

ETABS® 2016 (Version 16.1.0) Release Notes

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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 v16.0.3 (Released 2017-01-25)

Graphics

Enhancements Implemented

*	Incident	Description
*	100669	The DirectX graphics mode has been enhanced for speed and appearance, including shading and lighting. User settings are provided for advanced control. DirectX graphics mode requires a suitable graphics card or operating system support, whether using a physical machine, virtual machine, or remote desktop.
	101988	When using DirectX graphics mode, Cartesian grid-line elevations and developed elevations can now be used to graphically "cut away" part of the model when displaying a 3-D view. When using developed elevations, only the first segment of a multi-segment elevation will be used for this purpose.
	101991	A new "Walk" command has been added for viewing the model when in DirectX graphics mode. When using this mode, the mouse can be used to change the view of the model as if walking or flying around and through the structure. Walk mode is available for 3-D windows from the View menu or using the Walk toolbutton. Clicking the toolbutton again or entering Select mode cancels Walk mode.

Loading

Enhancements Implemented

*	Incident	Description
*	95479	An enhancement was made to add automated wind loads based on the Indian code IS:875 (Part 3) 2015 for Wind Loads.
*	100224	An enhancement has been made to add automated wind loads for the Vietnamese Standard TCVN 2737:1995 code.
*	100245	An enhancement has been made to add automated seismic loads and response spectrum functions for the Vietnamese Standard TCVN 9386:2012 code.

Modeling

Enhancements Implemented

*	Incident	Description
*	100287	An enhancement has been implemented to incorporate a library of concrete and rebar material properties for Vietnam.

Analysis

Enhancements Implemented

*	Incident	Description
	96716	The size of the saved analysis results files has been reduced for multi-step nonlinear static, nonlinear direct-integration time-history, and nonlinear modal (FNA) time-history load cases. This will reduce the amount of disk space required for these types of load cases in models containing isotropic frame hinges, parametric P-M-M frame hinges, and layered shell elements using Darwin-Pecknold (coupled) concrete materials. This may also result in some speed increase when running the analysis and displaying results, particularly for load cases with many steps. Note that for FNA load cases, this enhancement only affects frame hinges when modeled in links, since layered shells and frame hinges modeled in elements behave linearly in FNA load cases.

Frame Design

Enhancements Implemented

*	Incident	Description
	97668	An enhancement was made in the steel frame design report for envelope deflections where frame length has been added for reference in the "Deflection Design" table.
	100730	An enhancement has been made to steel frame design per the Korean "KBC 2009" code to provide more Design Input items for display using the command Design > Steel Frame Design > Display Design Info.

Results Display and Output

Enhancements Implemented

*	Incident	Description
*	99243	An enhancement has been implemented to view the response spectra for defined acceleration time-history functions. Response spectra can be requested either for a single time history function or a set of them. When viewing response spectra for a set of functions, an option is available to show the envelope, median, mean, or mean plus a multiple of the standard deviation.
	101981	The speed of recovering frame response for plotting and tabular display has been improved for very large models. The effect is most pronounced for single-step results (as opposed to multi-step envelopes).

External Import/Export

Enhancements Implemented

*	Incident	Description
*	82523	A new feature has been added to enable sending model geometry and results to CSI Cloud, an online storage service, for subsequent display on available mobile viewer apps. This feature is accessible from within ETABS using the new command File > Upload to CSI Cloud. Before using this feature, you will need to (1) Download and install the separate CSiCloudExplorer application that connects to CSI Cloud, and (2) Create a CSI Cloud account. The command File > Upload to CSI Cloud will automatically direct you to download and install the latest version of CSiCloudExplorer if it is not already present on your machine. Further information on obtaining a CSI Cloud account and the mobile viewer apps can be found at cloud.csiamerica.com .
*	98953	A new export option has been added for creating STL files that can be used for 3D printing of model geometry. Using the command "File > Export > 3D Printing .stl File", frame (line) and shell (area) objects present in the current window will be written to an STL file (ASCII format). For 2D windows, only the objects present for the given story will be exported. Objects which are not shown in the current window will not be exported. The undeformed geometry will always be exported as extruded shapes, regardless of what assignments or response quantities are being displayed in the current window. STL is a file format native to the stereolithography CAD software

*	Incident	Description
		created by 3D Systems, and is also known as Standard Tessellation Language. This file format is supported by many other software packages, including Microsoft 3D Builder for Windows 10. STL files describe only the surface geometry of a three-dimensional object without any representation of color, texture or other model attributes.

Miscellaneous
Enhancements Implemented

*	Incident	Description
	100079	The version number has been changed to v16.1.0 for a new intermediate release.

