ETABS® 2016 (Version 16.0.0)
Release Notes

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Notice Date: 2016-08-24

This file lists all changes made to ETABS since the previous version. **Most changes do not affect most users.** Incidents marked with an asterisk (*****) in the first column of the tables below are more significant.

Changes from v15.2.2 (Released 2016-03-18)

Modeling
Enhancements Implemented

*	Incident	Description
	44159	An enhancement has been made to keep group assignments when frame or shell objects are subdivided using the Edit menu.
*	58272	An enhancement has been made to allow assignment of moment and shear releases to any slab or wall edge.
*	72970	An enhancement has been made to allow generation of spring and dashpot properties under footings to model soil-structure interaction based on "Soil-Structure Interaction for Building Structures", "NIST GCR 12-917-21", September 2012. A set of soil profiles and a set of footing sizes can be defined and then they can be paired to calculate point support properties.
*	76578	An enhancement has been made to allow modeling of CoreBrace Buckling Restrained Braces. A database of CoreBrace BRB is now available in the software and the elastic and inelastic properties are automatically calculated based on the actual brace configuration. Users can overwrite the calculated values for special conditions not modeled. The Star Seismic database has been removed as it has been superseded. Old models will, however, still work without change.
	78172	A new database of Japanese steel frame sections is now available, called JIS-G-3192-2014. This includes the more commonly used wide-flange sections for the Japanese Industrial Standard code G 3192:2014.
*	86202	A new parametric P-M2-M3 frame hinge has been implemented for use with performance-based design and other types of nonlinear analysis. This hinge can be used for double-symmetric steel and reinforced-concrete frame sections. The axial capacity can be different in tension and compression. The P-M2-M3 interaction surface is assumed to be smooth and is represented by a few simple parameters. Strength loss and energy degradation can be captured. Deformation capacities can be defined and reported as part of the performance checks. Parametric P-M2-M3 hinge properties can be user-defined or automatically created from frame sections.
*	86306	Two enhancement have been made to the shell objects. First, thickness overwrites can be applied on a joint-by-joint basis so that shells can have nonuniform thicknesses. Second, joint offsets can be applied to shell objects so they can be more accurately located. Joint offsets can be applied in the shell-object local or any specified coordinate system. Note that the thickness overwrites do not apply to areas with layered-shell properties or deck-type properties.
*	88449	The behavior of fiber PMM hinges has been enhanced to remove double-counting of the elastic flexibility in frame members. The elastic flexibility of the frame section now will be set to zero for a tributary length of the member equal to the hinge length of the fiber hinge, so that all elastic flexibility over that length is represented only by the fibers in the hinge. For bending behavior this

*	Incident	Description
		works best when the hinge is located at the center of its tributary hinge length (axial behavior is not affected significantly by location). The tributary hinge lengths will be shifted as necessary so that they do not overlap the ends of the member or end offsets, and so that they do not overlap each other in the case of multiple hinges. In some cases this may mean that the hinge is not centered in the tributary hinge length, particularly for hinges at the ends of the member. In this latter case better results will be obtained if the hinges are located a half hinge length from the end. For hinge lengths that exceed the length of the element, adjacent elements will not be adjusted and some double counting of elastic flexibility will remain in the model due to the adjacent elements. For this reason it is not recommended to use object or element discretizations that are smaller than the hinge lengths. When frame hinge overwrites are assigned to automatically subdivide at hinge locations, this discretization will now be limited at fiber hinges to be no smaller than the hinge length, provided that no other specified discretization is applied near the hinge. Overall this enhancement will tend to affect the results for all models that use fiber hinges when compared with previous versions of the software, although the effect will be limited in most models where the hinges do not dominate the model. Affected models will tend to be stiffer. Only fiber PMM hinges in frame members are affected by this enhancement. Note that when the command Analyze > Analysis Model for Nonlinear Hinges was set to "Model Hinges as Separate Link Elements" and when using the Ultimate license level which permits this option, double-counting of the elastic flexibility was already eliminated and thus is not affected by this enhancement.
*	88682	An enhancement has been made to increase efficiency of creation of area meshes between analysis runs by saving them. Saved meshes are deleted on a story-by-story basis if changes are made that would affect the mesh.
*	90137	An enhancement has been made to allow drawing of polylines (multi-segment lines) over floor slabs to be used as design strips. The integrated moments, shears and torsions for these design strips can be viewed on screen and are reported in tables. They can also be used for concrete slab design. This feature is only available for the Ultimate license level.
	91264	A new property library "Nordic.xml" has been added. This includes a collection of common steel shapes used in the Nordic countries.
	94238	An enhancement has been added to initialize the default materials to the "Chinese" if the "Chinese" steel frame-section database is selected when starting a new model.

Section Designer
Enhancements Implemented

*	Incident	Description
	91165	An enhancement has been made to provide more detailed information in the message displayed when an error is encountered while plotting the moment curvature Form in the Section Designer. Such errors are typically due to an invalid specification of a Mander-Confined material that adversely affect the calculation of the stress-strain curve.

Loading
Enhancements Implemented

*	Incident	Description
*	61076	Automated wind loads, seismic loads, and response-spectrum functions have been added for the NBCC 2015 code. The wind load patterns include the torsional moment(s) as specified in Figure A-4.1.7.9(1) of the code.
*	77430	An enhancement has been made to automate human foot fall analysis for long spans. One or more walking vibration analysis paths can be defined on floor slabs, along with parameters defining the demand and capacity. An automated time-history analysis is performed for each case, and the resulting peak accelerations and demand/capacity ratios are reported.

*	Incident	Description
*	91668	An enhancement has been implemented to add the Russian SP 14.13330.2014 response spectrum function.
*	92127 93022	An enhancement has been made to allow for nonuniform distributed shell loads to be applied. They can be applied to floor and walls, and would typically represent soil or water pressure. When applied to overlapping floor areas, including areas with null properties, these loads are additive.
*	92857	An enhancement has been added to staged-construction load cases where "Story" can be used instead of a Group to specify which objects to add, remove, and load. The Auto Construction Sequence load case now uses the Story definition.

Analysis
Enhancements Implemented

*	Incident	Description
*	68067	An event-to-event solution strategy has been implemented as an option for nonlinear direct-integration time-history load cases. This is similar to the use of events as already available for nonlinear static load cases. Time steps will be automatically subdivided where significant changes occur in the stiffness of certain elements and hinges, such as at yielding, unloading, or strength loss. Iteration is performed at the end of the full time step as needed to achieve convergence. Previously the event-to-event option was available but had no effect. By default event-to-event stepping is turned off for each time-history load case so as to preserve the previous behavior. Additionally, events have been added for more types of elements and hinges. Previously events were only implemented in nonlinear static load cases for single-degree-of-freedom hinges and isotropic interacting hinges. Events are now implemented for the following nonlinear models: all frame hinges; layered shells with directional or coupled nonlinear behavior; and links with multi-linear plasticity, gap, hook, friction pendulum, and triple pendulum behavior. Event-to-event functionality has also been enhanced for frame hinges to better handle cyclic reversals. As a result of these additions, results for nonlinear static load cases using events may differ somewhat from previous versions, although the results are expected to be within the specified convergence tolerance for most models. Differences may be more pronounced for sensitive or ill-conditioned models. The purpose of using events is to increase the speed of analysis, but for certain models and load cases it may have little effect or even the opposite effect. See also Incident 90374.
*	86727	The option to change link properties has been added to staged-construction load cases. When this operation is performed on one or more link objects in a construction stage, the objects are effectively removed from the structure along with the loads they are supporting, new unstressed link objects added in their place having the specified new properties, and the previously supported loads reapplied. This is the same behavior as is currently available for changing frame sections and shell sections. In addition, link properties can be change to and from "None", which is equivalent to the object being absent from the model. The "None" property can also be assigned to a link object as well, such that the default is for the link object to be absent from the model until the link property is changed during staged construction.
	87460	The analysis log file (.LOG) now produces a warning message whenever negative stiffness eigenvalues are detected during the linear equation solution phase that precedes linear static, multi-step static, modal, buckling, and/or hyperstatic load cases. The number of negative stiffness eigenvalues was already being reported as the number of eigenvalues below the shift, but now an explicit warning is added when this number is not zero to emphasize that these may represent instabilities in the model, possibly due to P-delta effects.
*	90374	A pure event-to-event stepping solution strategy has been implemented as an option for nonlinear direct-integration time-history load cases. This is in addition to the iterative event-to-event stepping strategy already available for nonlinear static load cases and nonlinear direct-integration time-history load cases. Time steps will be automatically subdivided where changes occur in the stiffness of nonlinear elements. In contrast to the iterative method, more events will typically be

