Output Processor** graphics. Values display on the applicable **From Node** or **To Node**, in centerline mode, and at the correct structural node (for steel elements).

## Configuration

- New **DirectX 9**, **DirectX 11**, **OpenGL2**, and **CAESAR II Determines** video driver options were added to the **Graphics Settings** tab in the **CAESAR II Configuration Editor**. The **Video Driver** configuration setting now defaults to **CAESAR II Determines**, which means the software intelligently selects the appropriate video driver to use based on your system settings. In addition, the active video driver now displays on the status bar at the bottom of the CAESAR II main window.

## Support and Element Identification

Enhanced identification for restraints, hangers, and elements throughout the software:

- Expanded the **Restraints** auxiliary panel with two additional restraint definitions to support six degrees of freedom.
- Added a new **Tag** field for each restraint definition.
- Added new **Tag** and **GUID** columns to the **Restraints** list input. These fields reflect the new capability of the software to read and import support ID and display-only support GUID data from PCF files.
- Added **Tag** field to the **Hangers** auxiliary panel and to in the Piping Input.
- Update the **Hangers** list input to include the hanger **Tag** and the display-only hanger **GUID** columns. These fields reflect the new capability of the software to read and import hanger ID and display-only hanger GUID data from PCF files.
- Added the **Element Name** field to the Piping Input window and to the **Elements** list input. Element names also display in force reports, stress output reports, and stress isometric drawings.
- The software now allows you to customize the mapping options for attributes in the PCF file. For example, you can map the attribute definitions from the **NAME** or **TAG** attributes to the **Tag** field. You can also display tag and GUID data in annotations in stress isometric drawings.
- Added the **Show Tags** option to **Options > Node Numbers** to allow the display of support tags, hanger tags, and element names in the graphic view.
- Added Tag/GUID fields (for supports/restraints, hangers, and element names) in applicable output reports and in the MDB output tables.





## Piping Input

- When you delete pipe elements, the software retains the original nodal coordinates for all disconnected segments, instead of resetting the starting coordinates of those segments to the global setting (0,0,0).
- Implemented find and replace functionality within the **List** dialog. You can use the **Find/Replace** option on the right-click menu in the List dialog to search and replace data in a selected column.
- **Set North Direction** replaces **Model Rotation** in the **Advanced PCF Import (APCF)** and **Special Execution Parameters** dialog boxes. **Model Orientation** replaces **Model Rotation** in the **Load S3D/SPR Model** dialog box. You can specify the orientation of the Smart 3D or SmartPlant Review model to be imported. This is useful when you do not use the default CAESAR II mapping.
- Added **Previous** and **Invert** options to the **Line Numbers** dialog box in **Classic Piping Input** and **Static Output Processor**. **Previous** allows you to save the current view and return to the previous view. **Invert** allows you to toggle line number selections.


## Load Case Editor

- Improved the clarity and functionality of the **Delete** option in the **Static Analysis - Load Case Editor**. When you delete load cases in the **Static Analysis - Load Case Editor**, the **Load Case Delete Confirmation** window displays the load cases (and their dependents) that are deleted or revised. Remaining load cases are renumbered.

## 3D Model/Graphics

- Enhanced **Options > Axis**  (formerly **Compass** ) and **Configuration Manager (Tools > Configure/Setup** ) to allow display of a North arrow in **Classic Piping Input** and **Static Output Processor**. The North arrow indicates the North orientation of the plant.
- Rotational restraints, such as **RX**, **RY**, and **RZ**, display graphically with rotational arrows.
- Updated the software to ensure consistent functionality when using the **Delete** and **Backspace** keys on the 3D model. Now, if you press **Delete** when you have selected one more model components, the software deletes the selected elements. The software no longer performs an action when pressing the **Backspace** key when you have a model component selected. (The **Backspace** key works within the annotation or the move geometry functions.)
- Added a **Mill Tolerance** icon to the **Legends** toolbar. In addition, the **Mill Tolerance** options was added to the **Options** menu on the **Classic Piping Input** and the **PlotOptions** menu on the **Static Output Processor**.
- Symbols for restraints display on the outside of the pipe and remain visible when you use **Options > Restraints**.
- Enhanced the 3D mode so that multiple hangers display separately with leaders at the location of the hanger when you use **Options > Hangers** . Previously, the software only displayed one hanger symbol on a model when you had multiple hangers at the same location.
- Added the **Show Fixed** option to **Options > Displacements** to allow the display of fixed displacement vectors on the 3D model.

## Analysis

- Updated the ISO 14692 code stress calculations for load cases using the combination methods (scalar, max, min, etc.). Previously, the software did not use the effective hoop and axial stress values when calculating the code stress using the combination methods for **SIGNMAX** and **SIGNMIN**.
- Redesigned the user interface for the **API 610**  equipment module to improve functionality and usability. New features include:
  - Quick input and viewing of API 610 pumps.
  - The **Load Case Sets** tab lets you quickly define load cases and load case sets with suction and discharge nozzles.
  - Analysis of multiple load cases and multiple pumps.
  - Ability to update loads when the results of an imported and linked pipe stress analysis change.
  - Comprehensive, easy-to-read output results on the **Output** tab.

## User Interface

- The **Add to Quick Access Toolbar** right-click command allows you to add any ribbon command to the Quick Access toolbar in the main CAESAR II window.

## Integration

- Updated the CAESAR II installation wizard to include steps to install the B31J Essentials product from Paulin Research Group (PRG). B31J Essentials provides a set of calculations for revised SIFs and flexibility factors, as defined in the upcoming revision to *ASME B31J, Stress Intensification Factors (i-Factors), Flexibility Factors (k-Factors) and their Determination for Metallic Piping Components*. The B31J Essentials product is included with the latest version of CAESAR II and provides users with the ability to use PRG's FEATools application to perform the empirical B31J calculations. (CR-TX-20363)
- Added a new **Length for Nodal Increment** field to the Advanced PCF dialog boxes. This field sets the nodal increment for imported PCF files based on pipe length, which allows you to add more node increments for longer lengths of pipe.

## Documentation/Help

- Added more explanation and an example for using the **Alternate SUS/OCC** option of the **Load Case Editor** in the *Static Analysis* section of the *CAESAR II User's Guide*.
- Revised, reorganized, and added graphics to *Tutorial A* in the *CAESAR II Application Guide*.
- To provide better clarity, revised the overview and workflow topics for **Advanced PCF Import (APCF)** in the *Piping Input Reference* section of the *CAESAR II User's Guide*.