

# Release Notes for ADAPT-Builder

## Version 21.0.0 Enhancements/Corrections

### General:

- Added the Tendon Smart Tools which aids in dynamically modeling tendons and allows rapid modification of a single tendon or groups of tendons. It includes:
  - Wizard type modeling with auto-recognition for the location of high points, short spans, openings, and slab edges.
  - Mapping of distributed tendons between boundary tendons can be accomplished quickly using max spacing, fixed spacing, and number of tendon options.
  - Assignment and modification of the tendon span shape in plan view for a single tendon or multiple tendons using a two-click selection line.
  - Editing of tendon points - add, delete, move and align high points or swerve points for a single tendon or a group of tendons at the same time.
  - Option to “cut” tendons using the Cut to region tool.
  - Option to check precompression, number of tendons, number of strands, and tendon spacing along the selection line.
  - Option to assign tendon Direction as distributed, or banded.
  - Option to check for “short” tendons and colorize them for easy identification.
- Added LC Generator for auto-generation of load combinations based on selected design code.
- Added Visibility panel with improved view controls:
  - Dynamic list of components which shows only components that exist in the model.
  - The components are listed in categories, which are groups of similar components across the model.
  - Visibility is controlled based on component or category level.
  - Option to control the visibility of top and bottom columns or walls separately.
  - Option to display tendons per direction (distributed, banded).
  - Improved display of loads by displaying per load case instead of load type.
  - Improved visibility control for rebar.
  - Enhanced workflow for quicker display of the components versus the Select/set View Items dialog.
- Enhanced Long-term load combination generation:
  - Added modeling of loading history.
  - Auto-calculation of long term combination factors based on concrete model, age at loading and observation day.
- Enhanced Map Banded tendons option:
  - Added option to map tendons for total dead load, self weight and superimposed dead load.
  - Added Trim tolerance option where tendons are auto extended/trimmed to slab edge if in the tolerance range.
  - Added condition for assignment of cantilever shapes to end spans.
  - Extended the list of available shapes for mapping of tendon mid spans.

- Added Help menu with a library of all ADAPT resources.
  - Web based HTML help file (best viewed with Chrome)
  - Link to program documentation
  - Link to Technical Notes
  - Link to training and program usage videos
- Added Direction (bonded, distributed) parameter for tendons in the Property Grid.
- Added an option to assign standard rebar shapes to banded and distributed bars for Australian code.
- Added an option to colorize columns and walls by offsets to the Colorize panel.
- Added Skip Loading Subregion to the Property Grid.
- Updated the saving of project templates to include the latest criteria options in the program.
- Corrected an issue with the display of governing load combination in the Support Line dialog.
- Corrected an issue where manual design sections were initiated with the wrong value for the Stirrup legs parameter in the Property Grid.
- Corrected an issue with the wrong level assignment for components copied to another level.
- Corrected a graphical issue when in some cases the program created additional point springs.
- Corrected an issue with the display of Cracking Moment as the governing load combination in the Support Line dialog.
- Corrected typo in the description for the Design Criteria panel of the Criteria Ribbon.
- Corrected the list of parameters for Punching shear in the Property Grid to exclude Precompression entry if the program is opened in RC mode.
- Disabled the Reference Plane assignment in the Property Grid when in creation mode.

#### Operations:

- Corrected an issue where the number of tendons was not calculated correctly when Map Banded was used for the support line that includes a beam.
- Corrected an issue where the program closed unexpectedly when selecting columns corrupted by the deletion of the reference plane.
- Corrected an issue where the program closed unexpectedly when using the Exclude Meshing tool and trying to analyze.
- Resolved an issue where the program closed unexpectedly when using the Add Text tool in the Home ribbon.
- Resolved an issue where the program closed unexpectedly when using Model->Transform tools to transform polygons with 0 width dimension.
- Corrected an issue where the program prompted an error message when columns of different sizes were selected and modified in the Property Grid.
- Resolved an issue where the program closed unexpectedly during Load Takedown calculation due to incorrect modeling of overlapping slabs.

#### Analysis:

- Corrected an Issue where the upper and lower wall nodes were not shifted to the same location if not concentrically modeled.