*	Incident	Description
		generated, but iteration for equilibrium will not be performed under the assumption that the deviation from linearity will be small between events. Instead, any equilibrium errors are carried forward to the next time step and applied as a corrective load. This is similar to the method used in Perform-3D. This method may not be appropriate in cases with a large degree of geometric nonlinearity. Pure event-to-event stepping can be more efficient than iterative methods for small to medium sized models, but may not be so for large models with many nonlinear elements. Pure event-to-event stepping can also be helpful for models where convergence cannot be achieved with iterative methods, although the results should be reviewed for equilibrium. See also Incident 68067.
*	91429	Internal changes have been implemented to increase the speed of nonlinear static and direct-integration time-history analyses, including the use of parallelization of certain element processes. The effect on run-time will be problem-dependent. Results may differ from previous versions due to the change in the order of numerical operations, but the differences are expected to be within the convergence tolerance of the analysis. Larger differences may occur for some very sensitive or poorly conditioned models.
*	91738	Internal improvements have been made to the force equilibrium and deformation compatibility between frame hinges and their parent frame elements. This mostly affects fiber hinges and PMM hinges while dropping load. The effect is generally small, but can be helpful for the new event-to-event strategies that have been added for nonlinear direct integration time history load cases. In addition, multiple hinges in a single frame element will tend to perform better than previously, lessening the need to assign frame hinge overwrites that auto-subdivide the frame object at the hinges. This reduces the size of the analysis model and tends to increase the speed of the analysis. Only hinges in frame or wall elements are effected, not hinges modeled in links. Results for models with these hinges may differ from previous versions, although the difference will generally be within the convergence tolerance for the load case. Models with P-delta may be more significantly affected, particularly for those few cases where the deformations of the hinge and the parent frame element were not fully compatible. For unstable and numerically sensitive models, larger differences may be observed.
	93037	The "Hinge Unloading Method" parameter has been removed from nonlinear static and nonlinear staged-construction load case definitions. This parameter only applied to isotropic hinges, and using a non-default value was rarely useful in recent versions of the software. Now the default value "Unload Entire Structure" will always be used. Models opened in the new version that previously used a different setting may be affected, but this will not be common.
	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 time history load cases for sensitive models.

Frame Design
Enhancements Implemented

*	Incident	Description
	58459	An enhancement has been made to all concrete frame design codes to make the option "Consider Minimum Eccentricity" available as design overwrite for individual columns. Previously this option was only available in the design preferences and applied to all columns.
*	65244	An enhancement has been made to add steel frame design based on the Russian SP 16.13330.2011 (SNiP II-23-81:2011) code.
	70067	An enhancement has been made to the design output table "Shear Wall Pier Summary" by adding several new columns to report the values of compressive stress, compressive stress limit, neutral axis depth (c), and neutral-axis depth limit (climit) for the following design codes: ACI 318-14, ACI 318-11, ACI 318-08, ACI 530-11, AS 3600-09, CSA A23.3-14, CSA A23.3-04, Eurocode 2-2004, KBC 2009, Mexican RCDF 2004, and NZS 3101:2006.
*	73011	Steel frame design per the Eurocode 3-2005 code has been enhanced to provide torsion design for steel frame sections.
	75514	The handling of effective-length K-factors has been changed for steel frame design for the "AISC 360-10" and "AISC 360-05" codes when the Analysis Method is set to "Direct Analysis". Previously the bending factors K22 and K33 were always taken as 1.0, and the lateral-torsional buckling factor K_LTB was taken as an internally calculated value for K22, which was generally greater than 1.0 and usually over-conservative. Furthermore, these factors were always being used and could not be changed by the user. Now the default values for all three factors (K22, K33, and K_LTB) are taken as 1.0, but these can be changed by the user by assigning design overwrites to specific frame members. This change only affects the design using the Direct Analysis Method. The design manual has been updated accordingly.
	81927	The following enhancements have been made for steel frame design using the Italian NTC 2008 code: 1.) Two preference items, namely "Combinations Equation" and "Reliability Class" have been removed. 2.) The default value for preference item "Pattern Live Load Factor" is now set to 0.0 instead of 0.75. 3.) The preference item "Interaction Factor Method" is renamed as "Method Used for Buckling under P-M-M" with possible values "Method A" and "Method B". 4.) The options for "Framing Types" in the preferences have been changed to DCH-MRF, "DCL-MRF", "DCH-EBF", "DCL-EBF", "DCH-CBF", "DCL-CBF", "Inverted Pendulum", and "Non Dissipative". All DCM-* items have been removed. 5.) The descriptions of the preference items have been updated to reflect the NTC code clauses and equations instead of those of Eurocode 3. 6.) The reference to Psi factor that is used in the expression of Mcr was called C1. Now it is referred to as Psi. 7.) The output of the design details has been updated to better represent the governing interaction equations used. 8.) Some of the interaction equations in the output were referring to Eurocode. The references to the equations are now made to either NTC or Eurocode as appropriate. 9.) The documentation has been updated to reflect these changes.
	82033 84878	Steel frame design using the "Eurocode 3:2005" code has been enhanced to now calculate K-factors for non-sway frames. Previously they were always being taken as 1.0. Now the K-factors are calculated based on support conditions. The previous behavior was generally conservative. The design manual has been updated to reflect that the K values for non-sway frames are calculated.
	83021 88557	Concrete frame design has been enhanced to provide a new design overwrite parameter for beams specifying whether to design for torsion or to neglect torsion design. The affected codes are

