SAFE v21.0.0 Release Notes

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This document lists changes made to SAFE since v20.3.0, released 01-July-2022. Items marked with an asterisk (*) in the first column are more significant.

Analysis
Enhancements Implemented

*	Ticket	Description
	9099	The convergence check for cracked-section analysis is changed to check the maximum absolute vertical displacement to be consistent with SAFE v16. Previously in SAFE v20, the convergence check was done on the SRSS of all vertical displacements. Minor changes to cracked section analysis results may be observed in models with low rebar ratio but this change is not expected to significantly affect cracked section analysis results for most existing models.

Data Files
Enhancements Implemented

*	Ticket	Description
	8758	The Chinese frame-section database has been updated where section properties for some of the frame sections have been corrected and several new frame sections have been added for I/Wide Flange, Tee, Angle, and Pipe shapes.
	8830	An enhancement has been implemented to segregate the materials per New Zealand and Australian standards into three separate XML library files: Australia, New Zealand, and AustraliaNewZealandCommon. New concrete materials as per AS 3600:2018 V2 standard have also been added to Australian material library under this enhancement. Previously, the materials from Australian and New Zealand standards were included together in the single materials library for the New Zealand region. When a new model is created, the option to select the "Australia" region for default materials is now available in addition to the New Zealand region. When adding new materials, any of the three libraries can be accessed.
	9332	An enhancement was made such that when a new model is imported from a database-table file (Excel, Access, Text, or XML format), the database units are set to the units specified in the CurrUnits field of the "Program Control" table in that file. The database units are those used to store the data internally in the model, and are shown in the .LOG file after and analysis is run. Previously database-table files were always imported in US Customary units. Note that the length unit of microns is no longer supported.
	9343	Minor corrections have been made to the Chinese frame-section database file ChineseGB08.xml. These include (1.) Changing section name YB-WH700X300X12X38 to YB-WH700X300X12X28, with the corresponding change in flange thickness, and (2.) Minor changes to the section moduli of several sections. No section property values affecting analysis were changed, and the effects on design properties is insignificant. These changes only affect models that import these properties from the new database file. Models that imported properties from an earlier database file will not be affected.

Database Tables
Enhancements Implemented

*	Ticket	Description
	9207	An enhancement has been implemented to include the program name, program version, and the version for each table in the export of table and field keys to the XML file from within the software. Additionally, the menu command for this export has been changed to "Options > Database > Write Table and Field Keys to XML File" to better reflect the information being exported. Previously, the command was "Options > Database > Write Table and Field Names to XML File...". The resulting XML file as applied to all possible tables is now automatically included in the installation folder. This can be compared between versions of the software to see which tables have been changed. This information can be used to update programs and scripts that work with exported/imported database tables or API applications that use the table functions for editing and/or display.
	9307	The table "Concrete Slab Design - Flexural and Shear Data" has been expanded to present the additional parameters required to compute shear capacity of a design strip. This enhancement was implemented for the ACI 318-19, AS 3600-09, AS 3600-2018, CSA A23.3-14, CSA A23.3-19 and Eurocode 2-2004 design codes.

Design – Slab
Enhancements Implemented

*	Ticket	Description
	9133	An enhancement has been made to account for tributary PT tendon in finite element-based design of slabs. The strip-based design already accounted for the tendons within the strip when designing for additional reinforcement needed. The same tributary PT tendon in individual slab elements is also now used for slab cracked (short and long term) deflection analysis.

Detailing
Enhancements Implemented

*	Ticket	Description
*	3481	SAFE models can now be exported to CSiXCAD, a plugin for plan generation in various supported CAD program. This feature requires CSiXCAD v20.0.0.
*	6633	Detailed reinforcement from beams and slabs can now be exported from SAFE to Revit directly through the CSiXRevit 2023 plug-in to Revit 2023. Currently this is a one-way transfer: the rebar cannot be imported into SAFE from Revit. Previously this feature was available from SAFE to Revit using both CSiDetail and CSiXRevit. Now CSiDetail is not required. This feature requires CSiXRevit v2023.1.0 or later.
*	8223	An incident was resolved where the values specified in the Slab Detailing Curtailment Rules based on absolute length (rather than proportional lengths) could become corrupted when the display units were changed, and this could cause the rebar overlaps and other dimensions in the detailing windows to be displayed incorrectly. Analysis and design results were not affected.
*	8782	The production and management of schematic design drawings are now available from the Detailing menu inside SAFE. Previously, this feature was provided by the separate product CSiDetail v20 that worked with SAFE v20 after detailing was performed for the model in SAFE. With SAFE v21, CSiDetail is no longer needed. Detailing results can be displayed in the model windows and used for further design checks, as well as for producing drawings.
	8974	For the detailing of concrete beams and slabs, rebar spacing is now rounded to the nearest multiple of 1/2 inch (in US Customary units) or to nearest the multiple of 5 mm (in SI/MKS units), wherever practicable.

Drafting and Editing
Enhancements Implemented

*	Ticket	Description
	8683	An enhancement has been implemented to add Trim/Extend editing features for strip and tendon objects. These features work the same way as trim/extend editing for frame objects.

