

# Release Notes for RISAFoundation

## Version 17.0.3 Enhancements/Corrections

- Design:
  - Added support for the IS 800:2007 Indian steel design code, including Amendment 1 (2012) and Amendment 2 (2024).
  - Added support for the updated Indian load combinations (IS 875: 2015).
  - Fixed an issue where pile shear demand from pile cap MY torsion may be incorrectly calculated when length units were not set to feet.
  - Fixed Wind Load Combination Generator issues for semi-rigid diaphragms, including missing eccentric wind load cases and incorrect wind direction/sign combinations.
  - Fixed an issue where the Load Combination Generator may not create overstrength seismic load combinations properly.
- Hot Rolled Steel:
  - Added new Indian steel shape databases from several major manufacturers, expanding the available hot rolled shapes for design per Indian standards.
- Concrete:
  - Fixed an issue where pedestal shear capacity was not correctly updated when using custom shear tie spacing.
  - Added an option to neglect the size effect factor for one-way and two-way shear strength in mat slab and spread footing design rules to align with ACI 318-19/22, Section 13.2.6.2.
- Detail Report:
  - Fixed an issue where deleting spread footings, wall footings, piles or pile caps caused detail reports to appear blank.
- General:
  - Fixed a display issue where vertical seismic loads ( $Sds \cdot DL$ ) were not visible when load combinations included multiple instances of the Dead Load (DL) category.
  - Increased the Project Notes character limit to 8000 and corrected report printing behavior to ensure long notes wrap correctly across multiple pages in the programs.
- Integration:
  - Corrected the Load Combination Generator to properly expand the EL category into SX, SY, and SZ spectral load categories when integrated from RISA-3D.
  - Fixed an issue where the program may close unexpectedly or fail to open when integrating RISA-3D models with corrupted or missing material entries in the Pile Definitions spreadsheet.

- Operations:
  - Fixed an issue where sorting the Pile Design results spreadsheet after deleting piles caused the program to close unexpectedly.

## **Version 17.0.2 Enhancements/Corrections**

- Design:
  - Added load combination generation per NBC 2020.
  - Added CSA S16-19 hot rolled steel design code.

## **Version 17.0.1 Enhancements/Corrections**

- Design:
  - Added compatibility with IBC 2024.
  - Added masonry design per TMS 402-22 code.
  - Added wood design per NDS 2024, including compatibility for both the 2018 and 2024 NDS Supplements.
- Integration:
  - Fixed an issue where SX and SZ load types could not be input in the Load Combinations Spreadsheet for RISA-3D and RISAFoundation integrated models.
- Interface/Graphics:
  - Corrected the label in the Add Concrete Material dialog to display "Compressive Strength, f'c" instead of "Yield Stress" for concrete materials.
- Licensing:
  - Fixed the Borrow/Return toggle in the licensing dialog to allow users to release a borrowed license as intended.

## **Version 17.0.0 Enhancements/Corrections**

- General:
  - Updated installers to support Remote Mass Deployment through tools such as Microsoft Intune.
  - Updated Telerik .NET libraries to the latest versions to address security vulnerabilities.
- Design:
  - Added ASCE 7-22 / IBC 2024 Load Combination generation.
  - Added member design per the AISC 360-22 (16th edition) steel specification.
  - Updated missing load factors for SLN or SL in IBC 2021/2016 Load Combinations.

- Operations:
  - Fixed an indexing issue in element definition spreadsheets (Spread Footings, Piles, Pile Caps, Wall Footings) where deleting an existing row might cause elements to reference the wrong definitions or lose their definitions.
- Interface/Graphics:
  - Fixed an issue where drawing a new Strip Footing (Lateral/Custom) and connecting it to existing footings could cause unexpected misalignments in the new element.
- Printing/Reports:
  - Fixed an issue where seismic values defined in model settings were not displayed correctly in printed reports.
  - Fixed a unit display issue in the Contour Legend, such as 'in per in' for displacement and 'ksf per ft' for soil pressure.
  - Fixed an issue in the Piles Detail Report where the Code Check section headers displayed demand and capacity results in ksf instead of kips.
- Concrete:
  - Fixed an issue where the Min and Max Steel Ratio inputs in Footing Definitions were not applied in rebar optimization during design.

## **Version 16.0.2 Enhancements/Corrections**

- General:
  - Updated the license manager to use a new identity provider for cloud licenses and allow single sign-on.
- Operations:
  - Fixed an issue where in rare cases the program may report an access right error during initialization.
  - Corrected an issue where installer might not add a library file needed by the v15 executable for the Export to Excel feature.
  - Resolved an issue where the uninstaller might remove a library file needed for the Export to Excel feature in RISAFloor.

## **Version 16.0.1 Enhancements/Corrections**

- Design:
  - Fixed an issue where certain design rules used in the solution could reference inputs from another element type in the Design Rules spreadsheet.
- Detail Report:
  - Corrected a behavior where the load combination dropdown for a wall footing detail report would show unsolved load combinations.

- Spreadsheet:
  - Fixed an issue in the Nodal Loads and Load Combination spreadsheets where an error message would prevent the copying and pasting of data.
  - Resolved a display issue in the Load Categories spreadsheet where loads might appear as duplicate entries or under incorrect load types.
  - Fixed an issue where pedestal height for spread footing was retained in solution after changing element type from pedestal to post in the Spread Footing Definitions spreadsheet.
  - Updated spreadsheet behavior to prevent false geometry checks and error messages when switching wall type between retaining wall and strip footing in the Wall Footing Definition spreadsheet.
  - Fixed an issue where the existing boundary condition type could not be changed in the boundary condition spreadsheet.
  - Corrected an issue where the load combination generator would produce load combinations with missing categories from the 'Wind X and Z w/Ecc Quart' option for wind loads.
- General:
  - Updated the links for the 'Training' and 'Tutorial' buttons in the startup dialog to point to the new RISA training platform site.
  - Enhanced the behavior where the program might display an exception message for model files with missing or corrupted data under the Pile Definitions spreadsheet for design rules.
- Integration:
  - Fixed an issue where orphan nodes from integration (e.g. nodes that previously came from RISAFloor or RISA-3D but had been decoupled) could not be deleted or edited.
  - Fixed an issue where nodes created in RISAFoundation could not be deleted or edited after new base nodes were added from RISA-3D during integration.
  - Corrected an issue where the program may set up model defaults (e.g. default design rules, member definitions) in standard imperial units during the first-time integration with RISA-3D models using non-standard imperial units.
  - Resolved an issue where tnxTower files (.rt3) were not recognized as a supported file type during integration with RISA-3D.
  - Fixed a rare issue where load reactions transferred from elements with analysis offsets in RISA-3D might have incorrect magnitudes.
- Operations:
  - Fixed an issue where drawing design strips after deleting strips generated by the circular slabs or strip footing generators might cause the program to close unexpectedly.
  - Fixed an issue where elements drawn simultaneously using the box assign method might display offset labels in detail reports.

- Fixed an issue where piles and pile caps drawn simultaneously using the box assign method might have exception messages in the design result spreadsheets.
- Resolved an issue where an exception message might occur when using the 'Apply to Selected' button to assign boundary conditions in models with no existing boundary conditions.
- Printing/Reports:
  - Fixed a printing issue where the load category labels were absent from the section header for loading reports.

## **Version 16.0 Enhancements/Corrections**

- Interface/Graphics:
  - New graphical user interface with ribbon toolbar.
  - Added synchronous display of results based on the load combination selected in the 3D View drop-down.
  - Added preview thumbnails for recent projects accessible from the File menu.
  - Added custom Snap View options to allow snapping to a view other than the default ISO or PLN
  - Added the Dim Lock tool which allows the user to Lock a model, but still display the unlocked elements as grayed-out elements.
  - Added Viewer Mode to quickly show element information only for selected elements. Input and result spreadsheets are also automatically filtered based on which elements are selected.
  - Added the ability to customize the 3D view toolbar with custom bins and functions.
  - Added the ability to rotate the 3D axes by 45 degree increments by holding the SHIFT key while rotating.
  - Added functionality to show input and output information graphically when hovering over elements. Hover Detail settings are accessible through the Application Settings and the right click menu.
  - Added functionality to show the default soil region in the 3D view within Model View Settings
  - Added the graphical option to customize the scale of nodes.
  - Added the capability to delete the rotation bin from the 3D view toolbar.
  - Added input dialog for Spread Footing Definitions spreadsheet.
  - Added input dialog for Spread Footing spreadsheet.
  - Added the ability to click white space to clear the current selection.
  - Improved graphic display options in the Quick View toolbar.
  - Updated the Shape Selection dialog to be more intuitive.