#### Design:

- Added option to limit stud spacing to  $3d/4$ , as per ACI-318 Table 8.7.7.1.2.
- Added Australian - AS3600 (2018) design code.
- Corrected an issue where the Tendon Optimizer was reporting incorrect stresses for the estimated stress block in the form of a non-numerical value.
- Corrected an issue where overlapping tendons were only accounting for one of the overlapped

tendons during section design.

#### Reporting/Graphical Results:

- Corrected the total tendon length for spline tendons in the Tendon Totals report.
- Corrected an issue with color-coding of design sections for one way shear stress check.
- Corrected an issue where the graphical punching shear stress ratio report in some models displayed skewed wall design sections.

#### Integration:

- Corrected the sign for the axial force when exported to S-CONCRETE.
- Corrected an issue with the export of local forces for slanted columns to S-CONCRETE.
- Resolved an issue where space at the end of a level name was causing the export to REVIT to fail.
- Corrected an issue with import of distributed bar extents from the INP file.
- Resolved an issue where DWG Export resulted in the corrupt DWG file when Punching Shear Reinforcement Plan was displayed.

#### Licensing:

- Added Borrow License option to allow you to use the subscription license offline.

## Version 20.0.1 Enhancements/Corrections

#### General:

- Added an option to colorize tendons by span shape to the Colorize panel.
- Added the option to Save As Version 2019 in the File menu.
- Added the End Stressing option in the Properties Grid for tendons with effective force.
- Updated the "instability warning" message to reference the options in the current user interface.
- Improved interface to give an option to disable the Design Section tools in Multi-Level Mode.
- Modified the Item Properties dialog to be inactive in Creation Mode.
- Corrected a typo with the IBC version number associated with the ACI 318-19 code.
- Corrected build release date in Help-->About Builder dialog window.
- Corrected an issue with the display of SI units in the Dynamic Tendon Optimizer-->Calcs tab.

#### Operations:

- Enhanced the AutoSave feature to allow users to set the number of backup files.
- Enhanced efficiency for editing of column type selection.
- Improved the Colorize panel to enable the user to easily identify columns with the same rectangular shape.
- Enhanced the Properties Grid to automatically update as changes are made to the selected items.
- Enhanced the Properties Grid to not allow entry of component dimensions less than specified in the initialization file.
- Enhanced the Properties Grid to allow data entry in Creation Mode.
- Correlated the Node Shifting options between the Properties Grid and the Item Properties window.
- Correlated the behavior of components offset(s) between the Properties Grid and the Item Properties window.
- Corrected an issue where only the first rebar entity within a selection set was being modified when changed in the Properties Grid.
- Corrected an issue where selecting Rebar using Select by Type would not allow a change from Calculated to Base Reinforcement in the Properties Grid.
- Corrected an issue in Properties Grid where rebar cover remained locked after Type was changed

from Calculated to Base.

- Fixed an issue where the correct Section Type would not appear in the Properties Grid after it was assigned in Type Manager.
- Fixed an issue where the beam dimensions were displayed incorrectly in the Properties Grid when assigned a Section Type.
- Corrected an issue where the program would close unexpectedly if the user selected a Tributary Region and Support Line together.
- Corrected an issue where newly created reinforcement was missing the description.
- Corrected an issue where a Design Code modification resulted in duplicate Load Combination names.
- Corrected an issue where walls were being generated with the Node Shift option set to Manual.
- Resolved an issue where the program shut down when opening a new model within the program.
- Resolved an issue with the input of modulus of rupture for non ACI codes.

Performance:

- Improved performance of Design algorithm.

Analysis:

- Corrected an issue where Spline Tendons were flagged during analysis as “outside the slab region” when swerved around openings or slab edges.
- Corrected an issue where Temperature results were incorrect due to triangular shell elements.
- Corrected an issue where renaming of concrete material in single level mode caused unexpected closing of the program during analysis.

Design:

- Resolved an issue where the  $C_m$  value for column design was being conservatively passed to the SCO file as 1.0.
- Resolved an issue to prevent the program from unexpectedly closing, in some cases, during design with pattern loads present.
- Corrected criteria for when an opening is considered as slab edge in Punching Shear Check.
- Corrected an issue where calculated moment capacity using the Wood Armer method was conservative when selectively analyzing load combinations.
- Updated the formula for calculation of effective moment of inertia for EuroCode (EC2).