User Interface
Incidents Resolved

*	Incident	Description
	100503	An incident was resolved where requesting the response spectrum curve (command Display > Response Spectrum Curves) for a time history load case would cause an abnormal termination for models that had no structure defined at the top story. No results were affected.

Graphics
Incidents Resolved

*	Incident	Description
	100027	An incident was resolved where joint restraints were not being displayed when the graphics mode was set to DirectX. The Standard Graphics mode (GDI+) was not affected.

Loading
Incidents Resolved

*	Incident	Description
	100445	An incident was resolved for the Eurocode8-2004 auto seismic load pattern where the Modify Lateral Load option (command Define > Load Patterns) would not display the correct values previously specified for "Soil Factor, S", "Lower Bound Factor, Beta", and the three "Spectrum Period" values when the "Country" option was set to "Other". This was just a display issue and analysis results were not affected if the OK button was not clicked when displaying these values. Whatever values were displayed or set when the OK button was clicked would be used for analysis.

Analysis Incidents Resolved

*	Incident	Description
*	43870	An incident has been resolved where element load applied to a frame element in the global direction may rotate with the element after being applied during analysis with large displacements geometry. This issue only affects Nonlinear Static or Nonlinear Direct-Integration Time history analysis with the Geometric Nonlinear Parameter option "P-Delta plus Large Displacements" selected. When this issue occurred, the computed response was in equilibrium with the rotated load and the issue was reflected in the reported forces and base reactions
	88340 91024	An incident was resolved where the joint reactions reported for single-joint (grounded) links were too large for nonlinear modal time-history (FNA) load cases. The value reported was incorrectly adding the response based on the linear effective stiffness to the actual nonlinear response of the link. Only joint reactions were affected. The overall base reactions were correct, and the link forces reported for these supports were correct. No other response was affected. No other type of load case was affected.
	100570 100562 100650 100671 100981	An incident was resolved where running the analysis could generate an error message and fail to complete when performing certain operations on machines with a large amount of memory (RAM), typically 32GB or more. Using the standard solver could trigger this error (not the advanced or multi-threaded solvers), or performing Ritz modal analysis. Other operations could also be affected, depending on the model and the amount of RAM present. When this error occurred, no results were available.
*	100793	An incident was resolved where shell (area) objects that are not subject to a Change Section operation in a staged-construction load case could be affected by a Change Section operation in another staged-construction load case that was analyzed earlier in the same run, even if the affected load case did not continue from the prior-run load case. This did not occur if the two load cases were analyzed in separate runs.
	101115	An incident was resolved where the auto concrete beam flexural hinge properties calculated for nonlinear analysis were taking area of steel from the design instead of the overwritten value in the beam section property. This was true when design results were actually available; otherwise the overwritten value was used as expected. Columns were not affected by this error.
*	101220	An incident was resolved where linear load cases using the stiffness from a staged-construction load case starting from zero could be affected by the operations (Add, Remove, etc.) in another staged-construction load case that was analyzed earlier in the same run, even if the affected load case did not continue from the prior-run load case. This did not occur if the two staged-construction load cases were analyzed in separate runs. This only affected the stiffness of shell elements used for the linear load cases. No other type of element was affected.

Frame Design Incidents Resolved

*	Incident	Description
	97934	An incident has been resolved for concrete frame design where the shear design of tapered T-shaped beams was done based on shear area of concrete considering the width of the thickest part of the web and the effective depth. That could result in a non-conservative design as it overestimated the shear area of concrete. Now the shear area is based on the average width and the effective depth.
	98416	An incident was resolved in steel frame design code for the "Eurocode 3-2005" code in which the reported PMM ratio and its components for axial, major bending, and minor bending do not correspond to the heading. This is a reporting error only. All design results are correct.

* Incident	Description
100890	An incident was resolved for concrete frame design where the PMM interaction diagram used for concrete columns in design mode could be incorrect when there was a large difference in the area of rebar between what was specified in the frame section property and what was determined as being required for design. Concrete column design using check mode was unaffected. The amount of concrete displaced by the rebar was being taken equal to the specified rebar area. This would be unconservative when the area of design steel was much larger than specified and conservative when area of design steel was much lower. Generally the effect was small.
101001	An incident was resolved which affected composite design of beams per Eurocode 4-2004. When the model was created in U.S. Customary units, the minimum percentage of composite action for the beams specified by Equation 6-12 was incorrectly computed. The composite action provided for the beam was either too large, which was conservative, or it was the lesser of 40% and the percentage of composite action required to satisfy the strength and deflection checks for the beam. Models created in metric units were not affected.
101547 101548	An incident was resolved for concrete column design based on Chinese 2010 code where PMM interaction diagram was using compression capacity factor of 1.0 instead of 0.9 for computing the Pmax value.