*	Incident	Description
		"ACI 318-14", "ACI 318-11", "ACI 318-08", "AS 3600-09", "CSA A23.3-14", "Eurocode 2-2004", "Singapore CP 65:99", "TS 500-2000", "Italian NTC 2008", "KCI-1999", and "KBC 2009".
*	83293	Seismic performance-based design has been added to the Chinese version based on the Chinese codes provisions of JGJ3-2010 3.11. For concrete frame and shear-wall designs the following Seismic Performance Levels are recognized: (1.) Normal - Design is based on specified seismic loads and loading combinations that cover the GB50009 3, GB 50011-2010 5.4 and JGJ 3-2000 5.6 codes. Seismic modifiers and GammaRE are considered and the design strength of materials is used. (2.) Normal + Level I - The same as (1.) plus an added Level I check. The Level I check increases the specified seismic load to the Design Intensity level and uses a load combination based on JGJ3-2010 3.11.3-1. Seismic modifiers are not considered, but GammaRE is considered and the design strength of materials is used for this Level I check. (3.) Normal + Level II (DI) - The same as (2.) but with the following difference: All beams and spandrels tagged as energy dissipating are not checked for flexure using the JGJ3-2010 11.3-1 load combination, but instead use the JGJ3-2010 3.11.3-2 load combination. For this check the characteristic strength of the materials is used, and GammaRE is not considered. (4.) Normal + Level II (Rare) - The same as (3.) except that the specified seismic load is increased to the Rare level for loading combinations based on JGJ3-2010 3.11.3-1 and JGJ3-2010 3.11.3-2.
	85763	An enhancement has been made to give user control over the capacity design of RBS (reduced beam section) beams. Previously, capacity design was always performed as per AISC 360-10 for the RBS beams. Now, RBS capacity design is only performed when seismic load is present in the list of design combinations. In addition, a design overwrite has been added to turn off the RBS capacity design at the column face and for joint design. This would normally be desired when a proprietary joint design is used and joint design is to be performed by a third party proprietary system.
*	88026	An enhancement has been made to add concrete frame design based on Russian SP 63.13330.2012 code.
	92919	An enhancement has been made to steel frame design for the Indian code "IS 800:2007" where the K-factors (both sway and non-sway) are now calculated based on the Wood's Chart as described in the Indian code "IS 800:2007". Previously these K-factors were being calculated based on conventional analytical methods as described in the AISC codes. The effect is minor.
	94240	An enhancement was made for the auto load combinations generated for the Chinese design codes to calculate the Gamma_EG factor based on the live-load contribution given in the specified mass source for the seismic load case. If the mass source is not from loads then the default value 0.5 for Gamma_EG is used.

Slab Design
Enhancements Implemented

*	Incident	Description
*	86299	An enhancement has been made to add reinforced-concrete slab design based on design strips. Design strips can be added on concrete slabs and can be designed on selected stories. ACI, Eurocode, and several other international codes are available. See also Incident 90138 for element-based design. This feature is only available for the Ultimate license level.
*	86300	An enhancement has been made to be able to draw and model PT tendons and to consider PT in the design of concrete slabs. Design is performed on selected stories. ACI, Eurocode, and several other international codes are available. This feature is only available for the Ultimate license level.
*	90138	An enhancement has been made to add concrete slab design based on shell elements. Several design codes are covered. This is an alternative to strip-based slab design. The designed rebar can be viewed on screen. Options are available to average the reinforcement over user-defined widths and to view the required rebar that is additional to a user-defined value. See Incident 86299 for strip-based design. This feature is only available for the Ultimate license level.

Punching Shear Design
Enhancements Implemented

*	Incident	Description
*	90139	An enhancement has been made to add punching-shear design checks in concrete slabs at column and load locations specified by user. Users can specify overwrites for punching perimeters and also specify openings that could affect the punching perimeters but which are not explicitly modeled. Reinforcement - shear studs or ties - can be designed to resist punching shear. Several design codes are covered. The design/check results can be viewed on screen and are reported in tables. Design is performed on selected stories. This feature is only available for the Ultimate license level.

Results Display and Output
Enhancements Implemented

*	Incident	Description
*	57024	Step-by-step energy plots are now available for nonlinear direct-integration time-history load cases and for nonlinear static/staged-construction load cases. Previously they were only available for linear and nonlinear modal time-history cases. In addition, plots of the input ground accelerations and/or load function are now available for nonlinear direct-integration time-history and nonlinear static load cases.
	85336	An enhancement has been implemented to report concrete design results in the database tables based on the type of frame section definition (beam or column) instead of reporting results based on the object classification (orientation) as a beam or column. This does not affect the actual results reported for any member. Previously design results for concrete braces were not being reported because they were not classified as a beam or column. Now the results for braces will be reported in the beam or column table, depending upon the type of section property assigned to the member. Note that vertical members using a beam property will be reported in the beam table, and horizontal members using a column property will be reported in the column table.
*	85594	An enhancement has been made to calculate and display the target displacement based on the Eurocode 8, Part 3 and NTC 2008 codes when using nonlinear static pushover analysis for performance-based design.
*	89989	An enhancement has been made to display Story Plots of displacements, absolute accelerations, drifts, shears and overturning moments together on the same plot for time history and nonlinear static load cases. The maximum value, the minimum value and the values at a step are plotted. The step value can optionally be animated. For time history load cases the input acceleration is also plotted.

User Interface
Enhancements Implemented

*	Incident	Description
	87671	An enhancement has been made to allow creation of animated videos for staged construction analysis by showing the incremental updates to the structure.
	92204	An enhancement was made to add tool buttons to the "View" toolbar to toggle visibility of joints, frames, areas, links, and tendons in the active window.
	92481	An enhancement was added for the time-dependent properties of wall sections to now display the section thickness assumed for the Auto option. This does not affect any results.

External Import/Export
Enhancements Implemented

*	Incident	Description
	92191	An enhancement has been made to add curved lines and area edges to the export/import of the model text file (.E2K, .$ET).

Application Programming Interface (API)
Enhancements Implemented

*	Incident	Description
	77432	The following API (Application Programming Interface) functions have been added to retrieve information about coordinate grid systems in the model: cGridSys.GetGridSysType, cGridSys.GetNameTypeList, cGridSys.GetGridSysCartesian, and cGridSys.GetGridSysCylindrical.
	76670	A new API (Application Programming Interface) function cFrameObj.GetSupports has been added to retrieve the names of support objects (columns and walls) for composite beam objects.
	83921 93662 93867	Two new functions have been added to the Application Programming Interface (API) to retrieve analysis results for displacement drifts: SapModel.Results.JointDrifts and SapModel.Results.StoryDrifts
	88329	An enhancement has been added to retrieve pier section properties for a specified pier. This data is equivalent to the Pier Section Properties database table.
	88330	The Application Programming Interface (API) was enhanced by adding and/or documenting numerous new functions related to (a) Getting the properties of Section Designer and other frame sections, (b) Getting various object properties, (c) Hyperstatic and other load-case properties, (d) Retrieving loads from time history load cases, (e) Retrieving lists of selected objects, (f) Setting the previous selection, (g) Setting an eigen modal load case, (h) Various other functionality. Affected functions include: (1) cAnalyze.GetCaseStatus, .RunAnalysis; (2) cAreaObj.GetNameList, .GetPoints, .GetProperty; (3) cDesignConcrete.GetCode; (4) cFrameObj.GetLocalAxes, .GetEndLengthOffset, .GetNameList, .GetPoints, .GetSection; (5) cSapModel.GetModelFilepath, .GetModelFilename, .GetPresentUnits, .GetProjectInfo, .GetVersion, .SetProjectInfo; (6) cGroup.GetAssignments; (7) cCaseDirectHistoryLinear.GetLoads, .GetLoads; (8) cLoadCases.GetType, .GetNameList; (9) cCaseHyperStatic.GetBaseCase; (10) cCaseModalHistoryLinear.GetLoads; (11) cLoadCasesModHistNonlinearGetLoads; (12) cCaseModalHistoryNonlinear.GetLoads; (13) cCaseStaticNonlinear.GetLoads; (14) cCaseStaticNonlinearStaged.GetStageData, .GetStageDefinitions; (15) cLoadPatterns.GetLoadType; (16) cPointObj.GetConnectivity, .GetCoordCartesian; (17) cPropArea.GetNameList, .GetShell; (18) cPropFrame.GetAngle, .GetCircle, .GetRectangle, .GetTee, .GetType, .GetTypeRebar, .GetRebarBeam, .GetRebarColumn, .GetSDSection; (19) cPropFrameSDShape.GetAngle, .GetReinfCircle, .GetReinfCorner, .GetReinfEdge, .GetReinfLine, .GetReinfRectangular, .GetReinfSingle, .GetSolidCircle, .GetSolidRect, .GetTee; (20) cPropMaterial.GetNameList, .GetMaterial, .GetOConcrete, .GetORebar; (21) cCombo.GetCaseList, .GetNameList; (22) cAnalysisResults.FrameForce; (23) cAnalysisResultsSetup.GetCaseSelectedForOutput, .GetComboSelectedForOutput, .SetCaseSelectedForOutput, .SetComboSelectedForOutput; (24) cSelect.GetSelected, .PreviousSelection;
	91854	The ETABS API has been updated for v16 such that both v15 (ETABS 2015) and v16 (ETABS2016) can coexist on the same machine. API tools and plugins written using the v15 API should still work in v16 without a need to recompile, but we recommend changing the reference to ETABS2016.dll and recompiling whenever possible. The v13 API is no longer supported, but most tools and plugins can be updated by changing the reference to ETABS2016.dll and making minimal changes to the source code, as documented in the API Help file.