Reporting/Graphical Results:

- Modified the program to display the diameter for studs and bar size for stirrups, in the display of Punching Shear Reinforcement.
- Enhanced the program to display only the applicable menu items within the Generate Compiled Report menu.
- Resolved an issue where the program was generating reinforcement of zero length.
- Resolved an issue where in some cases the Design Section Forces and Design Section Rebar reports were empty.
- Resolved a discrepancy between the graphical results legend and the diagram results in some models.
- Resolved an issue in the Design Section coloring for the One-Way Shear stress check.

Integration:

- Corrected an issue with the Export->Revit function to create a compatible file for import to recent Revit versions.
- Corrected an issue where the Input Method for distributed rebar was not set correctly after being

imported from the INP file.

#### Licensing:

- Added license type in Help->About Builder dialog.
- Resolved an issue where users with perpetual licenses were incorrectly being prompted to sign-in to subscription licensing.

## Version 20.0 Enhancements/Corrections

#### Analysis:

- A new option was added to user-define the value for rupture modulus for cracked deflection checks and reinforcement necessary to meet or exceed cracking moment.
- Stiffness modifiers for beams were made to be consistent between Modify Selection and Property Grid for the M22 modifier.

#### Modeling:

- New and improved functionality for the automatic creation of middle strips and allocation of tributary (%) to column strips was added in the Dynamic Support Line Editor from Floor Design>Dynamic Editor>Middle Strips and Limits.
- General improvements were made to the Dynamic Support Line Editor from Floor Design>Dynamic Editor. These include:
  - Creation of unique support lines per span
  - Auto-adjust to snap perpendicular for support lines created from the Wizard
  - Auto-trim and extend of support lines to slab edges
  - Color coding for support line limits for NONE, Max Width, and % allocation for column strips.
- An improvement was made for modeling of spline tendons that were graphically shown with a kink complicating tendon selection.
- An improvement was made to Floor Design>Delete Design Strips to erase designs section from support lines when this option is selected.
- An improvement was made to Loading>Load Combinations to retain load combinations defaulted to or user-defined when the design code is changed from Criteria>Design Codes.

#### Performance:

- A performance enhancement was made to loading of contour results in Result Display Settings graphical display.
- Licensing has been modified to support RISA cloud, network, and standalone licensing.
- The program now includes operability for licensing and usage of FELT 3D w/Modeler for unbonded tendon systems.
- A performance improvement was made to utilize multicore functionality and threading in Builder's frame solver.
- Compatibility for 32-bit systems was removed.

#### Design:

- ACI 318-19 was implemented as a concrete design code.
- Punching Shear - An improvement was made for ACI code models for handling openings at or near columns in reduction of critical sections and critical area. New options are given in Floor Design-Shear Options.
- Punching Shear: A new feature was added to allow the end-user to define what critical section sides participate in the punching shear check within the Property Grid.

- Punching Shear: An improvement was made to the handling of columns, when rotated, to the effective depth when a critical section passes through slabs of different thickness.
- An improvement was made to the default value and use of the unsupported wall height for wall section design.
- Wall Designer was modified to properly write loads and other parameters to S-Concrete when using this tool for wall section design.

