SAFE® 2016 (v16.0.0)
Release Notes

Notice Date: 2016-12-22

This file lists all changes made to SAFE since the previous version. Incidents marked with an asterisk (*****) in the first column of the tables below are more significant.

Changes from v14.2.0 (Released 2016-02-29)

Modeling

Enhancements Implemented

*	Incident	Description
*	39250 76752	An enhancement was made to add the option to model elasto-plastic behavior for point, line and area (soil) springs.
	96256	An enhancement was made to allow overwrite of the modulus of rupture for cracked deflection calculations individually for each concrete material property. Previously, a single overwite value applied to all concrete materials. In addition, this overwrite value has been extended to the BS 8110, Hong Kong CP 2004, Hong Kong CP 2013, IS 456-2000 and SG CP-65-1999 codes as well.
	97941	An enhancement has been made to give precedence to area springs applied through area objects with null properties. This allows spring properties to be overwritten over portions of a larger slab area by using null-area spring specifications that will take precedence over any other spring specification at the same location.
	98521	Tendon vertical profile definition form was redesigned so that the data for all spans of the tendon are visible and editable at the same time. The previous version of this form displayed the data for only one tendon span at a time, requiring the user to step through the spans to view/edit data for a specific tendon span.

Analysis

Enhancements Implemented

*	Incident	Description
	93756	The multi-threaded equation solver has been changed to provide more consistently repeatable results when the same model is run more than once on the same machine. This change typically only affects very sensitive or ill-conditioned models, which could produce slightly different answers when re-run on the same machine. Previously the multi-threaded solver dynamically changed the number of threads used based on machine conditions, which could change the order of numerical operations and potentially affect sensitive results. Now the number of threads used defaults to the number of physical cores on the machine, and can be changed with the environment variables SAPFIRE_NUM_THREADS or SAPFIRE_NUM_THREADS_SOLVE. Furthermore, the order of operations now is fixed for the same number of threads on a given machine, leading to more consistently reproducible results. Sensitive models may still show differences between different machines with different processors and/or different numbers of cores available. This change will have little effect on most models, with the most significant effects being on long nonlinear static load cases for sensitive models.

External Import/Export

Enhancements Implemented

*	Incident	Description
	79662 85926 86828 95001	An enhancement was made for the export of models to DXF files: Design strips and their widths are now always exported to DXF, even if they are not being displayed in SAFE. Users who do not wish to see them in the resulting DXF file can turn off the layer on which they are drawn in the CAD program where they view the DXF file. This is consistent with the export of other features from SAFE models.
	89293	An enhancement was made to the import of model or architectural geometry from .DXF and .DWG files. When importing such files into an existing SAFE model which has been previously saved with a given name, that given name is left unchanged. Previously, the model was renamed after the imported file.

Documentation

Enhancements Implemented

*	Incident	Description
	82012	An enhancement has been implemented to update the Help topic "Cracking Analysis Options" to clarify that code minimum reinforcing ratios are not considered for cracking analysis when using the "User Specified Rebar" option for the reinforcement source.
	90655	An enhancement has been made to the context sensitive help to note that automatic beam torsional stiffness modifiers of 0.1 and f11 wall modifiers of 0.1 are applied internally in SAFE.

Miscellaneous

Enhancements Implemented

*	Incident	Description
*	91918	The version number has been changed to v16.0.0 for a new major release. SAFE v16 will be known as "SAFE 2016".

User Interface and Display

Incidents Resolved

*	Incident	Description
	76332	An incident was resolved where clicking the keyboard "Alt" key did not always bring up or cancel menu shortcuts as expected. No results were affected.
	85397	An incident was resolved where certain input forms containing a data grid (table) would enter alphabetic characters instead of numbers when values were input from the number keypad on the right side of a standard keyboard. The affected forms were the Tendon Vertical Profile and Line Object Type Options.
	92496	An incident was resolved where Cancel option in the tendon vertical profile was not working correctly. No results were affected.

Graphics

Incidents Resolved

*	Incident	Description
	85078 88348 90172 95101	An incident was resolved where circular slabs were only visible in Direct X graphics mode. They were not visible in standard graphics mode. No results were affected.
	98855	An incident was resolved where enabling the option "Slab Internal Ribs" in View > Set Display Options was causing the software to terminate abnormally for certain models. No results were affected.

Drafting

Incidents Resolved

*	Incident	Description
	84943	An incident was resolved where walls were being created from imported Architectural layers even on the layers that were turned off. Results agreed with the model as generated.
	86079	An incident was resolved where the Replicate command was not work properly for arc (curved) walls. When this error occurred the effect was obvious, and results agreed with the model as created.
	90032	An incident was resolved where the stiff area object created on top of a wall may sometimes be drawn rotated. This was a rare occurrence and happened if a rotated grid system was edited prior to drawing a wall. Results agreed with the model as created.
	90169	An incident was resolved where radial replication of columns would not rotate the column local axis correctly if the number of replication increments was more than one. Results agreed with the model as created.