- Updated URLs in the Subscription Login Dialog to direct users to the revised sections of the customer portal website.
- Operations:
  - Added functionality allowing users to move nodes using the mouse.
  - Added the ability to select and edit loads graphically.
  - Added the ability to select and edit soil regions.
  - Added the ability to select and edit slab regions and slab openings.
  - Added the option to Relabel Selected elements in addition to All elements.
  - Improved the Select Elements by Property tool to group section sets and shapes together.
  - Added the ability to use the Ctrl key + Mouse wheel to cycle through items that are able to be selected within the 3D view.
  - Added the ability to Move elements Point-to-Point.
  - Added modification tools for Design Strips.
  - Added the ability to match properties of one element to another element.
  - Added the ability to select the spreadsheet to automatically open after solution including disabling the Node Reactions spreadsheet.
  - Added the ability to increase and decrease the text size displayed in a model.
  - Added functionality into the warning log dialog to find and select elements reported in the warning log.
  - Added 'Center of Selection' as an origin option for the Move Rotate function.
  - Added the ability to select 'Model View Settings' and 'Results View Settings' by right clicking in the 3D model view.
  - Added options for window behavior to choose between Single Window Focus, Multiple Screen, and Auto-Docking Windows.
  - Enhanced the interface behavior to switch between open windows when using Ctrl+Tab and Ctrl+Shift+Tab.
- Spreadsheet
  - Added all input spreadsheets into the Data Entry drop-down list.
  - Added individual spreadsheets for Piles, Pile Caps, Spread Footings and Boundary Conditions in lieu of the single All Support Types spreadsheet.
  - Added Soil Regions spreadsheet in the Data Entry list.
  - Added additional tabs in the Slabs spreadsheet for Slab Regions and Slab Openings.
  - Added the ability to filter Input spreadsheets based on the graphical selection.
  - Enhanced the Design Rules spreadsheet so that each element type can have individualized maximum bending and shear check allowable code checks.
  - Enhanced spreadsheets allow for improved sorting and auto-sizing columns.

- Improved functionality of selecting/resizing cells in spreadsheets.
- Added a Spreadsheet dropdown menu where you can open spreadsheets and show open spreadsheets.
- Added Undo and Redo options into the right-click menu from within spreadsheets.
- Added the ability to reset the spreadsheet column widths to Default values.
- Added additional sorting capabilities for several results spreadsheets.
- Fixed an issue where Save As Default was not working properly in the Wall Footing Definitions spreadsheet, Wall (Masonry) tab.
- Fixed an issue where sorting functionality in the Wall Footing (Masonry) Spreadsheet was non-operational.
- Fixed an issue where sorting functionality in the Design Cut Results Spreadsheet was non-operational.
- Printing/Reports
  - Added an interactive Print Preview for the graphical view and reports.
  - Added batch printing of detail reports.
  - Added a preview of the custom logo in the print reports.
  - Added functionality to edit saved custom report templates.
  - Added the ability to print an individual spreadsheet.
  - Added the ability to Print Selected Lines in spreadsheets.
  - Saved page setup properties specified in Printing dialogs as default settings.
  - Added the ability to adjust the text size of spreadsheets when printing a report.
  - Added the ability to change view options of individual detail reports within a printed report.
  - Added project notes as an available section for the printed report.
  - Corrected printing layout for Pile Detail Report to ensure complete content fits appropriately across multiple pages.
- Detail Report
  - Improved Detail Reports layouts for all elements.
  - Added a vertical tracking line that follows the cursor when viewing enlarged force diagrams.
  - Fixed an issue causing overlapping lines in the printed detail report for piles.
- Concrete
  - Added ACI 318-19 (22) concrete code for concrete design.
  - Corrected shear capacity calculations for retaining walls using CSA 23.3-14 and CSA 23.3-04 codes.

- Fixed the display of Governing Load Combination number for shear checks in the wall portion of retaining walls across all codes.
- Resolved an issue where footing thickness was not optimally calculated, resulting in the default use of maximum thickness values in the footing design process.
- Corrected CSA one-way shear  $V_r$  calculation methodology.
- Fixed an issue that caused incorrect shear bar spacing when the units changed from imperial to metric.
- Masonry
  - Updated the default Masonry strength  $f'_m$  in the Material Spreadsheet to be 2000psi.
- Integration
  - Resolved an integration issue with RISAFoundation where changing units in RISA-3D after initial integration caused discrepancies.
  - Fixed an issue with incorrect unit conversion of user-defined loads in RISAFoundation when switching from imperial to metric units in a RISA-3D.
  - Fixed an issue where changing units in RISA-3D did not properly update in RISAFoundation, causing discrepancies in load and geometry representation when models were transferred between applications.
  - Corrected an issue where the RISAFoundation Merge Tolerance was not accurately converted when switching units.
- General
  - Modify tools improved to allow rotation and scaling based on a click point.
  - Improved the Distance Measure tool to remain active while in use.
  - Simplified the terms "joint", "point" and "node" to now use node exclusively in all input and output.
  - Enhanced the Starting a Model dialog to include access to learning tools.
  - Centered the model file name in the title bar.
  - Improved the file format of the Help file.
  - Improved Log File reporting when an error message occurs on startup.

## **Version 15.0.2 Enhancements/Corrections**

- General:
  - Converted to cloud-based subscription licensing.

## **Version 15.0.1 Enhancements/Corrections**

- General:
  - Added a new feature to export results spreadsheet data to Excel spreadsheets.

- Added a button to direct users to the RISA feedback page.
- Enhanced backward compatibility when the program cannot recognize model file data generated from future versions.
- Resolved an issue that may cause the program to close unexpectedly during solution when a model has masonry retaining walls and certain load combinations unchecked for solution.
- Corrected an issue where the help file shortcut (F1) for the Envelope Point Reactions spreadsheet failed to open the help file.
- Fixed an issue where changes in one footing definition might affect design results for footings under another footing definition.
- Concrete:
  - Added a new rebar design option to optimize slab design based on average steel area per slab width instead of integer number of bars.
  - Updated program to correctly calculate  $V_c$  for longitudinal reinforcement by taking the larger value between equations a and b in Table 22.5.5.1 of ACI 318-19.
  - Implemented provisions to distinguish between the compression strength capacity of walls and columns according to CSA A23.3-14, where it was previously undifferentiated in the program.
  - Resolved several issues within the slab and Slab Region spreadsheet during adding and deleting new regions.
  - Fixed an issue where certain values in the footing shear check were displaying 'nan' when using the ACI 318-19 code.
  - Corrected the equation used to determine the axial tension capacity of concrete columns from ACI Section 22.4.3 to ACI Section 22.4.2.
- Spreadsheet:
  - Resolved an issue in the Wall Footing Definitions spreadsheet that caused the Bot Bar and Top Bar to have matching bar sizes when their cells were selected.
  - Fixed an issue that prevented the Welded Wire Reinforcement sizes from being shown in the Wall Footing Definitions spreadsheet.
- Operations:
  - Updated the program initialization behavior to ensure default files (.def) are updated properly when upgrading the programs.

## **Version 15.0 Enhancements/Corrections**

- General:
  - Added compliance with the 2021 International Building Code.
    - Added Load Combination generation compatible with 2021 International Building Code.
  - Compatibility with RISA-3D V21.0.0 and RISAFloor V17.0.0.

- Operations:
  - Added envelope point reactions to the Point Reactions spreadsheet and Model Display view.
  - Resolved an issue that the program may close unexpectedly during opening footing detailed reports if the solution included blank load combinations.
- Analysis:
  - Improved meshing behavior by changing the default mesh size from 12mm to 600mm when the Canadian Default Region is set within the program.
  - Resolved an issue that ignored the dead load category in a nested load combination.
  - Fixed a problem where the load combinations solved with RSA scaling factors used the incorrect RSA scaling factors for the orthogonal directions.
- Printing/Reports:
  - Resolved a graphical issue for the (Global) Model Settings portion of the printed reports.
- Detail Report:
  - Updated the masonry retaining wall detail report to accurately reflect clear cover measured from the outside of the wall.
  - Improved retaining wall warning message to provide additional information within the detail report.
- Design:
  - Resolved a problem with the pedestal shear design that resulted in the use of incorrect shear force in the presence of other pedestals in the model.

## **Version 14.0.6 Enhancements/Corrections**

- General:
  - Compatibility with RISA-3D V20.0.6 and RISAFloor V16.0.6.

## **Version 14.0.5 Enhancements/Corrections**

- General:
  - Corrected an internal meshing issue that would occur when drawing a triangular mat footing.

## **Version 14.0.4 Enhancements/Corrections**

- Concrete:
  - Added the analysis and design of Welded Wire Fabric Design for foundation mat slab, footing, and pile cap.

- Solution:
  - Corrected a rare instance where the soil pressures were being incorrectly calculated when there are several slabs and pedestals present in a model.
  - Resolved an issue that the slab thickness in overturning checks was calculated incorrectly when there are multiple stem walls on a slab.

### **Version 14.0.3 Enhancements/Corrections**

- Updated the interoperability between RISA programs and RISA-Revit link.

### **Version 14.0.2 Enhancements/Corrections**

- Concrete:
  - Fixed an issue in the calculation of the size effect modification factor ( $\lambda_s$ ) in ACI 318-19 code when metric units are used.
  - Corrected the calculation of  $A_s, \min$  for flexure when using American concrete design code (ACI) and metric units.
- Footing:
  - Fixed an issue with Overturning (OT) resistance calculation when considering SDS.
- Slab:
  - Fixed an issue where the dead load factors in the load combination were not considered for the slab stabilizing moment.
- Detail Report:
  - Corrected an issue where opening a detail report for a wall panel would cause the program to terminate in some instances.
  - Resolved an issue where display of distributed loading occasionally created strange lines on member detail reports.
- Interface/Graphics:
  - Fixed an issue where the program would close unexpectedly when trying to view soil pressure contours in a retaining wall model.
- Operations:
  - Corrected the wall footing label and reinforcement schedule for the DXF export Foundation Plot.
  - Resolved an issue that prevented the deleting of nodes when using the 'Delete Marked Lines' option in the Point Coordinates spreadsheet.
- Integration:
  - Resolved a rare issue that caused the gravity column reaction from RISAFloor to be double counted in RISAFoundation.