#### Reporting/Results:

- Print preview for all graphical reports was improved to display the correct next page in sequence.
- Punching Shear: The XLS result file was improved to properly report combined stress for punching shear results.
- Punching Shear: A graphical improvement was made to the view of reinforcement for punching shear to report if any supports exceed code allowable maximum shear capacity.
- Punching Shear: A graphical improvement was made to the view of stress ratios for punching shear. If a single strength combo is selected, the program now reports the layer (critical section) that produces the worst-case ratio in ( ). If the strength envelope is selected, the program reports the combination that produces the worst case ratio in ( ).
- Punching Shear: A graphical improvement was made to the view of Condition at a column to report the effective depth for the first critical section at a distance from the face of the column based on code requirements.
- One-Way Shear: A graphical improvement to color code one-way shear requirements (NA, Reinforce, Exceeds Code) for beams and one-way slabs.
- One-Way Shear: A graphical reporting improvement has been included in Result Display Settings to report One-Way Shear results.(Item 7325) Results included are:
  - Shear Stress Check - color coding of design sections
  - Concrete Shear Strength,  $\Phi V_c$
  - Demand/Capacity ratio -  $V_u/\Phi V_c$
  - Required Reinforcement (Area of steel)
  - Provided Reinforcement (Area of steel)
  - Reinforcement layout
- A new feature has been added to graphically check differences, based on %, between physical and idealized design section geometric properties of area and moment of inertia.
- Report Compiler: An improvement was made to the default graphical design strip report displayed in the incorrect color.
- Report Compiler: An improvement was made to properly capture coloring of design strip results when images are screenshot and used in the compiled report.
- Report Compiler: An improvement was made to screenshots showing Moment Capacity with Demand in the compiled report caused the PDF creation to stall.
- Report Compiler: The graphical stress check reported in the compiled report was improved to properly show colors as presented graphically on screen.
- Report Compiler: Screenshots taken and used in the compiled report were improved to properly display shading as presented graphically on screen.
- Report Compiler: An improvement was made to the graphical reporting output that showed contours overlaid when other results were selected to be shown.
- Report Compiler: Print Preview Zoom and Navigation were stabilized and made functional in all use instances.

- An improvement was made to design section details to report both Physical and Idealized properties.
- An enhancement was made to the detailed geometric properties of design sections to display the physical and effective properties of design sections when the effective flange option is used for beams.
- An improvement was made for reporting of punching shear stresses for design code AUS3600 to report separate allowable stresses for each bending direction.

#### Graphic/UI:

- Punching Shear: An improvement was made to make local design and analysis input for individual columns as compared to global settings within the Property Grid.
- One-Way Shear: A modification was made to the Property Grid to include an entry for number of legs when One-Way Shear criteria is selected for support lines and manual design sections.
- A new dockable Property Grid has been added for controlling component and other modeling object properties, geometric assignments, design parameters, etc. This adds to current functionality of Item Properties and Modify Selection.
- A new dockable Colorize dialogue window has been added to filter, sort, and colorize components (slabs, columns, walls, openings, ramps, beams, drops), supports, springs, support lines, splitters, etc. Colorized selections can be isolated for propagation of changes in Property Grid.
- A selectable option has been added to easily display component local axes in Property Grid.
- Report Compiler: A new Report Settings tool has been added to predefine report settings prior to report compilation.
- The Items Properties dialogue was restored to properly open when using the option from the Modify Ribbon.
- The Property Grid now includes the ability to change the tendon material for a group of selected tendons. This is not available from Modify>Modify Selection.

#### Integration

- Inconsistencies in rebar data written to the ID assignment was out of sequence when rebar is included in the INP file.
- Loads defined in Revit are now written to the INP file format for import to Builder.

## Version 2019.2 Enhancements/Corrections

#### Analysis

- The option to "Reduce Axial Only" from Loading>LLR was also reducing moments on columns. An improvement was made to apply this option only to axial loads when selected.
- A correction was made to ramp property modifications that were not recognized in writing input data for the current analysis run.
- A correction was made to tributary load takedown where the original wall location was being considered after the wall was moved.
- Ramp meshing was improved for different column and beam placement conditions.
- An improvement was made to wall mesh subdivision for long walls for better node commonality with slab elements.
- A general meshing version compatibility resolution was made where models meshed in older version v2017 were not able to be meshed in the v2019.

#### Modeling

- A new line hinge tool was added for modeling of internal hinges. The option is included when modeling of a line support from Model>Supports>Line Support.
- Total Force input option, as compared to per strand, was added to the "Stressing" tab in the Tendon properties dialog window. When using this option, the program auto-scales the number of strands in the "General" tab.
- A correction was made to tendons outside of the slab were being falsely flagged as modeling integrity checks prior to meshing.