Graphics
Enhancements Implemented

*	Ticket	Description
	8346	The display of contours has been improved: (1.) For Standard Graphics mode, area element edges are now plotted lighter so as not to obscure the contours when displaying a large number of objects. This was not an issue for DirectX graphics mode. (2.) When plotting load contours, units are now included with the value shown at the mouse cursor location when hovering over the contours and in the title bar of the window.

Installation and Licensing
Enhancements Implemented

*	Ticket	Description
*	8702	The version number has been changed to 21.0.0 for a new major release.

Results Display and Output
Enhancements Implemented

*	Ticket	Description
	9065	An enhancement has been implemented to improve the model window caption for results display to indicate the multi-valued response being plotted (e.g. Max, Min, Max and Min, Absolute Max, etc). The enhancement applies to the display of results for points, lines, areas, diaphragms, and strips.
*	9085	An enhancement has been implemented to show the cracked section modifiers for beam and floor objects in the database tables (Display > Show Tables). The newly added tables "Frame Element Cracked Section Modifiers" and "Shell Element Cracked Section Modifiers" will be available for a nonlinear static or staged construction load case with the floor cracking feature enabled.

Analysis
Incidents Resolved

*	Ticket	Description
	9084	An incident was resolved where SAFE v20 cracked section analysis sometimes produced more deflection than SAFE v16 did for models with extremely low rebar ratio. Additionally, the cracked section analysis iteration was adjusted to improve convergence and prevent rapid flip-flopping of cracked section modifiers for models with extremely low rebar ratio. Minor changes to cracked section analysis results may occur because of this change.

Data Files
Incidents Resolved

*	Ticket	Description
	8820	An incident was resolved where a text file (.$sf or .f2k) could not be imported if it had concrete beam design overwrite data in it. If the concrete design overwrite data was removed the import would work. This issue did not affect the binary model file (.fdb). The issue only affected versions 20.0..0 to 20.3.0.
	8845	An incident was resolved where some of the Verification Examples produced warning messages when the analysis was run indicating that the structure was unstable. This was due to inadequate restraint in some of the out-of-plane degrees of freedom that were unrelated to the behavior and results being demonstrated by the model. Now, minor changes have been made to the restraints or active degrees of freedom for some of the Verification Example models supplied with the software to remove these warnings. These include the following: Analysis problems 1 to 7 and the beam design verification examples for all design codes. These updates do not change analysis or design results nor affect the validity of the features demonstrated by these examples.

Database Tables
Incidents Resolved

*	Ticket	Description
	8937	An incident was resolved where the table "Concrete Slab Design - Flexure and Shear Data" did not display correctly. No results were affected.

Design – Concrete Frame
Incidents Resolved

*	Ticket	Description
*	8896	An incident was resolved where the PT beam design stresses were always plotted as zero in the graphical user interface. In addition, new database tables have been added to present PT beam design stresses in tabular format. This information is now also presented in the report.

Design – Slab
Incidents Resolved

*	Ticket	Description
	9033	An incident was resolved for concrete slab design code "ACI 318-19" where the flexural reinforcement ratio, rhow, used in the shear formula ACI 318-19 22.5.5.1.2 and 2.2 (Table 22.5.5.1) was based only on the design flexural rebar required for the design moment without enforcing the minimum flexural rebar area. The effect was that the shear capacity phi*Vc could be underestimated, causing the required shear rebar to be more than the required value. The previous results were conservative.

Detailing
Incidents Resolved

*	Ticket	Description
	8994	An incident was resolved where slab detailing was not able to show openings with more than 4 joints, generating an error condition.
	9397	An incident was resolved where the use of duplicate names for beam-detailing groups could cause an abnormal termination of the software when selecting groups for display. Duplicate names for beam detailing are no longer allowed under command Detailing > Generate/Show Beam Groups.

Drafting and Editing
Incidents Resolved

*	Ticket	Description
	8841	An incident was resolved where using the command Quick Draw Walls with the architectural layer was not creating walls above the slab, only walls below. Now walls above can be drawn by clicking on the architectural layer wall mid-line, architectural layer line, or a grid segment line. In the case of the wall mid-line, an existing wall property will be used if it matches the the architectural wall thickness.
*	8861	An incident was resolved where the following sequence of actions could cause an abnormal termination of the software: (1) Draw a floor as a general area object, then change its type to floor; (2) Save the model, then re-import it from the .$SF or .F2K model text file; and (3) Draw a column object on the floor, which is then unable to create a valid stiff area over the column.
	8995	An incident was resolved where snapping to the architectural layer was not working while drawing in DirectX graphics mode.

External Import and Export
Incidents Resolved

*	Ticket	Description
	8621	An incident was resolved where the widths of design strips were not able to be imported from DXF files for Strip Layer B.
	8866	An incident affecting the import of Revit .EXR files into SAFE was resolved. When importing an .EXR file, clicking the XML Files button in the Frame Section Mapping form caused SAFE to terminate abnormally. SAFE versions v20.0.0 to 20.3.0 were affected. Clicking the XML Files button now displays the XML Property Files form as expected.
	9040	Am incident was resolved where the sizing and scaling of rebar text was not correct in models exported to DXF.