Shear Wall Design Incidents Resolved

* Incident	Description
96474	An incident was resolved in the Canadian shear-wall design codes "CSA A23.3-14" and "CSA A23.3-04" in which the shear rebar calculations for spandrels were incorrect. This led to exorbitantly high values for the design shear rebar area. When this occurred, the results were obviously unreasonable. No other results were affected.

Slab Design Incidents Resolved

* Incident	Description
98764	An incident was resolved where the fixed-strip width specified in the design-strip Add form was getting saved in incorrect units. This caused the width of the added strips to be incorrect. The effect was obvious and results agreed with the strips as actually created.
100540	An incident was resolved in Turkish slab design code "TS 500-2000" in which the design rebar was reported to be an unusually very large number. This was caused by an initialization problem and the error was obvious. This incident affected version 16.0.2 and previous. It was resolved in v16.0.3 but inadvertently not reported with that release.
101264	An incident was resolved where design was not considering the slab offset in PT design. The analysis results, PT design without slab offsets, and RC design with or without offsets were not affected.
101272	An incident was resolved where the web width used for shear-strength calculations of waffle/ribbed slabs was not taken correctly when they were modeled as distributed ribs in a slab property. A solid section was being assumed for design purposes. This has now been corrected. The analysis results were not affected. Also, if the ribs were individually modeled as beams the design used the correct section.
101274	An incident was resolved for reinforced concrete slab design using the ACI 318-14, ACI 318-11 and ACI 318-08 design codes where the value of A_{smin} was being limited to $0.0018A_g$, i.e., the rebar yield value f_y was limited to 60 ksi or less. Now, for rebar with f_y greater than 60 ksi, the value of A_{smin} is computed using the formula $0.0018 * 60,000 / f_y > = 0.0014 A_g$.

Punching-Shear Design Incidents Resolved

* Incident	Description
101267	An incident was resolved where the calculation of number of studs or ties (affecting the calculation of the length of rails) in punching-shear calculations could be incorrect. The error happens when the spacing of studs is not equal to half the effective slab depth (the recommended value). The number of rails reported is correct. The number of studs reported, and so the length of rails, is under-conservative when the spacing of studs is less than half the effective slab depth and over-conservative when the spacing of studs is more than half the effective slab depth.

Results Display and Output Incidents Resolved

* Incident	Description
96178	An incident was resolved where the displayed PMM interaction curve shown for a wall pier from the wall "Design Details" was being computed based on the preferences specified in the Concrete Design Preferences instead of code specified in the Wall Design Preferences. This was just a display issue and no design results were affected.
98239	An incident was resolved for shear wall design where a warning message is now printed in red color when a pier section fails in shear in addition to reporting the "OS" message in the Shear Design table. This message was previously printed only when pier section had more than one leg. This is a reporting improvement and no design results were affected.
99759	An incident was resolved where the units associated with the scale factor "SF" for the demand curve were incorrect for defining pushover curves of types "EC8 2004 Target Displacement" and "NTC 2008 Target Displacement". The units have been changed from acceleration to unitless. The target displacement was consistent with the values shown. No other results were affected.
99768	An incident was resolved where the response-spectrum demand curve generated when plotting pushover curves of type "NTC 2008 Target Displacement" was not correct when the Spectrum Type was set to "Elastic Horizontal". This affected the target displacement displayed for this pushover curve. No other results were affected.
99940	An incident was resolved for the concrete slab design form "Slab Design" where option to specify "Typical Uniform Reinforcing" based on "Defined by Bar Area and Bar Spacing" was not indicating the correct units. The units shown were "Rebar area" instead of "Rebar area/length" when the "Reinforcing Display Type" was "Show Rebar Intensity (Area/Unit Width)". This was just a display issue and design results were unaffected.
100346 100508 100578	An incident was resolved where attempting to display soil pressure results could result in an error condition. This only happened for models in v16.0.0 that were using the new option for area-edge releases. The analysis results were not affected and this was only a display issue.
100536	An incident was resolved where the table "Story Drift" was not reporting the second row (when expected) for the drift response of a story. This error was inadvertently introduced in V16.0.3. The on-screen display obtained by right-clicking on the joint gave the full results.
100543	An incident was resolved where the performance-point data shown in the property grid to the left of a plotted pushover curve could be incorrect. The correct values were shown in the plot itself when moving the mouse cursor over the performance point. No other results were affected.
100657	An incident was resolved for steel frame design where the envelope information was not being reported after the right-button click or in the report for members when axial tension governed. The envelopes were being reported for members when compression governed. This was a reporting issue only. All reported results were correct.
100917	An incident was resolved where requesting the pier design report by using a right-button mouse click on a pier for which design results were not available resulted in an error condition. No results were affected.