## Version 14.0.1 Enhancements/Corrections

- Concrete:
  - Fixed an issue with wall shear capacity calculation in strip footing and retaining walls using ACI 318-19 code.
- Detail Report:
  - Resolved a graphical issue where the phi factor being used did not match the phi factor being displayed in the detail report.

## Version 14.0 Enhancements/Corrections

- Concrete:
  - Enhanced optimization in slab rebar design when maximum and minimum reinforcement spacing were the same value in Slab Design Rules.
  - Resolved an issue with Vc calculation in Footing and Wall Footing for ACI 318-19.
  - Corrected an issue where the program would incorrectly use a phi factor from ACI 318-05 for pile cap punching shear for newer codes.
  - Resolved an issue where the designed reinforcement and reported UC for flexure was incorrect for some footings when the CSA design code was selected.
  - Corrected an issue that erroneously reported an overturning moment when no lateral loads were applied in the model.
  - Resolved an instance that incorrectly triggered a 'No Punching Shear Check for piles under beams' error for piles supporting slab elements.
  - Fixed an issue where mat slabs with reinforcement set to mid-depth were not properly calculating the shear capacity for design cuts with positive moment.
- Operations:
  - Added the ability to quickly change the thickness of a thickened region within a slab.
  - Added the ability to draw continuous footings without causing overlapping slabs at the corner. Check the 'Keep Wall Continuous' option when drawing a Lateral/Custom Strip Footing.
  - Enhanced ability to modify slab properties such as slab openings and modified slab thicknesses.
  - Resolved an issue that happened to isolated model files where the program closes unexpectedly when using the Contour Cut tool on slab contours.
- Analysis:
  - Added analysis and design feature for a single pile without a slab.
  - Enhanced the method used to calculate the critical shear section in pile cap groups.
  - Resolved a behavior that set pile reaction to 0 upon solving certain models.
  - Fixed an issue with reinforcement ratio calculation for round shape slabs.

- Solution:
  - Corrected an issue with backfill slope height calculation for retaining walls when heel batter exists.
  - Resolved an issue with the angle of active pressure resultant for Coulomb's Method.
  - Resolved an issue with active earth pressure coefficient for soil below the water table when Coulomb's method is used.
  - Fixed an issue with lateral earth pressure due to surcharge if at rest condition is activated when the passive force exceeds the active force.
- Detail Report:
  - Resolved an issue with negative rebar number displayed for some spread footing detail reports when metric units were used.
  - Corrected an issue that caused a model to close unexpectedly when opening the pile detail report in certain scenarios.
  - Resolved a behavior that did not recognize user-input load combinations as Service load combinations and resulted in Stability checks not being provided in the Footing Detail Reports.
  - Fixed the pile cap Detail Report which showed overlapping graphics.
- General:
  - Enhanced the program behavior when an invalid active earth pressure is calculated such that it displays a message warning the user in the detail report and does not provide results.
  - Enhanced the grade beam reinforcement design to provide a warning when the explicit rebar spacing provided exceeds the maximum allowed by code.
  - Updated the location where user data files are stored during default installation to prevent certain file access issues.
  - Updated text of 'Material Strengths' units to 'Material Stiffness' to better match the property the units apply to.
  - Resolved an issue where the program would close unexpectedly when using the Cut tool for the soil pressure contour.
  - Resolved an issue where changing units did not properly update the stem wall density.
  - Resolved an issue that would cause the program to close unexpectedly when a model is solved that has Design Strips with no Design Cuts.
  - Fixed a rare instance where the program does not prompt to save the model when opening a different model.
- Integration:
  - Fixed an issue where RISAFoundation results were not cleared after making changes in RISA-3D.
- Interface/Graphics:
  - Corrected an issue that reported strange symbols in the warning message.

- Resolved a graphical issue with the hydrostatic pressure reported in the detail report at the top of the footing.
- Fixed a scaling issue with printing reports when the display scale for the screen is set to something other than 100%.

### **Version 13.0.4 Enhancements/Corrections**

- Resolved an issue causing a false failure warning for a retaining wall.
- Resolved an issue with erroneous  $\mu = xx$  Unity Check value in the footing detail report.

### **Version 13.0.3 Enhancements/Corrections**

- General:
  - Added the ability to verify mesh size is not set to 0, and will set a default size before solving the model.
  - Resolved an issue that caused spreadsheet results to inaccurately show N/A for Strip Results when reinforcement is set to Single Layer option.
  - Resolved an issue where the program will close unexpectedly when using the Cut tool for the soil pressure contour.
  - Corrected a graphical issue in the concrete pile reinforcements spreadsheets where the rebar was listed as "CUSTOM" instead of the actual reinforcement.

### **Version 13.0.2 Enhancements/Corrections**

- General:
  - Resolved a display error that was reporting incorrect pile shear reinforcement spacing when utilizing pile caps.
  - Resolved a rare issue that was not allowing saved results to be read when the model file was saved to a cloud location.
  - Corrected an issue preventing the node label from being reported in a warning message in the Warning Log.
  - Resolved a meshing error caused by a mesh size of 0.
- Concrete Design:
  - Improved the footing optimization procedure to incorporate thickness considerations to achieve the required factor of safety for sliding.
  - Resolved an issue of wrong lateral pile stiffness being used in the analysis of foundation slab combined with piles.
  - Resolved a default value of -1 being used for  $I_{cr}$  factor in the Modify Beams dialog which caused an error message.
  - Corrected a rare issue preventing the program from optimizing the design of footings.

- Resolved an issue that spaced reinforcement at the maximum value entered in the Design Rules spreadsheet when the 'Force Top & Bottom Bars' option was selected.
- Graphical Interface:
  - Added the ability to open the Detail Reports for piles from results spreadsheets by using the Detail Report button.
  - Added the ability to display the soil pressure contour for enveloped results.
  - Resolved an issue causing the program to close unexpectedly when 'LC#' was nested in a load combination in lieu of 'L#'.
  - Corrected the behavior of nested load combinations to update automatically when rows are added or subtracted from the Load Combination spreadsheet.

### **Version 13.0.1 Enhancements/Corrections**

- General:
  - Resolved an issue causing an erroneous message 'Failed to satisfy Top Minimum Rebar Spacing Requirement' for mat slabs using either the Single Layer or Mid-Depth Only.
  - Resolved an issue that would cause the program to close unexpectedly when attempting to view a Detail Report for a footing.

### **Version 13.0 Enhancements/Corrections**

- General:
  - Added the ACI 318-19 concrete code for beams, columns, slabs and wall panels.
  - Added seismic factors (Omega, Rho and Ev) to the load combination generator.
  - Added the ability to consider cracked concrete sections by introducing a cracked factor, Icr.
  - Added the ability to exclude results based on selection.
  - Added the ability to include up to 100 custom other load cases.
  - Improved the Detail Report for footings by adding roof wind load categories to the loads summary table.
  - Resolved an issue causing an erroneous 'Deep Beam' warning message.
  - Fixed an issue that erroneously displayed the warning 'rebar spacing does not meet flexural min, T&S min, or strength requirements'.
- Analysis:
  - Improved the check for the tensile strain in steel by considering a more accurate reinforcement location within the slab.
  - Corrected the calculation for compression capacity of piles to consider the maximum axial strength ( $P_{n,max}$ ) per the ACI code.

- Interaction:
  - Added the ability to transfer Response Spectra Analysis (RSA) results from RISA-3D to RISAFoundation.
  - Added the ability to recover a file if the model file closes unexpectedly while integrating with other programs.
  - Resolved an issue where custom detail reports were not retained in the original program after using the Director tool to integrate between multiple programs.
  - Resolved an issue where connection forces were not properly transferred from RISA-3D into RISAConnection when the model originated in RISAFloor.

## **Version 12.0.1 Enhancements/Corrections**

- Analysis:
  - Added additional metric bar sizes for the ASTM A615M rebar set.
  - Added the AS/NZS 4671:2001 rebar set.
  - Added a warning message when ACI 318-14 minimum steel requirements are not met.
  - Added deep beam qualification criteria according to ACI 318-14 Section 9.9.1.1(a).
  - Removed an incorrect reporting of '-nan(ind)' in the Soil Pressures spreadsheet for grade beams with deep dimensions.
  - Updated the K factor equations using the Coulomb method in the analysis of retaining walls.
  - Corrected the sliding force for retaining walls with and without a key.
  - Resolved an issue where stem wall properties were not properly converted when switching units.
  - Updated the calculations for the stability of footings to only use Service load combinations.
  - Resolved an issue where the soil bearing unity check reported in the Footing Detail Report was not considering the ABIF factor.
  - Refined slab reinforcement optimization for large spacing increments.
  - Corrected an issue regarding conservative slab reinforcement when the 'Force Top and Bottom rebar' option was selected.
  - Corrected the slab moment capacity when the user input top cover exceeded the slab thickness for a single layer of reinforcement.
- General:
  - Fixed a display issue for the cover in the slab detail report when the cover exceeded 40% of the slab thickness using the Optimize rebar option.
  - Fixed an issue that caused a false warning message stating failure to satisfy minimum reinforcement for slabs using metric units.