#### Design

- An improvement was made to the presence of openings when design sections cut through them resulting in incorrect design section depths and reinforcement and PT depths in the section.
- Improvements were made to idealized design section geometry when cut over the slab and beam.
- Improvements were made to how the Wood Armer Method is implemented for twisting moments (Mxy) in two-way slabs. The calculation of Mxy was improved to include integration over the section cut line based on stress values. The program now reports Mxy in Design Section Actions when Wood Armer is enabled from Criteria>Analysis/Design Options.
- An improvement was made for punching shear to not check the least critical section (octagonal-shaped) outside of the shear reinforced zone when the first section at  $d/2$  from face of support passed allowable stress and did not require reinforcement.
- An improvement was made to the punching shear check when the seismic drift option is enabled from the Floor Design>Shear Design. When checking critical sections outside of the shear-reinforced zone (octagonal-shaped sections) the program was using the section critical area for determining reinforcement necessary to meet the drift requirement. This resulted in increasing reinforcement moving away from the support face. The critical section to be used for all locations within  $4*h$  from column face is the first critical section area at  $d/2$  from the support face.

#### Reporting/Results

- Print preview for selected and all graphical reports from Reports>Open Compiled Reports>File was enhanced for improved navigation and zoom in/out.
- Print preview for all graphical reports now displays the correct next page in sequence.
- A program stall was corrected when selecting Reports>Open Compiled Reports>File>Print Preview all Graphical Reports and all graphical reports were selected in the selection tree.
- The pier reaction dialogue window from Reports>Wall>XLS Reports>Pier Reactions was improved to indicate the pier local axes, reference axis and rotation direction.
- Punching shear reinforcement spacing output was made to be the same when shown graphically as compared to the tabular report from Reports>Punching Shear>Punching Shear reinforcement.

#### Graphics/UI

- The spelling of "Tendon" was corrected in the INP file for Builder 2019.0 and latest INP versions selectable from File>Export and INP selectable from File>Import.
- A correction was made to scaling of graphical loads based on the size setting in Visibility>View Settings.
- The display of the unit system in Result Display Settings>Settings>Result Unit System was corrected.
- An improvement was made where Home>Select by Type was crashing when the element selected and keyword did not produce a selected object.
- RISA branding and contact information updates were made to the splash screen and HELP dialogue boxes.



## Version 2019.1 Enhancements/Corrections

### Analysis

- A correction was made for the sign of distributed values for bending moment on a manual design section not being consistent with the sign for the integrated value.
- An issue was resolved patch loads were not being discretized properly leading to absence of modeled load in the analysis.
- An improvement was made to persistence of line load discretization when applied at the slab edges. In rare cases, line loads were not discretized to nodes leading to absence of modeled load in the analysis.
- An improvement was made to meshing of beams when negative offsets were assigned to the beam.
- An issue was resolved where zero uplift for a partial cantilever tendon shape in the Tendon Properties dialogue window reported uplift. Tendon uplift - partial cantilever has no uplift and should be zero.

### Modeling

- New tools were added to the Shop Drawing Editor from the tendon toolbar. These include:
  - Adding Chairs: Displays chairs and/or support types for tendons and accompanying support bar size, spacing and extension settings.
  - Edit Bars: Gives options to edit support type, support bar size and support bar extension.
  - Anchors: Displays set anchor type for unbonded and bonded tendons.
- A correction was made in the Tendon Editor where CGS values were set back to default when the option for end-span shape was used.
- An improvement was made in the Tendon properties dialogue to return a message when the green checkmark is selected if the system type is set to Bonded and the Calculated Long-Term loss setting is enabled. Long-term loss calculations are limited to unbonded tendons. Bonded tendons require the use of lump-sum loss estimate input.
- An issue was corrected to model crashing when tendons that had become corrupted were selected or clicked on.
- An issue was resolved that was related to program crashing when the Cantilever Partial tendon shape was set in the Tendon Properties dialogue.

### Performance

- Improvements were made to the performance and speed of data loading when levels are switched with the Level Selector or Arrow Up and Down.

### Design

- The load combination selection list in Wall Design Manager was improved to properly update the load case selection based on the load combinations selected and available solution sources.
- A correction was made to the large required area of steel for two-way reinforcement for NBR and EC2 design codes.
- An issue was resolved where manual design section values for axial and in-plane shear were reported as zero and with incorrect max/min values on the cut line (bracketed values). Only the integrated values are now reported.
- An improvement was made to the generation of the idealized sections produced in Designer for section design.
- An improvement was made to retain design section types already assigned when stiffness modifiers

were assigned to those columns.