Loading

Incidents Resolved

*	Incident	Description
	72828	An incident was resolved where temperature loads applied to floor objects were also getting applied to walls if the wall fell within the floor object to which temperature load was applied. That was not the intended behavior and has been corrected.
*	96088	An incident was resolved where the distribution of uniform load to the joints could be incorrect for triangular area objects for which meshing was not specified. The error did not affect area objects with four or more nodes, and it also did not affect triangular area objects for which meshing was requested even if they did not actually get meshed because of their smaller size.
*	96623	An incident was resolved where a point load applied inside an opening or outside of the slab and without any support was sometimes applied to an arbitrary joint, loading the structure. Now such point loads are ignored.

Analysis
Incidents Resolved

*	Incident	Description
	49240 87168	An incident was resolved where the cracked deflections calculated for T-shaped beams were very large when the neutral axis under cracking was within the flange. When this occurred the results were obviously incorrect.
	82386 82629	An incident was resolved where the analysis would sometimes run very slowly when there was a large number of linear load cases applying restraint displacement loads, such as might occur in large models imported from ETABS. This was an efficiency issue only. No results were affected.
	89411	An incident was resolved where using the Cancel button to stop a nonlinear case that was taking too long to converge would create an error condition. No results were affected.

Punching Shear Design
Incidents Resolved

*	Incident	Description
*	21959 63220	An incident was resolved where the calculation of number of studs or ties (affecting the calculation of the length of rails) in punching-shear calculations could be incorrect. The error happens when the spacing of studs is not equal to half the effective slab depth (the recommended value). The number of rails reported is correct. The number of studs reported, and so the length of rails, is under-conservative when the spacing of studs is less than half the effective slab depth and over-conservative when the spacing of studs is more than half the effective slab depth.
	87962 96933	An incident was resolved where punching-shear design results calculated for a given column or support could be indicated as "N/C" (not calculated) if you performed the following operations in sequence: 1.) Opened a model for which punching-shear design had already been run and saved, 2.) Displayed punching-shear results on the model window, 3.) Right-clicked on the column to view detailed punching-shear data, 4.) Closed the design report form, and then 5.) Redisplayed punching-shear results on the model window. The results previously shown on the model window and in the design report were correct. Re-running the analysis and design would regenerate the correct results and replace the "N/C" with the correct design ratio again, or simply closing the model without saving and then re-opening it.
	92075	An incident has been resolved for punching shear checks using the Eurocode 2-2004 and Italian NTC 2008 codes where k factor for computing unbalanced moments was computed based on c1+4d and c2+4d as used in some other codes instead of using the column dimensions c1 and c2 as required by these codes.

Slab/Beam Design
Incidents Resolved

*	Incident	Description
*	31364	An incident was resolved where the web width used for shear-strength calculations of waffle/ribbed slabs was not taken correctly when they were modeled as distributed ribs in a slab property. A solid section was being assumed for design purposes. It has now been corrected. The analysis results were not affected. Also if the ribs were individually modeled as beams the design used the correct section.
	90086	An incident was resolved for the ACI 318-08, ACI 318-11 and ACI 318-14 design codes where the minimum shear reinforcement in the beam was not being enforced when design shear force was greater than phi*Vc/2 but less than Phi*Vc and torsion force was less than Tcr.
	94369	An incident was resolved for the ACI 318-14, ACI 318-11 and ACI 318-08 design codes where the reinforced concrete slab value of Asmin was limited to 0.0018Ag, i.e. the rebar yield value fy was limited to 60 ksi or less. Now, for rebar with fy greater than 60 ksi, the value of Asmin is computed using 0.0018*60,000/fy > = 0.0014 Ag.
*	97965	An incident was resolved for the Turkish design code in which the flexural compression rebar was always being reported as zero, which could be unconservative.

Results Display and Output

Incidents Resolved

*	Incident	Description
	81032	An incident was resolved where the design for a strip was creating an unnecessary section cut immediately before the first station and one immediately after the last station. In some rare cases this would result in inconsistencies in the on-screen reporting of maximum values. No other results were affected.
	86476 89847 96297	An incident was resolved where, in certain cases, extraneous joint reactions were displayed. Specifically, if joint reactions were viewed on a particular model and then in the same session joint reactions were viewed on another model with soil supports, extraneous joint reactions would display at some joints equal to the tributary reaction to the soil at those joints. This was a display issue only, and no other results were affected.