- Corrected the displayed design strip results in the Strip/Cut Results spreadsheet for slabs with a single layer rebar option.
- Corrected the retaining wall load diagram for at-rest condition.
- Fixed a spelling mistake in a wall footing failure error message.
- Fixed a graphical display issue where top rebar was shown in the spread footing detail report when not required.
- Resolved an erroneous overlapping footings error message.
- Corrected an issue that prevented the display of results for some service load combinations in the footing detail report.
- Resolved a graphical display issue where metric bar sizes were shown as non-metric in the pedestal detail report.
- Resolved an issue with overlapping information in the pedestal detail report.
- Fixed an issue where exporting footing details to DXF caused the program to close unexpectedly.
- Integration:
  - Resolved an issue where custom detail reports were not retained in the original program after using the Director tool to integrate between multiple programs. (pending future RISA-3D update).
  - Resolved an issue where deleting a wall panel in RISA-3D caused issues during integration.
  - Fixed an issue to retain custom pile information for models integrated with RISA-3D (pending future update).
  - Resolved a metric units issue with custom rebar layouts caused by integration with RISA-3D (pending future update).

## **Version 12.0 Enhancements/Corrections**

- Analysis:
  - Added ability to create nested load combinations.
  - Corrected an issue with the progress bar that increased solution times.
- General:
  - Added single layer reinforcement design for mat slabs.
  - Added support for the Eurocode 2 concrete code. This includes design for mat slabs, pedestals, and grade beams.
  - Added the option to specify the minimum area of steel for longitudinal reinforcement in pedestal design.
  - Improved the slab safety factors spreadsheet to report sliding resistance due to passive pressure.

- Refined the slab sliding force to properly reflect the direction of the applied lateral load.
- Resolved an issue where applied vertical uplift was contributing to sliding resistance for slabs.
- Fixed an issue where slab sliding results were reported for the opposite slab local axis.
- Resolved an issue where modifying the slab local axis was not affecting sliding results.
- Corrected an error in considering soil overburden pressure in overturning moment calculation for slabs.
- Fixed an issue that caused a false warning message stating failure to satisfy minimum reinforcement.
- Corrected an issue where the provided top and bottom reinforcement for slabs were erroneously combined to meet minimum reinforcement requirements.
- Corrected the footing setting Force Top bars to require top flexural steel in both directions.
- Corrected the slab setting Force Top and Bottom bars to require flexural steel at the top and bottom of the slab.
- Resolved a spreadsheet issue where the pile type and shear UC were reported incorrectly.
- Resolved an issue where retaining walls with keys reported a higher unity check for sliding.
- Resolved an issue where the program would show a blank cell when the footing safety factor exceeded 1000 and will not report 'NA' instead.
- Integration:
  - Resolved an issue where the unattached nodes from RISAFloor or RISA-3D were unable to be deleted in RISAFoundation.

## **Version 11.0.4 Enhancements/Corrections**

- Enhanced message to include required version number during use of the Director to transfer between programs of incompatibility.
- Corrected an issue that didn't allow program integration for models saved on a shared network location.
- Resolved an issue that was not allowing the program to fully close on exit due to a licensing error.
- Removed false error message of not being able to release subscription license on select machines.
- Resolved an issue that prevented the import of select file types from other programs.
- Resolved an issue that caused solution files to be deleted when transferring between programs.

- Resolved issue of soil regions not being saved after transferring to RISAFoundation from RISA-3D.
- Resolved issue where loads added in RISAFoundation were not saved after transferring to RISAFoundation from RISA-3D.

### **Version 11.0.3 Enhancements/Corrections**

- Updated the IBC 2018 strength load combination Eqn 16-7 for the Load Combination Generator.
- Updated overly conservative soil pressures being used when a retaining wall had a key.
- Corrected an issue where designing footings using 'Group Design' could cause incorrect bearing and sliding checks.
- Corrected the footing setting Force Top bars to require top flexural steel.
- Corrected an issue where certain models would close unexpectedly when using the CSA code with piles and pile caps.
- Resolved a false error shown while displaying soil pressures in color fill slab contours.

### **Version 11.0.2 Enhancements/Corrections**

- Updated the number of cores in processor utilized for solver to decrease solution time.
- Corrected an issue where designing masonry wall footings using the TMS 402-16: ASD code with no applied shear force would cause the program to unexpectedly close.

### **Version 11.0.1 Enhancements/Corrections**

- Resolved an issue where graphically deleting design strips would cause the program to close unexpectedly.
- Resolved an issue where custom saved Drawing Grid settings would prevent program integration from RISA-3D.
- Corrected an issue relating to metric unit conversion which resulted in design check value of infinity (reported as '-nan(ind)') in Soil Pressures spreadsheet.
- Corrected a problem where a strip footing in tension would show zero axial capacity.

### **Version 11.0 Enhancements/Corrections**

- Analysis:
  - Added compatibility with IBC 2018.
  - Added ASCE 7-16 load combinations in the Load Combination Generator.
  - Added a passive pressure option to slabs to account for sliding resistance.

- Added the ability to apply soil overburden loading to slabs.
- Improved footing design optimization by ensuring that the final thickness is considered in the moment calculation.
- Retaining wall earth pressure coefficients will now be automatically re-calculated to assume the at rest condition when the passive forces exceed the active forces.
- Fixed an issue where top bars were not designed for footings despite the "Force Top bars" option being selected.
- Corrected an issue where retaining walls with shear keys used overly conservative soil pressures for sliding checks.
- General:
  - Added overturning and resisting forces per load category to the Safety Factor spreadsheet.
  - Added sliding and resisting forces per load category to the Safety Factor spreadsheet.
  - Fixed a problem where the Material Takeoff Volume and Weight for slabs incorrectly displayed as zero when the model is saved and re-opened.
  - Fixed a display issue in the Footing Results spreadsheet where pedestal dimensions were not updating properly.
  - Corrected a problem where the optimized shear steel would not fit in the member due to metric unit conversion.
  - Resolved an issue where pile punching shear parameters were not transferred properly when solved with all CPU cores.
  - Corrected a graphic display error where distributed loads were shown with the reverse sign.
  - Corrected a display problem where the 4/3rds design check was erroneously converted when using metric units.
  - Fixed issue that caused page numbers to repeat when "Create PDF" was used to print a report.
  - Resolved an issue where wood material Error Code 1095 was produced during solution without having any wood members.
- Integration:
  - Corrected an error where RISA-3D to RISAFoundation slab models allowed moment to transfer across a pinned slab edge.

## **Version 10.0.5 Enhancements/Corrections**

- For models integrated with RISA-3D, corrected an error in the iteration of member design which caused an increase in solution time.

### **Version 10.0.4 Enhancements/Corrections**

- Resolved an issue introduced in the Windows 10 Semi-Annual Update (KB 4103721) which prevented Standalone Licensing functions from operating as expected.
- Resolved an issue in which subscription licenses would become non-responsive during the upgrade process.
- Corrected an issue due to unstable models with multi-threading.

### **Version 10.0.3 Enhancements/Corrections**

- Corrected the pile capacity factor when using Allowable Stress Design.
- Corrected an error where the wall footing ABIF factor was applied to the required stress rather than the allowable stress.
- Corrected an error where custom longitudinal and shear rebar properties did not apply to pedestal/pile design.
- Resolved a problem with the seismic forces on retaining walls where the  $V_{sliding}$  value was off by a factor of 1,000 when running any load combination with the EQ basic load case.

### **Version 10.0.2 Enhancements/Corrections**

- Added the allowable bearing increase factor (ABIF) for wall design.
- Added the Wall and Footing Materials to the Strip Footing Definition Editor.
- Added the option for one layer of vertical reinforcement in retaining walls using Canadian design codes.
- Added the governing load combination for each shear direction in the detail reports and spreadsheet results for concrete pedestal and column members.
- Fixed a problem where the program used  $0.0018 \cdot b \cdot d$  rather than  $0.0018 \cdot b \cdot h$  for slabs. The code refers to  $A_g$  which should be  $b \cdot h$  instead of  $b \cdot d$ .
- Fixed a problem where when maximum spacing governed for design strips the program was being overconservative with the spacing value.
- Improved concrete shear capacity calculation to take into account any axial tensile force which would remove the contribution of concrete to the total shear capacity.

### **Version 10.0.1 Enhancements/Corrections**

- Fixed a problem with the slab Analysis Offset feature that would cause disconnected elements to act connected.
- Corrected an erroneous failure for the pile capacity in the Pile Cap Detail Report when soil depth properties have not been defined.

- Fixed a problem where Design Strips were not always giving rebar spacing within the limits set in the design rule.
- Fixed a problem where load combinations that produced errors in the solution were not processed properly and caused the program to close.
- Fixed a problem where using the undo command and saving would modify Custom Rebar Layouts in your model.
- Updated Subscription licensing behavior to prevent an erroneous failed log-in.