Documentation
Enhancements Implemented

*	Incident	Description
	89613	An enhancement has been implemented to add a note to the Analysis Reference Manual and the Generate Edge Constraints help topic that describes the potential issues with assigning an edge constraint along an edge that shares the same location as a frame, cable, tendon, or link object.

Miscellaneous
Enhancements Implemented

*	Incident	Description
	88604	The version number has been changed to v16.0.0 for a new major release. ETABS v16 will be known as ETABS 2016.

Modeling
Incidents Resolved

*	Incident	Description
	85751	An incident was resolved where diaphragms assigned to the base of a structure would not display when the show diaphragm extent option was turned on. This was a display error only.
	86307	An incident was resolved where starting a new model using the option "Use Settings from a Model File" and then creating a structural model from a template could cause an abnormal termination. This occurred when either a dead-load or live-load type of load pattern was not present in the model file used for the initial settings. Now, in such a case, the structural model from template will provide no load pattern for either the dead load or live load if the corresponding type of load pattern is missing from the model file used for the initial settings.
	86718	An incident was resolved where the shear area for beams was not being increased as expected when a SidePlate type of moment-frame beam connection was assigned to the member. The shear area used was still that of the beam without the SidePlate addition. The results were insignificantly affected for most steel sections. Other section properties were being correctly modified.
	89339	An incident was resolved where the weak-axis section properties were incorrect in the database provided for ArcelorMittal British steel UB and UC frame sections. Analysis and design results agreed with the section properties as imported and reported in the model. These could be seen in the section property forms, tables, and reports.
	90344	An incident was resolved where the options "Table 10-19 (Concrete Shear Wall – Flexure Controlled)" and "Table 10-20 (Concrete Shear Wall – Shear Controlled)" in the Auto Hinge Assignment Data form (command Assign > Frame > Hinges) remained exposed in the released version whereas they are not currently implemented.
	90756	An incident was resolved where the fillet radius data was missing in the database provided for British BS 2006 steel wide-flange/I frame sections. Analysis and design results agreed with the section properties as imported and reported in the model. These could be seen in the section property forms, tables, and reports. The effect was generally small and conservative.
	91075	An incident was resolved where the time variation of stiffness was incorrectly applied for "User" type time-dependent properties (command Define > Materials > Time-Dependent Properties > Modify/Show Stiffness Curve). Rather than using the values of the Stiffness Multiplier specified by the user, the square-roots of these values were being used instead. The value of modulus actually being used in analysis could be seen using the Show Plot button available while defining the time-dependent properties.

*	Incident	Description
	91465	An incident was resolved where, when initializing a new model using the built-in defaults with SI units, the typical stud tensile strength for deck section properties was set to 4000 MPa instead of 400 MPa. The error was obvious, and design results were consistent with the model.
	94864	An incident was resolved where dividing a frame object with nonlinear hinges would generate additional hinges in the resulting frame objects. Results agreed with the model as generated. This affected frames manually divided using the command Edit > Edit Frames > Divide Frames, not frames that were automatically meshed for the analysis model.
	94970	An incident was resolved where inserting a story and editing the story elevation at the same time was causing abnormal termination. This did not occur if the story elevation was changed at a later time.

Loading
Incidents Resolved

*	Incident	Description
	65303 70716 94503	An incident was resolved where diaphragm eccentricity overrides set for one auto seismic load pattern of type "UBC 97" and "UBC 97 Isolated" were affecting other "UBC 97" and "UBC 97 Isolated" load patterns.
	88433	An incident was resolved where the building depth specification in the dialog box for Chinese auto wind load was being overwritten by the depth calculated from the model geometry. If the specified value was different from that calculated from the geometry it would affect the wind pressure calculation for across wind and torsional wind loads.
	94032	An incident was resolved for the "Costa Rica Seismic Code 2010" response-spectrum function definition where the Overstrength Factor, SR, was being taken from the specified value for "Ductility Overstrength". A new parameter has now been added to specify an explicit value "Overstrength Factor".

Analysis
Incidents Resolved

*	Incident	Description
	64200	An incident was resolved where the stiffness used to enforce edge constraints on area objects with layered shell properties was based on the homogeneous material and thickness rather than the material and thickness of the actual layers. The homogeneous material and thickness are not directly visible in the definition of the layered shell property, but can be seen if the section property is changed back to a thin or thick shell, plate, or membrane section. The effect of this error is generally insignificant. If the homogeneous values used were much too small compared to the actual layer properties, edge constraints may have been poorly enforced, and the effect would be obvious from the deformed shape and force/stress plots. However, the effect is localized. If the homogeneous values used were much too large compared to the actual layer properties, numerical sensitivity could result, primarily affecting convergence behavior for nonlinear analysis. The behavior of the layered shell elements themselves was not affected by the homogeneous values, only edge constraints if actually present on the edges of the layered elements.
	79599	An incident was resolved where area edge constraints were sometimes not being created due to an overly strict tolerance check for determining if a point was on an area edge. The stricter check got introduced in ETABS 2013. Failure to enforce edge constraints did not affect overall equilibrium, but could cause localized lack of continuity. It is still possible, in very rare cases, that horizontal continuity will not be enforced for a point on an area edge if that point and the two adjacent points defining the area edge are not either all part of the same rigid diaphragm or all part of no rigid diaphragm. While this will not be common, if it occurs it will not affect overall equilibrium, only localized horizontal continuity.

*	Incident	Description
	80744	An incident was resolved where non-isotropic, single-degree of freedom frame hinges sometimes exhibited extreme numerical sensitivity that could cause results to diverge or fail to converge when running nonlinear static or direct-integration time-history load cases. Such hinges include the kinematic, Takeda, pivot, degrading, BRB hardening, and concrete hysteresis models. When this error occurred, the effect on the results was obvious.
	86424	An incident was resolved where mass-proportional damping specified on the materials was incorrectly applied to frame elements in linear and nonlinear direct-integration time-history load cases, which tended to underestimate the amount of damping. In addition, for a frame element with non-zero insertion points, the damping force was applied at the insertion points rather than at the joints where the mass is located; the effect of this on the results was generally inconsequential.
	87330	An incident was resolved where a file error message was generated when running the analysis using the Standard Solver and the equation block size was larger than 2 GB. This only occurred on machines having a large amount of RAM memory. When this occurred, analysis results were not available. This error did not occur when using the Advanced Solver (the default) or the Multi-threaded solver. This has been resolved by limiting the equation block size to 2 GB for the Standard Solver. Versions 15.1.0 to 15.2.2 were affected.
	87406 94338	An incident was resolved where the stiffness proportional damping used for wall hinges was too large when the analysis model for nonlinear hinges was set to "Model Hinges within Elements" (command Analyze > Analysis Model for Nonlinear Hinges). When this occurred, the forces and moments in the wall hinge were inconsistent with the forces and stress reported in the wall object itself. In general, the hinge results were much smaller than expected for the response of the wall itself. This error did not affect hinge results when the option analysis model for nonlinear hinges was set to "Model Hinges as Separate Link Elements". Only nonlinear direct-integration time-history load cases were affected when stiffness-proportional damping was used. Note that results for fiber and non-isotropic hinges in frame elements could also be affected, but the effect was generally very small.
	92536	An incident was resolved where a semi-rigid diaphragm assignment made to the Base story of the structure was being treated as a rigid diaphragm assignment.
	92664	An incident was resolved where the stiffness-proportional damping matrix computed for line springs and area springs was not being scaled by tributary length or area for nonlinear load cases. For nonlinear direct-integration time-history load cases, the calculated damping was correct to within the convergence tolerance, but the convergence behavior could be poor. For linear direct-integration time-history load cases using the stiffness from a nonlinear load case, this caused the damping to be overestimated for springs with smaller tributary regions and to be underestimated for larger tributary regions. Linear direct-integration time-history load cases starting from the unstressed (zero) state were not affected. Modal time-history analysis, including FNA, was not affected.
	92891	An incident was resolved that in certain very rare cases caused area objects to be meshed twice when there were multiple area objects at slightly different elevations (elevation difference < Length Tolerance). This led to two sets of slabs (in the same location) and their associated loads being present in the analysis model.