Loading
Incidents Resolved

*	Ticket	Description
	9237	An incident was resolved where the load pattern(s) of type "Pattern Live - Auto" would not get imported correctly when the model was exported and imported in text format or any of the available database formats. The type for the affected load pattern(s) would be set to "Other". Also, the multi-step static load case associated with the load pattern in question would not get imported.

Results Display and Output
Incidents Resolved

*	Ticket	Description
	8693	An incident was resolved where certain concrete slab design preferences were not exported to the .$SF text file or to database-table files. Models imported from affected files would have the corresponding values set to default. These included: (1.) For the ACI 318-19 code, option "Overwrite Shear Lambdas to One for Mats and Footings?" was not exported to text file or database-table files. (2.) For the CSA A23.3-19, Hong Kong CP 2013 and Italian NTC 2008 codes, preferences were not correctly shown in Concrete Design Preferences database tables and design reports, and would not be correctly exported to database-table files.
	9214	An incident was resolved where an abnormal termination could occur when attempting to generate a report for certain models.
	9345	An incident was resolved that corrected two display issues: (1.) The contour legend was not displayed when printing surface-loading contours. (2.) The cross-sectional shape of beams shown in design reports did not account for any mirroring of the section. No results were affected.
	9350	An incident was resolved where the Soil Pressure contour (Display menu > Force/Stress Diagrams > Soil Pressure) with the Max Abs option would not display the minimum value when the minimum value was larger in magnitude than the maximum value. This issue only affected the Soil Pressure contour display for multi-value or envelope type load cases or combinations and has been resolved so that the Max Abs option displays the maximum or minimum value of larger magnitude.

Structural Model
Incidents Resolved

*	Ticket	Description
	8699	An incident was resolved to allow loads applied to null lines and null areas in any local or global direction to transfer to underlying structural floors. This capability was inadvertently dropped in SAFE v20 and only loads in gravity direction were transferred.
	8917	An incident was resolved where, for cracked section analysis with long-term effects, a user-defined modulus of rupture for cracked deflections specified in the concrete Material Property Data form (Define menu>Material Properties) was being multiplied by a 0.55 factor for the following Slab Design codes: Indian IS 456-2000, BS 8110-1997, Hong Kong CP 2013 and SG CP 65-1999. This resulted in larger than expected deflections reported for long-term cracked section analysis using the affected Slab Design codes. This did not affect material properties with the modulus of rupture for cracked deflections set to Program Default. This issue affected SAFE v20.0.0 to v20.3.0.
	8992	An incident was resolved where the beam Design-Property Dimension Data for concrete Tee and L sections was reset to default values on the form when the definition of a previously defined Tee or L section was viewed again. These default values were used if the OK button was clicked without changing them, but they had no effect if the Cancel button was clicked. The selected option was however saved correctly and the design was accounting for the selected option.
	9001	An incident was resolved were auto-generated drop panels were deleted when the analysis was run a second time. This only affected drop panels that were specified as part of column section-property definitions.
	9241	An incident was resolved for general meshing where the slab mesh at a drop-panel was not aligned with the drop-panel edges when an automatic rigid zone over the column was included in the column section property. This issue did not affect rectangular meshing.
	9317	An incident was resolved where the thickness specified for the mat foundation on the mat foundation data form was not being used in the generated model. Instead, the default mat thickness was being used to create the model. Additionally, if only the thickness of the mat was changed on the mat foundation data form, the template type would switch to Grid Only upon clicking the OK button on the mat foundation form. Results agreed with the model as generated.

*	Ticket	Description
	9396	An incident was resolved where partial area overlapping was not correctly handled in rectangular meshing. This particularly affected openings that overlapped multiple floor areas.
	9442	An incident was resolved where wall meshing was failing for curved walls for the case where the curves at the top and bottom edges were not identical. Now meshing is based on the curve at the bottom of the wall.
	9494	An incident was resolved where models from SAFE 2016, when opened in SAFE v20, did not read the previous "Auto Merge Tolerance for Joints", but was instead setting it to the default value. This had no effect on most models, but could affect meshing in cases where the previous tolerance was significantly different from the default.

User Interface
Incidents Resolved

*	Ticket	Description
	8773	A typo error was fixed in the strip object properties form.
	8816	An incident was resolved where default materials were being created for the US region instead of the region specified on the model initialization form when creating a new model for the first time in a session.
	9109	An incident was resolved where column capitals were being shown in extruded views as extending to the top surface of the slab instead of the bottom surface when there was no drop panel present. This was a display issue only. The model was correct, and results were not affected.
	9315	An incident was resolved where, when moving objects, the assignments (such as restraints) were not maintained for connected joints unless the joints themselves were also explicitly selected to be moved.
	9339	An incident was resolved where slab rebar objects imported from a model text file (.f2k or .$sf) or a database-table file (Excel, Access, XML) were always located at the bottom level rather than at the slab level. In addition, an incident was resolved where Slab Rebar Object visibility in a model window could not be turned on if the model was saved after turning off the visibility for that window. Other windows were not affected. This latter issue only affected the display, not the model itself.