- An improvement was made to ignore the area of mesh reinforcement in design sections that cut through openings.

#### Reporting/Results

- An improvement was made related to crack widths being reported as zero and graphical results not being produced. This stemmed from non-converging equilibrium state due to incorrect consideration of prestressing force for prestressed sections.
- An issue was resolved where actions and reinforcement were reported as zero in tabular reporting for manual design sections.
- The sign convention for axial force for design sections, both automatic and manual, was changed to be consistent with general sign convention adoption in the program. Axial tension is positive and axial compression is negative.
- An improvement was made to the graphical display of beam stirrups in the strip elevation view.
- An issue was resolved related to screenshots added to the report compiler not being deleted properly from the Report Compiler dialogue.

#### Graphics/UI

- The FEM options for Consider and Disregard were added as right-click options.
- A licensing bug was fixed where the option for Lump-sum loss estimate was grayed out if the 3D Felt option in the program splash screen was not selected.
- Ramp coloring was added to Visibility>Color Palette.
- Ramps are now shaded when the model is set to shaded view from Visibility>Shading.
- An issue was resolved where the program crashed if window selection was used to select an entity to add vertices.
- An improvement was made to the visibility of soil bearing pressure contour lines that were skewed back to the origin.

#### Integration

- ADAPT-Revit Link 2020 was released for compatibility with Autodesk Revit 2020.
- An improvement was made to the .INP file data when P-Delta combinations are included in a model. An issue existed where regular service combinations were not being solved.
- An issue was resolved where tendons set to "Fillet-Radius" were not discretized properly when written to the .INP file format from FILE>Export.
- The .INP file format was improved to allow offsets at both ends of a beam component.
- The .INP file format was improved to accept ramp data allowing ramps to be exchanged within ADAPT-Builder using the .INP import/export options.

## Version 2019.0 Enhancements/Corrections

#### Analysis

- The program now includes the option to run 2nd-order analysis for geometric nonlinearity ("big" P-delta) based on the compilation of the elastic and geometric stiffness matrices. A new analysis/design option type for P-delta is included in which combinations can be singularly run for 2nd order effects or processed as a batch based on a combination used to obtain the geometric matrix. Graphical analysis results similar to regular combinations can be obtained for P-delta combinations. These results can be utilized for the design of columns.
- The default value for the shrinkage load case was changed to 5.0x10E-4 in/in.

- An issue was resolved where some models with load patterns were crashing the .ADM file.

## Modeling

- A new feature has been added to model ramps in the program. Ramps are limited to analysis only and cannot be designed through means of design strips. Tendons cannot be modeled in ramps. Longitudinal and transverse beams can be modeled at ramps with options to automatically offset the beams as well as offset walls and columns supporting ramps. Ramps are required to be modeled in the same plane and the program constrains the graphical input as 3-point input to enforce planar modeling.
- Design Strip Modeling: A new and improved Strip Modeling Dynamic Editor includes tools used to more rapidly model and modify support lines and design strips. These include:
  - Support Line Wizard: Creates a support based on a construction line defined by snap points along the strip path.
  - Support Line Limits: Changes selected support line design criteria and tributary limits for the design strip.
  - Wall: Allows the user to set constraints for how walls are considered for design strip generation.
  - Display: Sets the support line display for Direction, Criteria and Width Limit
- The program includes new and improved splitter functionality. The use of splitters has been simplified to creating a boundary that the tributary edge extends when the width is required to be limited to either side. Splitters are no longer required for any other purpose as the program has been improved to recognize support line nodes at any location and properly generate strips.
- A new Shop Drawing Editor has been added and contains the following features:
  - Tools: Converts all tendons to a new fillet-radius display type as compared to straight or spline and allows for removal of all non-auto swerve points on tendons.
  - Chair Groups: Allows the user to input on-demand chair bar maximum spacing and chair bar extensions for graphical output of tendon support bars.
  - Colors: Designates user-defined colors used to group like tendons by length.
- A new tendon representation option is available called 'Fillet.' In this mode the user enters a radius for construction circles used to develop the in-plane curvature and shape of the tendon. The Dynamic Tendon Editor controls the display of the construction circles from Mode-Show Fillet Details.
- An issue was fixed related to the undo function after a tendon is deleted. The program now properly restores the tendon object when undoing the delete.
- For full compatibility of use of the new Dynamic Strip Wizard options, the auto-creation of middle strips when in RC mode had to be removed from Criteria-Analysis/Design Options. Users can use the new features for more rapid creation and modification of both column and middle strips.
- Two offset inputs are given now for beams, slabs, support lines, tendons, ramps. This input is found in the component property dialog under the 'Location' tab.
- An improvement was made to walls and columns having a blank material assignment when created through a new project template file.