Frame Design
Incidents Resolved

*	Incident	Description
	59993 81776	An incident was resolved for steel frame design per the "Eurocode 3:2005" code where the K-factors for sway frames were being set to the value 1.0 even when the preference item "Consider P-delta Done" was set to "No". Now the K-factors are being calculated based on support conditions when this preference item is set to "No", and are set to 1.0 when the preference item is set to "Yes".

*	Incident	Description
	66512	An incident was resolved for concrete frame design where results were not available for the design of columns having non-prismatic (variable) frame section properties.
	70734	An incident was resolved for concrete frame design where an error message was being generated when trying to design non-prismatic frame members when a regular column section property was specified at one end of a variable segment and a Section Designer section was specified at the other end. When this occurred, no design results were available for that member. Normally, non-prismatic frame members can be designed when the section properties used in the definition of the non-prismatic section are either all of beam type or all of column type, and are either all to be designed or all to be checked.
	72966	An incident has been resolved for certain concrete frame design codes where the Cm factors for columns were often too conservative for load combinations involving response-spectrum load cases. For any member, Cm is 1.0 if the member is laterally loaded with in-span load. For columns, there are typically no in-span lateral loads for gravity, equivalent static seismic load, or spectral load. However, because of loss of sign under spectral loading, the design was incorrectly assuming the presence of an in-span lateral load. This caused the Cm to be calculated as 1.0 for all combinations with spectral loading, when a smaller value could apply. The affected codes were "ACI 318-14", "ACI 318-11", "ACI 318-08", "AS 3600-09", "CSA A23.3-14", "CSA A23.3-04", "KCI-1999", "KBC 2009", "Mexican RCDF 2004", "NZS 3101:2006", and "TS 500-2000". In addition, there was a lower limit of 0.4 being imposed on the Cm factor for "ACI 318-14" and "ACI 318-11" codes, which has now been removed. This limit was not present for the "ACI 318-08" code. This same limit was and is correctly being applied for all other codes.
	74070	An incident was resolved for steel frame design using the "AISC 360-10", "AISC 360-05", "CSA S16-14", "CSA-S16-09", and "KBC 2009" codes where the doubler-plate design for OMF was based on capacity design instead of simply the unbalanced moment.
	78161	An incident was resolved for concrete frame design using certain codes where the reported enveloping "End-I Design Moment", i.e. the moment at the start end, for the beams was incorrect in the detailed envelop information. This was a reporting error only. All reported rebar calculations were correct, and no other results were affected. The affected codes are "ACI 318-14", "ACI 318-11", "ACI 318-08", "AS 3600-09", "BS 8110-97", "CSA A23.3-14", "CSA A23.3-04", "Eurocode 2-2004", "Hong Kong CP 2013", "Hong Kong CP 2004", "IS 456:2000", "Italian NTC 2008", "KCI-1999", "KBC 2009", "Mexican RCDF 2004", "NZS 3101:2006", "Singapore CP 65:99", and "TS 500-2000".
	81232 81806	An incident was resolved for the Australian steel frame design code AS 4100 where the value of Lambda_wy for major-axis bending mode was being used instead of the value of Lambda_wy for axial mode while calculating the value of Mrx (the moment capacity with the presence of axial force) for doubly-symmetric I- and box-sections when Kf < 1.0 (slender in axial mode) (AS 8.3.2(b)). This has been changed to use the value of Lambda_wy for axial mode for calculating Mrx in this case. The previous result was slightly conservative.
	81451	An incident has been resolved for steel frame design for the Italian NTC 2008 code that addresses the following issues: 1.) Some of the interaction equations in the output were incorrectly referring to Eurocode. The equations now reference NTC or Eurocode as appropriate. No results were affected. 2.) The choice of interaction methods "Method A", "Method B", or "Method Both" has been introduced for stability check of Class 1, 2, and 3 sections under flexure and axial compression (NTC Eq. C4.2.32, Eq. C4.2.37, Eq. C4.2.38). 3.) The equation for Mb,Rd has been updated for the expression for chi. The new expression follows NTC Eq. 4.2.5.1. Previously chi was based on EC3 6.3.2.2(1), which is a simpler version of NTC Eq. 4.2.5.1. 4.) The expression of psi = 1.75 - 1.05 * (Mb/Ma) + 0.3 * (Mb/Ma)^2 was corrected per NTC Eq. C4.2.31. Previously it was psi = 1.88 - 1.40 * (Mb/Ma) + 0.52 * (Mb/Ma)^2. 5.) The beam/column capacity ratio is now determined with the appropriate gamma_RD factor: 1.3 for DCH and 1.1 for DCL, per code (EC8 4.4.2.3). Previously the factor 1.3 was always used.

*	Incident	Description
		6.) The buckling curve for the case of lateral torsional buckling of rolled I-shapes is now taken as "b" for h/b <= 2 and "c" otherwise. Previously the curves "a" and "b" were used, respectively.
	81687	An incident was resolved for steel frame design per Eurocode EC 3-2005 and Italian NTC 2008 codes with Eurocode 8:2004 where the section compactness was correctly checked for DCH-CBF and DCM-CBF per section EC8 6.5.3(2) and Table 6.3, but unlike for other framing types, this was reported as a warning rather than an error message. Since this was treated as a warning instead of an error, the member was not colored Red in the model window, and the error message was not being displayed in the summary window. The warning was being displayed in the details and in the database tables only. Now an error message will be displayed instead of a warning message. No results were affected.
	82117	An incident was resolved where, under certain circumstances, the default minimum live-load reduction-factor check was not being applied. Specifically, this occurred when the live-load reduction was first defined by user curves or by user story-based reductions where the minimums do not apply, and then the specification was changed to a code basis or user-formula basis and the default minimum was turned on. User-defined minimums were always being imposed. The design details showed the actual live-load reduction factor being used, and design results were consistent with that value.
	82590	An incident was resolved for steel frame design using codes "AISC 360-10" and "AISC 360-05" where changing the value of Omega0 in steel frame design preferences did not affect the value of Omega0 actually used in certain cases. The value of Omega0 used for design was being taken from an IBC 2003 seismic load pattern if one was defined, or the default value of 3.0 was used. The actual value of Omega0 used for design was being reported in the design output.
	86021	An incident was resolved for AISC 360-10 encased composite column design where the shear capacity in the major direction was always over-conservative. The depth of the embedded section was taken to be larger than the actual value when used for the calculation of web slenderness.
	86752	An incident was resolved for Eurocode 2-2004 concrete frame design using the Norwegian national annex, in which the minimum required reinforcement for columns was incorrectly calculated. The value previously calculated was conservative.
	87332	An incident was resolved for RBS beams where the D/C ratio at the j-end of a steel moment frame with RBS moment connections was not being reported.
	89603	An incident was resolved for composite column design where the specified strength of longitudinal rebar for encased columns was not reported correctly in the design report. The value reported was Fy for the shear rebar instead of Fy for the longitudinal rebar. This was just a reporting issue and no design results were affected.
	90208	An incident was resolved for concrete frame design where the design of some columns would produce an error message that the member could not be designed. The error was limited to concrete columns that were framed by variable-section beams which had more segments than the column itself.
	91148	An incident was resolved where a non-zero percentage of composite action was reported for cantilever beams on which shear studs had been placed to satisfy the minimum shear stud spacing requirement. Since the bending moment is negative across the entire length of a cantilever, no composite action occurs and this was obviously incorrect. This did not affect the strength of such beams, because their bending capacity is based on the properties of the steel section alone, but their actual deflection could be greater than reported.
	91991	An incident was resolved for steel frame and composite beam design according to the AISC 360-10 code in which the calculation of the web plastification factor, Rpc, was not considering the case when Iyc/Iy <= 0.23 and therefore setting Rpc=1.0. This could result in unconservative moment capacities when Iyc/Iy was less than 0.23.