Detailing

Incidents Resolved

*	Incident	Description
	41622	An incident was resolved where detailed slab sections do not match the model when deep narrow trenches were present in thick slab.
	46309	An error was detected in the detailing in which a vertical offset assigned to an area object caused a horizontal offset and/or stretching of the area as shown in the detailer drawings.
	50689	An incident was resolved in which running the detailing with the "Generate Bars in 3D Model" option turned on would take a significant amount of time or stop responding for certain models. No results were affected.
	66050	An incident was resolved where the Bill of Quantities for slabs was blank when detailing a ribbed slab.
	70176	An incident was resolved where running the detailer would generate error messages such as “Can not Generate Rebar, Object-0” or “Could not initialize the Program" for certain specific models. When this occurred, rebar detailed drawings were not available. No other results were affected. This was not common.
	72411	An incident was resolved where the rebar detailing for individual beam views was incorrect in certain rare cases for specific models. When this occurred, the rebar was drawn without cover or even outside the beam and the error was obvious.
	79731	An incident was resolved where rebars were not generated correctly in the detailer when rebar choices were limited to a single bar size in the Slab/Mat Detailing Preferences. Design results were not affected.
	82008	An incident was resolved for the detailer where the spacing between the ribs was incorrect in the detailer drawings for ribs oriented parallel to the Y-direction. This error did not affect the detailing for ribs parallel to the X-direction. Only the detailing was affected. Analysis and design results were correct.
	85102 88432	An Incident was resolved where detailing would not run to completion for certain models. When this occurred, no detailing results were available.
	87704	An incident was resolved where the detailer was unable to generate rebar drawings for waffle slabs. It should be noted that when openings are present in a waffle slab, the slab is removed at openings but the ribs will pass through the opening and rebar provided. It is up to the engineer to make the necessary adjustments.
	90721	An incident was resolved where detailing did not complete properly for certain models with very thick drop panels. When error occurred, no rebar detailing was generated.
	94261	An Incident was resolved where the detailing was not obeying some of the rebar selection rules for footings.
	95718	An incident was resolved where beam cross-section detailing was not available when the beam depth was greater than 10 ft (about 3 m). Now the detailing of beams up to a depth of 20 ft (about 6 m) is supported.

Database Tables

Incidents Resolved

*	Incident	Description
	82967	An incident was resolved in which exporting to Microsoft Excel could generate an abnormal termination when certain third party applications (such as Bentley ProjectWise) that also integrated with Excel were installed on the same machine. No results were affected. This was previously released in Version 14.2.0 but not reported then.

External Import/Export

Incidents Resolved

*	Incident	Description
	66564 66935	An incident was resolved where not all columns could be automatically generated from an architectural layer. This was not common and only occurred for certain DXF files. Results agreed with the model as generated.
	78945	An incident was resolved which affected the import of architectural areas and slab objects with curved edges from .DXF and .DWG drawing files. Polylines depicting architectural areas and slab objects with curved edges were being imported as SAFE architectural areas and slab objects with straight edges. This occurred in all versions of SAFE capable of importing objects from .DXF and .DWG drawing files. When this happened the error was obvious and the results agreed with the model. Polylines depicting architectural areas and slab objects with curved edges are now imported as SAFE objects with similar curved edges.
	87730	An incident was resolved where the import of DXF files using the Architectural layer did not work correctly when specifying rotation angles other than zero. The actual angle used for import would be different from that specified. The error was obvious and results agreed with the model as imported.
	94987	An incident was resolved where walls were being created from imported Architectural layers even on the layers that were turned off. Results agreed with the model as generated.

Documentation

Incidents Resolved

*	Incident	Description
	83539	Minor corrections have been made to the SAFE Verification Example 16 that is included with the software. These changes are documented in the Change Log of the SAFE Verification Manual. This does not affect the validity of the software itself, only the verification model files and the documentation.
	86140	A documentation error was corrected in Section 6.3 "Slab Punching Shear Check" of the "SAFE Key Features and Terminology" manual to explain which slab thickness is utilized for punching-shear checks when multiple area sections are within the perimeter.This was a documentation error only, the algorithm has not changed and results are unaffected.
	89427	A typo error in the SAFE Verification Manual Table 4-1"Comparison of Average Strip Moments" for Thin-Plate Formulation has been fixed for the 4x4 mesh model under column strip moment for moment Direction MB at y=120". No results were affected.
	92219 95586	Minor corrections and improvements have been made to the SAFE Verification Examples that are included with the software. These changes are documented in the Change Log of the SAFE Verification Manual. This does not affect the validity of the software itself, only the verification model files and the documentation.
	94848 95661	A documentation error has been corrected for the ACI 318-08, ACI 318-11 and ACI 318-14 design codes in the "SAFE Post-Tensioned Concrete Design Manual" under topic "Determine Concrete Shear Capacity" to correct and clarify the design algorithm used for shear rebar in prestressed members, particularly for how the default strength load combinations are created. The actual design algorithms have not been changed and no results are affected.

*	Incident	Description
	96931	Minor typographical corrections and improvements have been made to the "SAFE Post-Tensioned Concrete Design Manual" for the Turkish TS 3233-1979 design code. The actual design algorithms have not been changed and no results are affected.