## Version 10.0 Enhancements/Corrections

- Pile Design:
  - Added axial pile design for Hot Rolled Steel, Concrete, and Wood piles.
  - Added pile detail reports.
  - Added a Pile Definition Editor to input pile information in a more user-friendly way.
  - Added Custom Rebar Layout option for concrete pile reinforcement.
  - Added a Soil Definitions spreadsheet to define the soil properties.
  - Moved the default soil properties from the Model Settings dialog to the Soil Definitions spreadsheet.
  - Added a Soil Depth Properties spreadsheet to define soil layers for static pile design.
  - Added a Soil Definition Editor to define soil region properties and soil depth properties.
  - Fixed a metric unit bug with pile punching shear capacity where increasing the thickness of the slab reduces the capacity.
- Wall Footings:
  - Added support for the *TMS 402-16* masonry code. This includes updated shear friction calculations from concrete provisions to newly added provisions in the masonry code for wall footings.
  - Added the ability to apply triangular seismic loading to retaining walls per a max force or the Mononobe-Okabe formulation.
  - Updated hydrostatic loads with surcharge based on whether LL is included in the load combination or not. Previously we always used the surcharge load in the hydrostatic load calculations.
- General:
  - Added solution multi-threading to use all available CPU cores to drastically speed up solution time for models with many load combinations.
  - Added a Move Selected Items graphic editing tool.
  - Enhancements to the Custom Rebar Layout dialog:
    - Added spreadsheet functions for easier data input (TAB and ENTER keys).
    - Added the option to highlight and copy data from several cells at once.

- Added access from the Concrete Members spreadsheet directly to the Custom Rebar Layout dialog through a new Set Layout dialog.
- Fixed a problem where slabs with vertical analysis offsets that contain pedestals would give an erroneous message about the pedestals sitting on beams.
- Updated the Copy/Paste functionality so that the column headers would not erroneously paste into the program. They now will only paste if you're in an external program.
- Corrected the link from the Spreadsheet menu to Materials spreadsheet.
- Updated our design strip reinforcement design to prevent reporting of more reinforcement than necessary.
- Integration:
  - Fixed a problem with pile punching shear capacity that would cause an incorrect value if different concrete codes were selected in a combined RISA-3D/RISAFoundation model.
  - Fixed a problem with a combined RISAFloor, RISA-3D, and RISAFoundation model if elevated floor slabs were used that would cause the program to shut down.
  - Added the ability to see RISAFoundation footings in RISA-3D in an integrated model.

### **Version 9.0.3 & 9.0.4 Enhancements/Corrections**

- Updated the program install to improve behavior for network licenses.
- Improved the subscription license functionality to make it more robust.
- Discontinued support of the 32-bit version of the program.

### **Version 9.0.2 Enhancements/Corrections**

- Added the option to set grade beam End Releases to pinned.
- Added semi-rigid load combinations to the Load Combination Generator.
- Added the governing load combination to the detail report and output spreadsheets for design strips and design cuts.
- Major improvements to the automatic model backup functionality.
- Using the Copy to Clipboard command from spreadsheets no longer copies blank cells to the clipboard.
- Corrected an error where the program would not report overlapping footing geometry.
- Corrected an issue where line loads near the slab (but not actually applied to it) were being included in the Sliding Safety Factor VaZZ value.
- Fixed a problem with reinforcement design for footings and design strips if  $4/3 A_s$  required  $> A_s$  min flex, the program will then only use  $A_s$  required.

- Corrected the page footing in the detail report that referenced RISAFoot rather than RISAFoundation.
- Corrected an issue with design strip detail reports where advancing between strips could cause the program to hang

### **Version 9.0.1 Enhancements/Corrections**

- Corrected an interface issue where Load Categories with a (-) sign could not be selected by the user in the Basic Load Cases spreadsheet.

### **Version 9.0 Enhancements/Corrections**

- Concrete Design:
  - Added a new Custom Rebar Layout option for Pedestal Reinforcement.
  - Added the CSA A23.3-14 Canadian concrete design code.
  - Improved the concrete reinforcement optimization to fix a problem where reinforcement design could produce a code check of 1.02 instead of 1.00.
- Spread Footings:
  - Fixed a units bug with footing reinforcement in metric units where the codes checks far exceed 1.0.
- Wall Footings:
  - Added masonry wall footings for both ASD and Strength design codes.
  - Fixed a problem where the Copy command would not copy the material for a wall footing. Instead the default material was used.
- Slabs:
  - Enhanced the Design Strip and Cut detail report with further code check information.
- General:
  - Added compatibility with IBC 2015.
  - Added an Analysis Offset feature for slabs and beams which allows elements to be at different elevations relative to each other.
  - Added the live display of coordinates and deflection values to the mouse cursor.

### **Version 8.0.2 Enhancements/Corrections**

- Made significant improvements to the behavior of Subscription licensing, including adding the ability to view current license usage.
- Propped retaining walls are no longer checked for overturning stability.
- Propped retaining walls now enforce that the base is restrained against sliding.

- Fixed an issue with grid line generation to allow grid lines to be inserted at the beginning of an existing project grid.

## **Version 8.0.1 Enhancements/Corrections**

- Concrete Design:
  - Governing load combinations for shear and bending code checks have been added to the results spreadsheets and member detail reports.
- Spread Footings:
  - Updated spread footing design to make design forces based on load combination rather than load categories. This could have caused a symmetrical loading situation to give non-symmetric results.
  - Fixed a problem where spread footings connected to slabs with grade beams would act as if they were unconnected.
  - Updated the program to give more information for failing footing flexure checks when the footing cross-section is not tension-controlled. Previously the rebar would be omitted, but it was not clear why.
  - Corrected an issue with spread footings where banded reinforcement of rectangular footings could result in excess steel for some regions.
  - Clarified the selection of the Boundaries and Eccentricities in the Footing Definition spreadsheet.
- Wall Footings:
  - Added a check for net uplift on wall footings. If large upward forces are present a Warning Log message will trigger.
  - Added warning messages for failing wall footings, making it more obvious to see when there is a problem.
- Pile Caps:
  - Added warning messages for failing pile caps, making it more obvious to see when there is a problem.
- Slabs:
  - Results are no longer cleared when editing the Slab Design Rules spreadsheet.
  - Fixed a solver error that could occur with closely spaced nodes along the edge of a slab element.
- Punching Shear:
  - Corrected an issue where pedestal self weight was not being considered in the slab punching shear calculations.
- General:
  - Added an option for subscription licensing.
  - Added live load reduction for column reactions into RISAFoundation

- Added a warning to notify the user that there are point loads in the model that have no supports.
- Fixed a problem in models which include a pedestal but not a slab or footing in a model integrated with RISAFloor and/or RISA-3D.

## **Version 8.0 Enhancements/Corrections**

- Added the *ACI 318-14* concrete code.
- Added the ability to batter retaining walls.
- Added the ability to model the edges of adjacent slabs as pinned to each other. This is useful for shear key or dowel joints between slabs.
- Added punching shear checks for pedestals inside of thickened regions.
- Corrected an issue where the input pedestal clear cover value did not match the value displayed in the detail report rebar graphic.
- Increased the program limit number of slab elements to 250.
- Corrected a graphical display and printing problem with footing detail reports.
- Fixed a problem where the programs won't close down properly from the taskbar.
- Fixed a problem with Help files not working when the program was installed to a folder with a period in the name.
- Fixed an error where the time stamp was no longer showing up on printed reports.
- Updated the program to allow export from RISA-3D to RISAFoundation if Tension-Only members are present.
- Updated the orientation of a landscape image so the image is rotated counter-clockwise instead of clockwise.

## **Version 7.0.1 Enhancements/Corrections**

- Installation & Licensing Updates:
  - Released an update version of Sentinel RMS License Manager to be compatible with Windows Server 2012 R2.
  - Fixed the Network.ini behavior to allow for the file to be placed in the root RISA directory and still be seen by the client installs.
- Miscellaneous Updates:
  - Added the ability to save a video of the animated deflected shape and mode shapes.
  - Added links to all Warning Log messages that take you directly to the relevant section in the help file.
  - Added a graphic verification that confirms if you are running in a demonstration version.

- Changed the name of the Global Parameters dialog to Model Settings. Changed the name of the Plot Options dialog to Model View Options. Changed the name of the Preferences dialog to Application Settings.
- Corrected an issue where the footer for PDF reports was not included on the last page.
- Corrected an issue that caused a pedestal in a RISAFoundation/RISA-3D integrated model to display incorrectly in Metric units.
- Corrected the DXF export display for metric Footings Details.
- Corrected an issue where sliding and overturning safety factors calculated for slab foundations could erroneously count self-weight multiple times.
- Corrected an issue where the units for moment did not convert in the detail report when changes were made to the units selection preferences.
- Corrected the RISAFoundation Report Allowable Bearing text that stated "Net" instead of "Gross".
- Fixed an issue where, for one-way shear checks for pile caps, the program was not verifying the "w" and "Vu" were occurring on the same side of the pedestal. Check the "One Way Shear Checks for Pile Caps" section in the help file for more information.
- Corrected a footing design problem when solving an empty load combination (no loads applied).
- Fixed a conservative units issue with footings where the x-direction As Provided was wrong if using Metric units.
- Fixed a problem where the internal PDF writer would print spreadsheet results as images rather than text, causing PDF sizes to be much larger than necessary.