*	Incident	Description
	92339	An incident was resolved for steel frame design per the "AISC ASD 89", "AISC LRFD 93", "BS 5950-2000", "CSA S16-09" and "CSA S16-14 codes where the "Effective Length Factor Major/Minor" values were always shown as zero in the design overwrite tables, regardless of the values assigned. This was just a reporting issue and design results were unaffected.
	92341	An incident was resolved for steel frame design per the Eurocode 3-2005 and Italian NTC 2008 codes where the value of Gamma0v that may have been assigned using design overwrites was not being reported correctly in the design output. The assigned value was being used and the design results were correct.
	93138	An incident was resolved for concrete frame design where the confinement rebar was always being treated as type "Tie" for the flexural design of concrete columns even when the confinement was specified as type "Spiral" in the definition of rectangular and circular column section properties. "Spiral" type confinement was not being used for flexural design. The effect of this was conservative. This error affected versions 13.0.0 to v15.2.2.
	94149	An incident was resolved for composite column design per the AISC 360-10 code where the rebar inertia was being incorrectly computed for encased concrete composite columns. Design results were always conservative.
	94423	An incident was resolved for Chinese frame design where the calculation of dual system modification factors based on frame story-shears ratios may be incorrect for some structural systems under certain conditions. The factors were mostly calculated assuming Frame-shearwall structural systems, and for these systems they were correct.
	94809	An incident was resolved for concrete frame design per the Turkish "TS 500-2000" code in which Eqn. 8.19 of section TS 8.2.5b (Td/S + Vd/(bw*d) < 0.22 fcd) was not being used to check the absolute upper limit of the shear-torsion combination that can be carried by a concrete beam section irrespective of the amount of stirrup or torsional transverse reinforcement provided. This check has now been implemented. The effect of this error was that the design was not declaring shear-torsion combined failure in the case of overstress, and hence could have been unconservative.
	94244	An incident was resolved for Chinese concrete frame design code where the computations were incorrect for adjustment coefficients (i.e., MMF, SMF) for various framing types. The design results showed the actual values used in design.

Shear Wall Design
Incidents Resolved

*	Incident	Description
	73424	An incident was resolved for Eurocode 2-2004 shear wall design where shear design with user specified "Force Modification" was not enforced properly. When this error occurred, the wall design report showed the shear force used for design.
	75543 92087	An incident was resolved for concrete shear-wall design using the ACI 318-08, ACI 318-11 and ACI 318-14 codes where the spandrel diagonal reinforcement was being designed based on phi factor for seismic shear of 0.6 instead of 0.85 as allowed per ACI 318-08 section 9.3.4(c), ACI 318-11 section 9.3.4(c), and ACI 318-14 section 21.2-1, Table 21.2.1. This produced a conservative design for coupling beams.
	91522 91743	An incident was resolved for ACI 318-11 shear wall design where the value of phi*Vn used for design was incorrectly reported in certain cases. The correct value was being used and design results were not affected.
	94421	An incident was resolved for shear wall design using the Chinese code where the force adjustment coefficients MMF and SMF were not correct for some structural systems. The actual values used in pier design were reported in wall design overwrites and results were consistent with these values.

Results Display and Output
Incidents Resolved

*	Incident	Description
	59382	An incident was resolved where single degree-of-freedom frame hinges using the Takeda or concrete hysteresis models could sometimes indicate that yielding had occurred at force or moment values lower than the specified yield value (point B). Only the reported state (past point B) was affected, not the actual force-deflection or moment-rotation behavior. No other results were affected. This error did not affect other hysteresis types (isotropic, kinematic, Pivot, degrading, BRB hardening).
	54404 76887 80204 90039	An incident has been resolved where the command Display > Force/Stress Diagrams > Soil Pressure was always showing results in internal database units and was unaffected by the units setting for displaying force/length^2 values. The behavior of some other controls on the dialog box was also erratic and has been corrected. The display now also shows the local pressure value under the mouse cursor, and the maximum and minimum pressure values and their locations are shown in the status bar.
	76602	An incident was resolved for shear wall design where the L/h ratio was not correctly reported in the spandrel design report for the AS3600-09, Mexican RCDF 2005, New Zealand NZS 3101-06, and Turkish TS 500-2000 codes. This was just a reporting error and design results were unaffected.
	78544 82198	An incident was resolved where, for the graphical display of pier and spandrel forces, there could be a sign error in the value reported under the mouse cursor when the cursor hovered over the model. The problem was limited to axial force, shear forces and torsion when the option to show "Moment Diagrams on Tension Side" was ON. The bending-moment signs were correct. All colors and values plotted on the screen and shown in the right-click details form were correct. The value shown under the mouse cursor has now been corrected. No other results were affected.
	81859 91352	An incident was resolved for printing the area stresses/forces contour plots using the command File > Print Graphics where the values of the stresses/forces actually plotted were in the model default database units instead of the display units shown in the footer of the printed image. This only affected the printed plot. No other results were affected.
	82144	An incident was resolved where, for multi-valued results, the individual "Max" or "Min" displays were not correct (some values were switched) for pier and spandrel results when seen in the pier or spandrel diagram form after right-clicking the member. They were correct in the overall model display. The combined "Max/Min" displays were correct in both places.
	85493	An incident was resolved in which the design details report may not have been completely generated if the data for one of the table cells ended with an underscore character. This affected the detailed reports for all design types, but didn't affect the actual calculated design results or those results that were present in the report.
	86614	An incident was resolved in which the auto wind load calculations for ASCE 7-02, 7-05, and 7-10 could show incorrect pressure coefficients if the load pattern was setup for all cases (directions) and the pressure coefficients differed for the cases. This was a reporting issue only and did not affect the results.
	87111	An incident was resolved where the backbone curve displayed in the Hinge Results plot form (command Display > Hinge Results) would, for certain non-isotropic hinges, show the incorrect yield deformation for points +B and -B. This was a display issue only and did not affect the actual results computed or plotted for the hinge response.
	87778	An incident was resolved where after double-valued story response plots are displayed there may be extraneous results shown in subsequent single-value story response plots which remain until the display form is closed and reopened.
	88119	An incident was resolved where creating a Project Report that included wall pier design caused an abnormal termination. This occurred when the wall pier was assigned a Section Designer Section. This was just a reporting error and no design results were affected.