## Design

- The program now includes the option to calculate the effective flange and properties of beams when a support line is set to 'Beam' criteria. The design of the beam sections is performed using the effective properties. The component of stress related to the precompression uses the full tributary area of the section as does the graphical precompression result. ACI and EC2 calculations for

effective width are supported.

- When the PT Shop Drawing module is enabled, the program gives new input and functionality for the calculation of long-term losses for unbonded tendons and bonded tendons stressed at the same time.
- New improvements have been made for punching shear according to ACI318-14. These include:
  - The option to consider critical sections outside the shear reinforced zone with either a rectilinear or octagonal-shaped critical section. ACI 318-14 Sections 22.6.4.2, 22.6.6.1
  - The option to apply two-way shear provisions for minimum reinforcement for seismic drift. ACI 318-14 Sections 18.14.5.1.
  - Application of minimum two-way shear reinforcement at critical sections is based on the requirement at the first section  $d/2$  from face of support.
- An issue related to crashing when a section type is assigned to columns or beams was resolved.
- An issue was resolved related to the calculation of LL reduction factors of columns when you have multiple overlapping loads.
- An improvement was made to update the current value for precompression when the tributary width is changed in Settings and the span is re-optimized.
- A correction was made to the 'a' factor required for the CSA code when the effective depth,  $d$ , used for two-way shear calculations exceeds 300mm. Per Section A23.3-14 and 13.3.4.3 the correct factor is taken as  $1300/(1000+d)$ . Previously the program was using  $1300/(1300+d)$ . Canadian Punching Shear Check calculates  $V_c$  incorrectly for deep slabs.
- The tolerance that is checked for determining the design actions for punching shear at stacked columns was increased to avoid conservative design and incorrect values being used.

#### Reporting/Results

- For inclusion of P-Delta combination consideration, the program graphically reports drift and moment amplification factors (2nd/1st order results) for local axes, RR and SS, as well as the combined global results. The program code checks against a user-defined value set in the Result Browser.
- New XLS reporting is available for lateral drift for P-Delta and non-P-Delta combinations. New reports include a list of vertical stations arranged top-down with column coordinates and elevation, X/Y/Global displacements at top and bottom of columns, drift at columns with code check, maximum drift data arranged for easy plot, average story drift, and story drift plot data.
- The program now produces a FELT 3D Report – a compiled PDF report summarizing tendon loss calculations including graphical views of the tendons horizontal and vertical profile and the loss diagrams.
- Result Display Settings (red eyeglasses) includes graphical reporting options for design sections to include the area of steel for provided, required and base (user-defined) reinforcement as well as the area of steel/section area ( $\rho$ ).
- An issue was resolved where the units were not updating properly when KPa and kN/m<sup>2</sup> were selected in Result Display Settings-Settings.
- An improvement was made to support the graphical display of the model and results and associated result dialog windows when dual monitor setups are used.
- When in MAT mode and the option for graphical display of Soil Pressure is selected from Result Display Settings-Analysis-Slab-Stress, when right-click is used to select the filter, a new warning is given "Filter is not available for this item."
- An issue was fixed related to the crashing of the Report Compiler when screenshots were taken and

selected and Print or Print Preview was used from the FILE drop-down.