## **Version 7.0 Enhancements/Corrections**

### **Enhancements**

- Wall Footing Enhancements
  - Added a strip footing element for gravity design.
  - Added a wall pedestal element to transfer wall loads into a mat slab.
  - Added a wall pedestal element to transfer wall loads into a mat slab.
  - Added a custom wall footing generator which includes a wall pedestal, slab and custom design strips.
- Added the ability to include design and analysis of circular pedestals and posts for footings and slabs in RISAFoundation.
- Added an Enveloped Soil Pressure Results spreadsheet to make it easier to find maximum bearing pressures.
- Updated the Copy tool to include an option for copying unattached points.

- Improved slab overturning and sliding checks to now consider thickened slabs and slab openings.
- Improved Install Behavior
  - Improved ability of Network Client versions to find a license server.
  - Reorganized all files (databases, defaults, etc) into new subfolder locations.
  - Added an option in the installer to install to the Program Files and Documents folders.
- Improved the capability of tnx Tower to integrate with RISA-3D and RISAFoundation. Previously RISAFoundation input would not be read in after the .rt3 file was created.

## **Corrections**

- Corrected a RISAFoundation slab meshing issue where having points too close together on a slab edge would cause an error.
- Corrected load combination equations for the SBC 301 2007 Saudi Arabia code.
- Fixed the status bar in the Wall Footing Definition Editor, which was always blank.
- Fixed a problem where atypical wall footing dimensions could cause images to be cut off in printouts.
- Fixed a problem where saving drawing grids in a RISAFloor, RISA-3D and RISAFoundation integrated model could ignore saved grids in certain cases.
- Addressed a slab meshing tolerance issue related to continuous grade beam foundations.

## **Version 6.0.2 Enhancements/Corrections**

- Eliminated the need to manually edit the Windows registry for Network Client Installations.

## **Version 6.0.1 Enhancements/Corrections**

- Added the ability to use Canadian, Mexican and Saudi region defaults.
- Licensing:
  - Added an auto-save during a Windows shut down.
  - Updated the program to allow remote desktop connections for standalone versions.
  - Created an install / initialization log file to better diagnose commuting issues
- Added an external utility to specify a license server for network client installs to use.
- Fixed a problem with Design Strips where the program erroneously gave a warning about rebar spacing.
- Corrected a problem with the Load Combinations where entering a factor while leaving the Category blank resulted in incorrect loads being applied to the model.

- Addressed a units problem in the program that was previously giving erroneous pedestal axial force and capacity values.
- Fixed a units problem in Retaining Walls with the vertical component of soil loading on sloped backfill soil.
- Fixed an error where line load labels were previously controlled by the "Beam Label Font" under Tools Application Settings.
- Fixed a problem with Design Strip reinforcement design where a design may provide  $4/3 \cdot A_s$  req'd even if that is larger than  $A_s$  min flex. The program will now use  $A_s$  min flex in this scenario.
- Fixed an issue where RISAFloor/RISA-3D/RISAFoundation integrated models with generated lateral loads and flexible diaphragms did not pass all Load Category information into RISAFoundation.
- Corrected an issue where Footing thickness changes during optimization may not have been fully reflected in soil bearing values.
- Corrected an issue related to Design Strip reinforcement area and spacing.
- Corrected an error where the number of bars in the Design Rule was not being taken into account for the  $M_n$  capacity of beams.
- Fixed a crash related to deleting and redrawing a slab opening when in isometric view.

## **Version 6.0 Enhancements/Corrections**

### **Enhancements**

- Enhanced Report Printing options:
  - Added the ability to include Detail Reports.
  - Added the ability to include RISA Screen Shots/Graphics.
  - Added the ability to include non-RISA images.
  - Now the user can add a Custom Logo to the report header.
- Ability to perform slab on grade design for slabs with a thickness of 3" or more. The previous minimum thickness was 6".
- Added Posts to define punching shear perimeter for posts/racks bearing on slab on grade.
- Added the Material Takeoff spreadsheet to the Results toolbar.
- Added a toolbar option to view Retaining Wall properties.
- Added Windows 8.1 compatibility.
- Increased the maximum number of slab sub-regions (opening thickened regions) to 500.
- Increased the maximum number of Design Strips to 1000.
- Updated the Node/Member labeling so that labels are synchronized in combined RISAFloor/RISA-3D/RISAFoundation models.

- Updated Design Strip behavior for reinforcement, limiting the design to the values defined in the Design Rule. Previously the program would design reinforcement to meet code requirements, regardless of the Design Rule.
- Moved registry information from HKey Local Machine to HKey Current User to better comply with Windows best practices.
- Added the display of “reinforcement below” graphic to equally spaced footings.

## **Corrections**

- Corrected an inconsistency when using pedestal dimensions with a greater width than depth.
- Corrected an issue that causes the units in RISAFoundation to be off when both the units are changed and an Undo is performed in RISAFloor or RISA-3D in a combined RISAFloor/RISA-3D/RISAFoundation model.
- Corrected an issue where some footings with zero height pedestals would not report a governing load combination.
- Corrected the Phi factor for plain concrete to be 0.60 for ACI 318-08 and ACI 318-11. Previously 0.55 was used for all ACI codes.
- Corrected an issue where converting between imperial and metric units erroneously allowed the user-input retaining wall rebar spacing to increase.
- Corrected z-direction As provided in footing detail report.
- Corrected the Contour Display tool that had been broken in a previous release.
- Corrected an issue where a units change would not update if an Undo command occurred after the units change.
- Corrected an issue with corner punching shear for pedestals on a slab, where the program could conservatively use the calculated stress from the free corner. In a corner condition the program should only check the stress at three of the four corners (ignoring the free corner).
- Corrected an issue with edge punching shear calculations for pedestals on a slab, where the program was only checking the two interior corner punching shear stresses. Now the program checks all four corners and uses the maximum stress demand.

## **Version 5.0.2 Enhancements/Corrections**

- Added a Pile Cap Definition Editor to add pile cap information in a more user-friendly way.
- Added the ability to draw tapered surface loads.
- Added an automatic save of RISAFloor results when transferring a model from RISAFloor to RISA-3D.
- Added an automatic save of RISA-3D results when transferring a model from RISAFloor/RISA-3D to RISAFoundation.
- Added retaining wall foundation plans and detailed cross-sections to the DXF Export options.

- Added a Tools-Application Settings option to define whether you want spreadsheet headers to copy over or not when using the copy command in a spreadsheet.
- Added the capability to select an individual plate inside of a slab element from the Plate Forces spreadsheet.
- Added the ability to show plate labels graphically from the Model Display Options dialog.
- Revised OTM safety factor calculations to better account for eccentric axial loads in slabs.
- Updated the calculations for extra bars around areas of banded reinforcement in footings to eliminate unnecessary bars.
- Corrected an issue with the program erroneously reporting that a slab could not be designed because it was too thin.
- Corrected an issue where 64-bit network clients were not displaying the Key ID in the Help-About dialog.
- Corrected a problem with the Pile Cap Results spreadsheet where the pile cap Label was shown incorrectly.
- Fixed an issue with saving results between RISAFloor, RISA-3D and RISAFoundation that would cause RISAFoundation to shut down.
- Fixed an issue where the program shuts down when viewing the soil contours graphically.
- Fixed heel shear capacity for situations where the heel shear is upward. Previously it was always conservatively assumed that heel shear would be downward.

### **Version 5.0.1 Enhancements/Corrections**

- Compatibility with RISA-3D V11.0.1 and RISAFloor V7.0.1.

### **Version 5.0 Enhancements/Corrections**

#### **Enhancements**

- Added 64-bit version capability.
  - The program will run in 64-bit addressing space, expanding Windows memory limits.
  - Allows for increased program limits when running on a 64 bit system.
- Added the ability to import a DXF underlay; Allows users to snap to the underlay when drawing foundation elements.
- Added Copy functionality.
- Added the ability to graphically add openings and thicken slab elements.
- Added an "Offset Slab" tool that allows a user to extend a slab perimeter outward from a column or wall line.
- Added the CSA A23.3-04 Canadian concrete code for retaining wall design.

- Added the NBC-10 (Canadian) load combinations (service and strength) to the Load Combination Generator.
- Added the ability to add line horizontal forces and line moments.
- Added an interference check to the Warning Log between pile caps and footings.
- Added mesher line constraints to slabs for openings, thickened slabs and grade beams.
- Moved net soil bearing pressure from Soil Regions and Model Settings dialog to the Footing Definitions spreadsheet.

## Corrections

- Corrected an issue where an install path with long file / directory names could cause the program to fail to launch when using file association.
- Corrected an issue with the Rho Min Horizontal for retaining wall stems. The program was previously always using a value of 0.0025 when it should be either 0.002 or 0.0025.
- Corrected an issue with retaining wall sliding checks where lateral loads applied to the top of the wall that resist sliding were causing erroneous sliding capacity values.
- Corrected a problem with retaining wall soil bearing checks, where the Max Bearing value would be incorrect when there are multiple retaining walls of different lengths in a single model.
- Corrected a problem with the display of soil pressure contours which caused the program to close.
- Corrected an issue with retaining walls where the moment capacity goes to zero for very odd loading conditions.

## Version 4.0.1 Enhancements/Corrections

### Enhancements

- Enhanced performance on 64-bit operating systems to allow use of up to 4 GB of memory.
- Simplified database shape comparisons to reduce program start-up time.
- Retaining Wall Enhancements:
  - Updated the retaining wall detail report by adding the Soil Bearing Check section. Previously this check only showed up in the Retaining Wall Results spreadsheets.
  - Updated the shear check location for retaining wall footings. Previously the program checked a distance "d" from the wall face for the toe and directly at the face of wall for the heel. Now it will determine the net shear direction and perform the shear check accordingly.
  - Updated the way graphic reactions are shown for retaining walls. The program will now divide the entire reaction force by two and show it graphically at the end nodes of the retaining wall.