*	Incident	Description
	88606	An incident was resolved for concrete frame design where the display of the design report would produce an abnormal termination when all beams connected to a specific column did not have concrete properties. The error was limited to concrete columns framed by some steel beams. When this occurred no results were available for that particular display, but results were otherwise unaffected.
	89709	An incident was resolved for the AISC 360-10 and AISC 360-05 steel frame design codes where the table "Torsion Moment and Capacities" in the Summary Report was showing a redundant row. No results were affected.
	89912	An incident was resolved where the plotted potential and hysteretic energies for FNA load cases are wrong for certain types of link objects: Multilinear Elastic, Gap, Hook, Plastic (Wen), Rubber Isolator, and all three Friction-Pendulum Isolators (the first three types exhibit potential energy only). When this error occurred the effect was usually obvious from the unrealistic plots, which could include negative energies. Hinge energies were not affected. No other results were affected. Versions 15.0.0 to 15.2.2 were affected.
	89970	An incident was resolved for the Eurocode 2-2004 and Italian NTC 2008 concrete frame design codes where the longitudinal rebar for torsion design was incorrectly reported in Summary Report. This was just a reporting issue and no design results were affected. The Envelope report for tables "Design Shear Force for Major VEd2", "Torsion Reinforcement", and "Design Torsion Force" were also enhanced with improved formatting.
	90558	An incident was resolved where the detailed design results for non-prismatic concrete beams were not available using right click on a beam.
	92549	An incident was resolved where displaying diaphragm forces would cause an abnormal termination error on certain models.
	94176	An incident was resolved where the story-drift and generalized-displacement response for modal time history load cases were being reported as zero in certain cases. This affected: (1.) Drift response reported on the Point Displacements form (accessible via right-click on the displayed deformed shape), (2.) Max Story Drift plotted on the Story Response Plots, (3.) The tables "Joint Drifts" and "Joint Displacements – Generalized" when only a single (e.g. the last) step was requested for a load case. Correct values were displayed by other methods, and no other results were affected. Only modal time-history load cases were affected.
	94237	An incident was resolved where a section cut drawn on screen that passed through a link would not produce any result.
	94253	An incident was resolved where the Chinese Summary report was not being created when wind loads with the across wind or torsional wind were specified. The Wind Load table could not be created, which affected the report. The wind load was still being applied, and no other results were affected.
	94651	An incident was resolved where the Plot Functions form (command Display > Plot Functions > Define Plot Functions) for link forces and link deformations would select a different link object from the one that was clicked by the user in the drop-down box. Displayed results agreed with the link object actually shown as having been selected.
	94865	An incident was resolved where, if two or more nonlinear fiber hinges were modeled in the same frame object, the results presented in the tables for the second and subsequent hinges may not have been correct. Plotted hinge results were not affected, and overall analysis results were not affected.

Graphics and Drafting
Incidents Resolved

*	Incident	Description
	87007	An incident was resolved where an abnormal termination error could occur when drawing a deck object in a 3-D view and then performing a zoom in/out operation. This error only affected the 64-bit version of the product, not the 32-bit version. No results were affected.

User Interface and Display
Incidents Resolved

*	Incident	Description
	67420 76332 92112 92118	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.
	74716 86471	An incident was resolved where the automatically created Auto Sequence load case was being deleted when the model was unlocked. This was resulting in the load case being dropped from loading combinations.
	76298	An incident was resolved where the table Model > Definitions > Shell Sections > "Shell Sections - Summary" sometimes indicated an incorrect material for an unfilled deck. This was only a reporting issue and no results were affected.
	77101	An incident was resolved where an Abnormal Termination error could occur when trying to display elevations views when an unnamed developed elevation was present. Now unnamed developed-elevation views are no longer available in the Set Elevation View form. No results were affected.
	82440 82441	An incident was resolved in which a keyboard shortcut would not work after customizing it if the key combination had previously been assigned to another command.
	85456	An incident was resolved in which a group name containing a space is unable to be manipulated in the model explorer tree. This was a user interface issue only. No results were affected.
	86345	An incident was resolved where the description that showed when moving the mouse cursor over the name of a load combination in the Load Combinations form (command Define > Load Combinations) could correspond to a different load combination. The correct description was shown in the definition of the load combination itself as seen by clicking the Modify/Show button in the Load Combinations form. This was a display issue only and no results were affected.
	86975	An incident was resolved where trying to capture an image using the Alt+PrtScr keys would sometimes cause an error condition.
	89894	An incident was resolved where using the "Add" button in the Point Spring Properties form (command Define > Spring Properties > Point Springs) was causing an abnormal termination when no link property was available.
	91078	An incident was resolved where trying to add a story in the New Model Quick Templates form initialized with the option "Use Settings from a Model File" could cause an Abnormal Termination error. This was a rare occurrence.

Database Tables
Incidents Resolved

*	Incident	Description
	78515	An incident was resolved where the table "Shear Wall Pier Overwrites - Eurocode 2-2004" was unable to be displayed or included in a report, generating an error message instead. No results were affected.
	85702	An incident was resolved in which the database table "Frame Assignments – Offsets" was always reporting the Rigid Factor as either 0 or 1, even when the value was somewhere between those two values. This was a database table issue only and did not affect results.

*	Incident	Description
	86724	An incident was resolved where the tables for story displacements and max/average drifts could not be selected for display or inclusion in reports unless a Chinese license was being used. Only versions 15.2.0 and (15.2.1 Chinese) were affected.
	89647	An incident was resolved in which changing the unique name in the Joint Coordinates table and applying it did not save the change. No results were affected.
	90312	An incident was resolved for the table "Shear Wall Spandrel Summary" where diagonal rebar area was reported as Length^2/Length units instead of the correct Length^2 units. This was a reporting issue in the table only and no design results were affected.
	91151	An incident was resolved for the Eurocode 3-2005 design preferences database table in which the GammaM0 and GammaM1 values were always reported as 1.1. The GammaM2 value has also been added to the table. This was a database table issue only and did not affect design results.
	91786	An incident was resolved in which the Shell Assignments - Property Modifiers table would not display if a v23 property modifier was assigned to an area object. This also affected generation of reports when this table was included in the report. No results were affected.
	91957	An incident was resolved where the beam span lengths displayed in the composite beam design envelope tables were incorrect. This was a reporting error only. Calculations and design results were not affected. This error affected ETABS v13.0.0 to v15.2.2 for all codes.

Data Files (.EDB, .E2K, .$ET)
Incidents Resolved

*	Incident	Description
	70692 87509	An incident was resolved where importing a model with multiple towers from a text file (.E2K, .$ET) would create duplicated joints at the common nodes. This would cause instability and the duplicated joints had to be merged manually using the Edit > Merge Joints command to avoid instability. This has now been corrected, and older files with this problem will automatically get the duplicated joints merged when the file is opened.
	86932	An incident was resolved where user-defined nonlinear stress-strain curve definitions for concrete materials were incorrectly converted for stress units when exported to the text file (.E2K) when actually the stress is normalized with respect to the concrete characteristic stress, fc and should have been treated as unitless. This resulted in discrepancies upon import of the text file when the units chosen for export were not the database units. Database units are by default either kip-in or KN-mm, or whatever units were specified if the model was previously imported from a text file. Note that the automatically exported .$ET text file was not affected since this file is always exported in database units.
	88027	An incident was resolved where the shear wall design overwrites for spandrels were not being imported from the text file (.E2K, .$ET), but were instead reverting to default values. This did not affect models opened from the model file (.EDB). Results agreed with the model as imported.
	88185	An incident was resolved for the export/import of text model files (.E2K, .$ET) where some design preference parameters were not properly exported and/or imported. The affected parameters are as follows: (1.) "Combinations Equation" for the "Italian NTC 2008" concrete frame code was redundant, It is now removed from the design preferences form. This has no effect on results. (2.) Several parameters for the "Italian NTC 2008" steel frame code were missing from export and import. Default values were being used upon import. Results agreed with the model as imported. (3.) "Lateral Factor" for the "AISC ASD89" steel frame code was missing from export and import. The default value was used upon import. Results agreed with the model as imported. (4.) "Consider Torsion" for the "Eurocode 3-2005" steel frame code was missing from export and import. The default value was used upon import. Results agreed with the model as imported. (5.) "GammaM0" and "GammaM1" for the "IS 800-2007" steel frame code was not being exported correctly and the imported value was being ignored. The values shown in the design preferences

*	Incident	Description
		form were also being ignored. The actual values used for design were being reported in the design output.