Database Tables

Incidents Resolved

*	Incident	Description
	98207	An incident was resolved in which the Shear Wall Pier Overwrites table was unable to be populated when both general and uniform reinforcing piers were present in the model. This could also affect the generation of reports containing these tables. No results were affected.
	99775	An incident was resolved where the table "Steel Column Envelope" was showing nonzero values for Continuity Plate and Doubler Plate when the column failed in design, rather than not showing any details. This was just a reporting issue and design results were not affected.
	99829	An incident was resolved in which the Shell Section Summary database table was displaying the incorrect material. This was a reporting issue only and results were unaffected.
*	100118 100260 100719 100940 100973 101000 101117	An incident was resolved where the message "Error filling object recovery group" was generated when displaying the table "Story Forces". This error was inadvertently introduced in v16.0.3. No results were affected.
	100422	An incident was resolved for displaying the table "Auto Seismic - NBCC 2015" where a message "error switching between tables" was generated when the structure type was "Shear Wall", and the table was not displayed. This was a display issue only and no results were affected.

Data Files

Incidents Resolved

*	Incident	Description
	100016 100548	An incident was resolved where the concrete FEM slab design overwrites data could get corrupted if the rebar material used in the overwrites was deleted. This also affected the export of the model to the text file.
	101187	An incident was resolved where the option to consider "Time Dependent Material Properties" for nonlinear staged-construction load cases was not being saved in the model text file (.E2K, .SET), and so was always being set to the default value of "No" when a model text file was imported. Models saved and opened from the model file (.EDB) were not affected.

External Import/Export

Incidents Resolved

*	Incident	Description
	96346	Two separate incidents related to the import of .DXF and .DWG files depicting architectural plans were resolved. 1.) When a .DXF file containing text objects and saved in a given length unit was imported into an ETABS model having a different database length unit, the resulting architectural text objects were of the wrong height. 2.) When a .DWG file was imported into ETABS, no architectural plan was being created. Results were not affected by either issue.
	99923	Two incidents were resolved which affected the export of ETABS models to IFC architectural coordination-view files. 1.) Story levels were exported but incorrectly labeled - the exported IFC story entities had default sequential labels instead of the ETABS story labels. 2.) When an ETABS model contained floor and wall objects whose geometric definitions included intermediate points located along the object first sides but away from the object corners, these floor and wall objects were not exported. When this occurred, a warning was posted to the log file correctly stating that the floors or walls object had been omitted from the IFC file, but incorrectly stating it was because the objects were not planar. These walls and floors are now exported, with any intermediate points located away from their corners removed from their IFC geometric definitions.

* Incident	Description
100093	An incident affecting the export of ETABS models to Revit .EXR files was resolved. In some rare cases where some of the grid line labels were blank, ETABS would not generate an .EXR file. This has now been fixed.
100716	An incident was resolved which affected the import of .DXF drawing files containing polylines with curved edges as floor plans. Some polylines with curved edges were occasionally not imported. Whether or not the polyline was imported depended on whether its curved edges were oriented clockwise or counter-clockwise. Reversing the orientation of the polyline with the AutoCAD Pedit command most often fixed the problem.

Application Programming Interface (API)

Incidents Resolved

* Incident	Description
98813 101975	An incident was resolved for the Application Programming Interface (API) where the function <code>cPropFrame.SetRectangle</code> could create eccentric sections with incorrect reinforcement.
99101	An incident was resolved for the Application Programming Interface (API) where the functions <code>cDesignConcrete.GetSummaryResultsBeam</code> and <code>cDesignConcrete.GetSummaryResultsColumn</code> would return empty <code>ErrorSummary</code> or <code>WarningSummary</code> messages.
101721	An incident was resolved for the Application Programming Interface (API) where the function <code>cPropMaterial.GetConcrete_1</code> was not correctly retrieving lightweight concrete material properties and was incorrectly resetting these properties in the model.

Documentation

Incidents Resolved

* Incident	Description
95587	An incident was resolved that corrected minor errors in the ETABS Verification manual to match actual results calculated by the software: 1.) Minor rounding errors were corrected in the reported ETABS results for Example 6, and 2.) Example 14 results were updated to reflect changes under Incident 73043 of released version 16.0.3.
98850	The concrete frame design manuals have been updated to remove the Concrete Design Preferences, Concrete Frame Overwrites, and Error messages and Warnings appendices (where applicable), as these provided redundant information. This information is already available within the software Concrete Frame Design Preferences form, Concrete Frame Design Overwrites form, and the various design reports.