- Updated the reinforcement checks for retaining wall footings. Previously the toe was only checked for bottom reinforcement and the heel only checked for top reinforcement. The program will now check both the heel and toe for top and bottom reinforcement design.
- Added a check for retaining walls comparing total passive force versus total active force. If passive force exceeds active force a warning is given in the detail report and the design is halted.
- Fixed an issue with retaining walls where the program would give an instability if the length of the toe or heel of the footing was shorter than the "d" of the footing.
- Updated saving results behavior when working in linked programs so that clicking the Save Results button once will save the results for all linked programs.
- Added validation to confirm that all Design Rules are valid upon opening a model.
- Enhanced spreadsheet behavior so that column widths will be remembered when they are updated.
- Added additional licensing information to Help - About screen for commuted licenses.
- Increased the number of allowable pile elements in a model from 1000 to 1500.
- Updated the overturning moment calculations for shear loads applied to slabs. Previously the shear load was assumed to act at the mid-height of the slab, but it has been updated so the overturning calculations consider the forces at the top of slab.
- Removed limitation on rebar Fy on Concrete tab of Materials spreadsheet. Added warning for ACI codes when rebar Fy exceeds allowable.

## **Corrections**

- Corrected a results reading problem where saved results would not be read in for models integrated with a RISA-3D model that had boundary conditions at varying elevations.
- Corrected an issue with network license validation that could cause a slow down with the user interface.
- Corrected an issue where processing of line loads with extremely small (or zero) values could cause "INF" results.
- Corrected a problem with the spreadsheet reporting of Footing Shear Checks within the Footing Results spreadsheet for Canadian, Indian, and Mexican codes.
- Corrected a metric units issue with pile cap one-way shear checks.

## **Version 4.0 Enhancements/Corrections**

- Added Retaining Walls to RISAFoundation:
  - Added the ability to model cantilever or propped walls.
  - Added the ability to handle sloped backfill.

- Added the ability to review / print load diagrams showing all wall loading for any load combination.
- Automatic calculation of  $K_a$  and  $K_p$  based on soil definitions.
- Added ACI 318-2011 design code.
- Added the Canadian (CSA 23.3-2004) design code.
- Added the Saudi (SBC 304-2007) design code.
- Added a "Force Top and Bottom" steel option for slab reinforcement to the Design Rules. (This may reduce temp / shrinkage bar requirements in bottom of footing.)
- Added footing optimization based on overturning moment and sliding safety factors.
- Added the governing load combination to the pedestal code checks section of the footing detail reports.
- Added hydrostatic (HL) loads to the Load Combination Generator.
- Updated the "d" calculation for footings to now be equal to the footing thickness minus cover minus one bar diameter. Previously we considered only half of the bar diameter. The new "d" is more conservative, as we do not know how the rebar mat will be placed.
- Modified concrete shear tie design to round to the nearest 10 mm when metric units are used.
- Modified footing optimization routines to better handle cases with net uplift.
- Corrected an issue where a footing with a large negative moment could receive overly conservative reinforcement for resisting positive moment.
- Modified the logic for footing reinforcement. This should only affect cases where temperature / shrinkage requirements resulted in reinforcement demand between  $\frac{4}{3}A_{s_{required}}$  and  $A_{s_{required}}$ .
- Corrected an issue with the Slab Soil Pressures spreadsheet where the maximum solid pressure could erroneously be listed as zero.
- Corrected an issue where inserting points via the Point Coordinates spreadsheet could cause pedestal locations to move.
- Corrected an issue with overturning moment stability factor calculations when the mat contains pedestals with a different density concrete material than that of the footing/slab.

### Version 3.1.1 Enhancements/Corrections

- Tabulated the soil bearing results browser to separately summarize the bearing results separately for each slab, grade beam or footing.
- Added the graphical display of soil bearing results for footings and grade beams to the main graphical model view.
- Updated the Assign Support Type dialog to make it easier to use.
- Added the "Solve Batch" button to the load combinations spreadsheet.
- Improved the processing time for the creation of results browsers or flat file printing.

- Added the ability to generate "ring" foundations using the circular slab generator.
- For the Canadian code, added the strain value used for the calculation of Beta in the shear capacity calculation to the detail reports for grade beams and design strips/cuts.
- Changed the logic related to minimum slab reinforcement to address the rare case where flexural minimums will control over temperature / shrinkage.
- Updated the cover threshold for slabs to 40% instead of 25%. If your cover is greater than 40% of the slab depth then RISAFoundation will make the cover 40% of the slab depth.
- Updated the "d" for footings to be equal to the footing thickness minus cover minus (1) bar diameter. Previously we considered only 1/2 of the bar diameter. The new "d" is more conservative, as we do not know how the rebar mat will be placed.
- Corrected an issue with integrated RISA-3D/RISAFoundation models where the presence of Solid Elements would cause odd display issues with RISAFoundation graphical results.
- Fixed an issue with the "Slab Rebar at Mid-Depth" in slab design rules where the program would erroneously put in top bars.

## **Version 3.1 Enhancements/Corrections**

- Pile Cap Enhancements
  - Added the ability to consider soil overburden.
  - Added the ability to account for torsional shear in piles in pile caps.
  - Added the ability to add a pile location tolerance for piles in a pile cap.
  - Added DXF Export capability.
- Added ACI 318-08 Concrete code.
- Moved the definition of the yield strength of the reinforcement ( $F_y$ ) from the Design Rules spreadsheet to the concrete tab of the materials spreadsheet.
- This could result in reduced backwards compatibility of Concrete Materials with older versions of the program.
- Added back in the ability of the program to launch in "Demo Mode" when a license is not detected. Feature now requires the creation of a Demo sub-folder.
- Added a feature to report the stability ratio for slabs subjected to overturning moments (Overturning moment safety factor).
- Added buttons/icons for pile and pile cap display.
- Added DXF export of piles and pile caps.
- Added a Warning Log message when the pile cap thickness does not meet the minimum thickness requirements of the Canadian or Saudi Concrete codes.
- Corrected an issue where the "save as defaults" was not working for footing data.
- Corrected an issue where RISAFoundation could inadvertently remember internally generated spring constants.

- Corrected an issue where the Pile Results spreadsheet was not displaying the proper joint label for models originated in RISA-3D.

### **Version 3.0.1 Enhancements/Corrections**

- Added the governing LC to the pedestal code checks section of the footing detail reports.
- Increased the maximum number of design strips from 100 to 200.
- Changed a misleading Warning Log Message to be more descriptive. Instead of "Not enough solution data", the message will now inform the user that their results were generated by an older version of the program.
- Improved behavior of pile cap reinforcement design when strength parameters governed the design. The program would previously give the provided steel requirement exactly equal to the required steel. The program now presents the exact area from the number of bars selected.

### **Version 3.0 Enhancements/Corrections**

#### **Pile and Pile Cap Feature**

- Added the ability to model pile supports for mat foundations and grade beams, including capacity checks and punching shear checks.
- Added the ability to model and design pile cap elements, including:
  - Pile layouts based on the CRSI handbook.
  - Individual pile capacity and punching shear checks.
  - Pile cap reinforcement design and shear checks using the beam analogy.
  - Full detail reports with pile cap dimensions and all design calculations.

#### **Enhancements/Corrections**

- Added network file security to prevent multiple users from opening / editing the same file at once.
- Added the self weight of slab pedestals into the analysis. Previously this was excluded for all but spread footings.
- Updated the names assigned to all design code options to match ANSI naming convention.
- Corrected an issue where some report printing sections were printing out the wrong sections.
- Corrected an issue with the Revit Link where RISAFoundation data embedded in a RISA-3D model could get stripped out of the model after round tripping to Revit.
- Corrected an issue with incorrect pedestal design loads when a line load ends within the footprint of the pedestal.

- Corrected an issue with calculating  $\epsilon_x$  used in the shear capacity of concrete in CSA 2004 using the general method (section 11.3.6.4).

### Version 2.1.3 Enhancements / Corrections

- Added the 2007 edition of the Saudi concrete code (*SBC 304*).
- Added footing soil pressures to the **Soil Pressure** results spreadsheet.
- Added deflection reporting (based on interpolation) for joints which are not located directly on plate corners.
- Modified the legend range for wireframe plate contours to more closely match the range shown for color coded contours.
- Improved the auto update detection sequence so that it cannot falsely report the presence of an update
- Corrected an issue where temperature / shrinkage failures could be erroneously reported for design cuts with a  $\rho_{\text{required}}$  very close to the temperature / shrinkage limit.
- Corrected an issue where the **Footing Results** spreadsheet could report pedestal reinforcement that was not consistent with the correct detail report results.
- Corrected an issue that prevented the program from updating the  $f'_c$  or self weight of a footing unless the file was saved and re-opened.

### Version 2.1.2 Enhancements/Corrections

- Added the ability to report soil pressure at joints that are not part of the FEM mesh.
- Corrected issue which could result in duplicate nodes being created in the RISA-3D/RISAFoundation interaction.
- Corrected an issue with the pedestal punching shear calculations that could cause a crash for concave slab and/or pedestals whose punching shear perimeter could be within multiple slabs.
- Corrected an issue where models with ONLY grade beams could erroneously report an instability.