External Import/Export
Incidents Resolved

*	Incident	Description
	73053	Several changes have been made to the exchange of models between ETABS and Revit Structure using .EXR files. (1.) An incident was resolved where ETABS was unable to export models with cylindrical grids. When this happened, an error message was displayed and no .EXR file was created. Deleting all cylindrical grid systems made the export possible. This affected all versions of ETABS versions from 13.0.0 to v15.2.2. Models with cylindrical grids can now be exported, but the circular grid lines are imported as straight lines in Revit Structure. This limitation will be resolved in a future release of CSiXRevit. (2.) An incident was resolved where ETABS models having multiple grid lines with identical labels - either within one grid system or across grid systems - would have the grid lines renumbered when imported into Revit Structure. This would occasionally affect more grid lines than just the ones with duplicate labels. This affected all versions of ETABS prior to v16.0.0. Any grid line with a label that is duplicated across grid systems but not within individual grid systems is now exported with a new compound label made up of its original label and the name of its parent coordinate system. Any grid line with a label that is duplicated within an individual grid systems is exported with a new unique numeric label. If these grid lines are imported back from Revit Structure, their original labels are preserved in ETABS. (3.) An enhancement was been made such that grid lines originally defined in Revit will be internally identified as Revit grid lines regardless of the number of import/export round trips, and subsequent changes to the grid lines in Revit will be reflected in the ETABS model. This includes deleting, relabeling, and moving the grid lines in Revit. (4.) An enhancement was been made such that grid lines originally defined in ETABS will be internally identified as ETABS grid lines regardless of the number of import/export round trips, and will be retained when importing the model back into ETABS even if they were deleted in Revit.
	73368	An incident was resolved which affected the import of DXF files containing vertical arcs or circles. When using the Import 3D DXF option, these arcs and circles were imported as ETABS curved-line objects but were incorrectly located. When this occurred, the error was obvious and the results agreed with the model as imported. This affected ETABS versions 13.1.2 to v15.2.2.
	74768	An incident was resolved where an empty coordinate/grid system called Csys1 was being generated each time a new Architectural DXF plan was imported, possibly resulting in multiple grid systems with the same name. No results were affected.
	75992	An incident was resolved which prevented the import of DXF file into ETABS as floor plans when the DXF file contained a number of AutoCAD block insertion objects greater than the number of AutoCAD line objects. Import was still possible in this case either by deselecting the import of columns in the form provided when the import was launched, or by adding a number of AutoCAD line objects so that their total number was at least equal to the number of block insertion objects. When this error did occur, the import failed and no new ETABS objects were created. This affected ETABS versions 13.1.4 to v15.2.2.
	88115	An incident was resolved which prevented the export of models with reduced beam sections or side plates to CIS/2 step files. When the user attempted to export such a model, an error message was displayed and no .STP file was written out. This affected all versions of ETABS featuring reduced beam sections and side plates.
	91731	An incident was resolved where ETABS was unable to export some models to the Revit intermediate file (.EXR) because some of the load combinations in the model were missing their global unique identifier (GUID). This was a rare occurrence. When this happened, an error message was displayed stating that no .EXR file was created. Deleting all load combos made the export possible in that case, but is no longer required.

Application Programming Interface (API)
Incidents Resolved

*	Incident	Description
	69627 92150	An incident was resolved for the Application Programming Interface (API) where the function cAnalyze.CreateAnalysisModel was available but was nonfunctional. No results were affected.
	78102	An incident was resolved where the API functions SapModel.GetDatabaseUnits, SapModel.GetDatabaseUnits_2, and SapModel.GetPresentUnits_2 sometimes failed to return correct values.
	82099	An incident was resolved where adding a load combination through the Application Programming Interface (API) and then subsequently deleting that load combination in the graphical user interface would cause an abnormal termination error. No results were affected.
	86546 86847	An incident was resolved for the API (Application Programming Interface) where calls to the function SapModel.FrameObj.GetModifiers would fail with an error flag if the input arrays were not pre-dimensioned. Pre-dimensioning is no longer required. Additionally, calls to function SapModel.FrameObj.SetModfiers would not accept valid input arrays below a certain size. This issue has also been resolved. These were corrected for ETABS 2015 v15.2.1 but omitted from the Release Notes.
	87556	An incident was resolved where the results for torsion design of reinforced concrete members was not available through the API. It was available through the tables and onscreen displays.
	87815 87877 88302 89364 89401 89445 90262 90435 91922 93974	An incident was resolved where some API users creating 32-bit COM clients were experiencing "Runtime error "429": ActiveX component can't create object" when attempting to use the 64-bit program via the API. This has been resolved as part of the installation process.
	87920 93306	An incident was resolved for the API (Application Programming Interface) where the function cPropFrame.GetRebarColumn did not provide values for the RebarSize and TieSize parameters.
	90231	An incident was resolved for the API enumeration eFramePropType which was previously not matching the values returned using the cPropFrame.GetTypeOAPI function. In addition, new API functions have also been added to get and set steel and concrete tee and angle frame section properties. The old functions always used the steel shape irrespective of the material property.
	90283 91688	An incident was resolved for the Application Programming Interface (API) where using the function cPropFrame.SetAutoSelectSteel would either fail to populate the Auto Select List, or cause an abnormal termination of the program.
	94509	An incident was resolved for the Application Programming Interface (API) where some functions which access analysis elements by name would fail to find those elements, and return an error code. This problem affected models that were newly created in the same session, and did not affect models that had previously been analyzed, saved, and then reopened.

Documentation
Incidents Resolved

*	Incident	Description
	79515	An incident was resolved in which the ACI 318-08, ACI 318-11, and ACI 318-14 concrete frame design manuals indicated that torsion can be neglected using preferences, which was not available in the concrete frame design preferences.

*	Incident	Description
	86064	An incident was resolved in which the Area Springs Help topic incorrectly indicated that the nonlinear local 3-direction springs only applied to vertical springs. These springs are effective for area objects of any orientation.
	92175	An incident was resolved in which the steel frame design manuals for AISC 360-05 and 360-10 incorrectly documented the equation for Fez in section 3.5.2.1.2.3.4. This was a documentation issue only and did not affect design results.
	92252	An incident has been resolved in the concrete frame design manual for ACI 318-14 code in which the expression of T_th had a term $(A\_cp/p\_cp)^2$ instead of (A_cp^2 / p_cp). This was a documentation issue only and did not affect design results.
	93135	An incident was resolved to update the Property Layer Definition Data Help topic to briefly describe how to activate the Modified Darwin-Pecknold Material Model used for coupled material behavior in nonlinear layered shells.
	93328	An incident was resolved that corrected a few minor typos in the Help and one in the Analysis Reference Manual. These were very minor and primarily in the topics describing the different hysteresis models. No results were affected.