### Version 2.1.1 Enhancements/Corrections

- Corrected a graphics issue in which the direction of the Design Cuts was being displayed incorrectly.
- Corrected an issue where entering into RISAFoundation could clear RISA-3D Detail Reports.
- Corrected a case where the program could produce a false warning message about soil bearing values being exceeded.
- Corrected a problem which caused the Modify Slabs dialog to stop functioning.

- Enhanced design strip reinforcement spacing by expanding the optimization routine to work for strength considerations.
- Added output to the design strip reinforcement spreadsheet by adding the code checks for each strip and also giving shear values.
- Enhanced design strip reinforcement optimization by requiring a second iteration of the top and bottom bars, thus allowing the program to minimize the reinforcement per Asmin requirements.

## **Version 2.1 Enhancements/Corrections**

### **Enhancements**

- Added a Circular Slab Generator
- Added full pedestal design for both rectangular and circular pedestals.
- Added a customizable graphic toolbar with new Model Display Options button for easier graphical review of results.
- Added CSA A23.3-2004 Canadian concrete code.
- Added NTC-DF 2004 Mexican concrete code.
- Added CSA G30.18 Canadian concrete reinforcement.
- Added double-click functionality for points that allow you to modify the point location and the boundary conditions for the point.
- Organized Model Settings, Design Rules and Footing Definitions to be more in sync with different elements in the program.
- Grade beam spring meshing now tied to Global parameter mesh size.
- Added Redesign Rules and material to various Modify and Selection dialogs
- Soil Pressure spreadsheet sheet results now show controlling pressure for footing joints rather than forcing user to review individual footing detail reports.
- Improved ability to recognize instabilities for overloaded slabs.

### **Corrections**

- Changed the equivalent square pedestal used for punching shear calculations of round pedestals. Previously this was based on equivalent area. This is now based on a square of equivalent perimeter.
- Corrected an issue where the program could not calculate punching shear for pedestals with unusual edge geometry.
- Corrected an issue in pedestal design that could result in an incorrect capacity for pedestals in tension when they have a low, but non-zero moment.

- Removed some over conservative loading that was included in the pedestal bearing calculation for footings.
- Corrected multiple problems associated with models with more than 100 area loads.

### **Version 2.0.3 Corrections**

- Fixed an error in exporting a footing DXF where the output on the footing schedule did not match the graphical view of the footing.
- Fixed an issue which prevented sorting in the soil pressure results spreadsheet.
- Modified bearing check in RISAFoot. Older version were including weight of footing and overburden to arrive at an overly conservative bearing check
- Corrected issue with spread footing top bar steel requirements where bars could be sized for positive moment rather than negative.
- Corrected an issue where the "default" global parameter settings were not being set properly for models that came from RISA-3D or RISAFloor.

### **Version 2.0.2 Corrections**

- Corrected the display of the contours and contour legends.

### **Version 2.0.1 Corrections**

- Adjusted overlapping text in Beam Detail Reports.
- Adjusted rebar call out locations on Slab Design Strips to avoid overlapping text when applying horizontal and vertical design strips to the same area.
- Corrected conversion of Fy from Imperial to Metric units in the Custom Rebar Layout dialog.
- Corrected a printing bug that could cause load input spreadsheets to show erroneous values in the printed reports.
- Fixed a bug where the program was not properly re-assigning a rebar layout that had naming conflicts.
- Corrected an issue where crack control requirements for concrete members could produce tight bar spacing.

## **Version 2.0 Enhancements / Corrections**

### **Interface & Graphics Enhancements/Corrections**

- Allows user to add pedestals to slab foundations.
- Added option to place rebar at the mid-depth of a slab.

- Improved model selection criteria.
- Enhanced the Detail Report for design cuts.
- Added a Load Categories spreadsheet.
- Added select/unselect option for cuts, soil regions, and slabs.
- Added the option to copy load categories in Load Combination spreadsheet.
- Merged Design Strips and Design Cuts into one spreadsheet.
- Added plot option for strip and cut design rules.
- Added the option to display local axes to plates in the plot option dialog.
- Expanded ability to graphically delete items (design strips and cuts and such)
- Enhanced the plate label to be a 3 way toggle: Show Plates (w/o Label), Show Plates (w/ Label), And Do NOT Show Plates.
- Modified the program to delete area loads if one of the designated points is deleted.
- Fixed a bug relating to deleting rebar layouts that are in use in the model.
- Correct the display of incorrect stress block selection in the detail reports.
- Improved the layout of the Delete Items dialog box.

### **Concrete Design Enhancements/Corrections**

- Added punching shear calculations for pedestals on mat slabs
- Added ability to use a single layer of reinforcement at the center of the slab.
- Added a Detail Report for Design Strips
- Increased the default number of cuts in a Design Strip to 50.
- Added the ability to change Rebar Angle in the Modify Strip dialog.
- Corrected an issue relating to minimum placement of steel in a design cut.
- Corrected a bug where no design was performed if a design cut had a moment very close to zero.

### **Interaction Enhancements/Corrections**

- Fixed bug related to reading the redesign rule parameters in an appended RISAFoundation file.
- Corrected a bug with exporting of Footing Pedestal Dimensions to a DXF file.

### **Version 1.1.3 Corrections**

- Corrected a serious bug that could result in the deleting of embedded RISAFoundation data from a RISA-3D model. If a RISA-3D file with embedded RISAFoundation were saved

without having first viewed the Footing data during that session, then the Foundation information would NOT be embedded in the 3D file.

- Corrected a bug related to the reading of the results file. There were instances where saved results were being discarded even when they were present and valid.
- Corrected a bug associated with the Self Weight of Lateral walls that were brought into RISAFoundation from RISAFloor. Essentially the self weight of the wall was being included twice.
- Corrected a bug associated with the saving and retrieving of drawing grids.
- Corrected a bug with the optimization of concrete reinforcement for beams. The bug would have prevented the program from adding steel that is above the min flexural steel requirements.

### **Version 1.1 Enhancements / Corrections**

- Separated RISAFoundation and RISA-3D variables to allow proper saving from within RISAFoundation when model is linked to RISA-3D.
- Fixed an error in exporting a footing DXF where the output on the footing schedule did not match the graphical view of the footing.
- RISA-3D/RISAFoundation link is improved; fast, efficient.
- RISAFloor/RISA-3D/RISAFoundation data are saved into a single file.
- RISAFoundation solution can now be saved when it runs under RISA-3D.
- Added a sparse solver to speed up solution times and reduce memory requirements.

### **Concrete Design Enhancements / Corrections**

- Added ACI 2005.
- Changed  $F_y$  in the rebar layout dialog so that it is tied to stress units to be consistent with definition of  $F_y$  in the Design Rules.
- Fixed bugs related to rebar optimization for extremely, extremely wide beams.

### **Wall Enhancements / Corrections**

- Corrected a units bug for line load / wall reactions.

### **Loading Enhancements / Corrections**

- Increased Load Combination limit to 5000.
- Corrected units bug in the conversion of line load. This issue affected both RISAFoundation line loads and gravity wall load reactions from RISAFloor.

## **Miscellaneous Enhancements / Corrections**

- Improved dialog behavior by highlighting the Use? Checkboxes and added in a Clear Use Boxes button.
- RISAFoundation file now saved within RISAFloor or RISA-3D file for linked files.
- Improved Sorting in various results browsers.
- Added in better status bar support for Dual Monitors.
- Added restrictions on spreadsheet printing for Demo versions. Now limited to a maximum of 5 rows for each spreadsheet.
- Corrected report printing to re-adjust report widths to allow for wider / Landscape pages.
- Corrected a bug where copying and pasting from results browsers could result in a memory error based on an "out of range" spreadsheet setting.
- KeyID added to input file.
- Demo Versions will now run out of HKEY\_Current\_User if Local\_Machine is unavailable.
- Ability to turn off the time / date stamp.

## **Version 1.0.4 Enhancements / Corrections**

### **Miscellaneous Enhancements / Corrections**

- Corrected an un-conservative units bug with line loads. When the length units were set to anything other than inches the line loads were being interpreted erroneously during the solution. This would be an un-conservative error for any length units GREATER than inches.

## **Version 1.0.3 Enhancements / Corrections**

### **Enhanced Concrete Design Features**

- Added Shear Capacity Calculation of Design Cuts

### **Miscellaneous Enhancements / Corrections**

- Modified the Slab Contour Values 'Mx' & 'My' to 'MX' & 'MY' to Reflect Global Axis Values
- Corrected Unit Conversion Bug in Soil Pressures
- Corrected a Program Crash which Occurred While Converting Units from US to Metric if there was No Strength Combination Solved
- Corrected Rebar Spacing Unit Conversion Bug in RISAFoot
- Added File Association (Double Click on a File to Open and the Current Solution is Cleared While Loading a New File)

- Corrected Model Merge of Beams when a Continuous Beam Overlaps a Non-Continuous Beam
- Changed Boundary Conditions Setting of Footings to a 2-Way Spring Rather Than Compression-Only Springs

## **Version 1.0.0**

There were no 'Release Notes' for Version 1.0.0 of RISAFoundation.