#### Graphics/UI

- A new cloning feature has been added to clone multiple combinations in a single instance and/or to clone combinations as P-Delta types.
- The selection for display of required and provided rebar on support lines was removed from Rebar-Display Manager. Users can obtain this information using new graphical options from Result Display Settings (red eyeglasses)-Analysis-Design SectionsReinforcement (Longitudinal).
- The default design code when launching the program in US or MKS units is set to ACI 318-14.
- New right-click options for Show Selection, Hide Selection, and Show All have been added when selecting at least one component and clicking off the component.
- Improvements have been made to visibility options found in Floor Design-Strip Results/Visibility. The last-selected strip direction X or Y will be retained if the strips are deleted and regenerated and at least one support line is displayed. Otherwise, the default X-direction will be displayed.
- The tendon area defined in the Tendon Properties dialog now supports 3-digit values.
- An improvement was made for applying curvature color coding to fillet tendons. This option is found in Tendon-Display Manager.
- Two checkboxes were added from Modify-Modify Selection-Tendon-Display Control Points. The first checkbox indicates a setting is to be changed and the second is used to display the points.
- The inactive pull-down options for system type were removed in the Tendon Properties Dialogue.
- The default values and selections in the Tendon Properties Dialog and Modify-Modify Selection-Tendon are now synchronized to display the same values.
- An improvement to display the total effective force of a tendon when selected from Tendon-Display Manager-Stressing-Effective Force.
- An improvement was made to reinforcement being centered over supports correctly when the option is selected from Criteria-Rebar Lengths or Rebar-Rebar Lengths.
- The Snap Tool Palette was added to the end of the Home ribbon.
- An issue was corrected where if Tendon-Display Manager was selected all tendons would be displayed even if not displayed prior to invoking the dialog.
- An improvement was made to the Fixed Range contour results so that the values of the contour map match the scale values.
- Loading dimensions properly show assigned loads for all directions when graphically viewed.

#### Integration

- An issue was resolved that was related to crashing when tendons were exported as a DWG file.
- An improvement was made to import of tendons from ADAPT-PT/RC to Builder when the latest versions are used.
- A correction was made to the .INP file format so that beam dimensions are written as beam width x depth.

## Version 2018.3 Enhancements/Corrections

#### Reporting/Results

- An improvement was made to the total effective force to be displayed when selected from Tendon>Display Manager.

#### Graphics/UI

- An issue was resolved where the reduced stiffness ratios for cracked deflection combinations were

not being displayed when selected.

- An issue was resolved where the program was crashing when selecting a load combination from the "Loads" tab in Result Display Settings while the "Analysis" tab was completely expanded.
- An issue was resolved in Tendon Optimizer related to the precompression not updating when the tributary width was modified in "Settings."
- An improvement was made to the Home Ribbon by adding a Snap Tools panel allowing shortcut keys to be assigned to snap tools.

## Version 2018.2 Enhancements/Corrections

### Modeling

- An improvement was made to tributary regions being updated when a column endpoint is modified from the column properties location input window.
- An issue was resolved where renaming the default concrete material property corrupts the model resulting in program instability during analysis and/or design of sections.

### Reporting/Results

- An issue was resolved where HTML column design reports was inactive from Reports>Columns>HTML>Column Design Summary and Column Design>Reports>HTML>Column Design Summary.
- An issue was resolved where cracked long-term deflection results were not included in the Loads>Load Combos>Long-Term Deflections list from Analysis>Result Display Settings (results browser).
- An improvement was made to include long-term deflection combinations for graphically reporting the deformation on support lines.

## Version 2018.1 Enhancements/Corrections

### Analysis

- An improvement was made where imported building load case reactions for Wind and Seismic from Etabs were not handled correctly in Analysis->Analysis Options. These reactions should not be listed as selectable reactions for 'Include reactions' when they are imported via .INP for 'Reactions only.'
- A fix was implemented where Builder will crash when the default 'Concrete 1' material property is renamed or removed from a model.
- Save as version 2012 from the File menu was fixed.

### Modeling

- An issue was resolved where the program was crashing when modifications to a tendon anchored at opening edges was made.
- A correction was for tendons being redrawn and attached to slab edges after the tendon end was moved from slab to opening edge.
- The default modeling mode for tendons was set to linear (straight) versus spline in the Tendon properties dialog.
- The Dynamic Tendon Editor was improved and reorganized to stabilize tendon mode and trim functionality and additional options were added. These include:
  - Tendon trim with tolerance setting
  - CGS (same as previous version)
  - Force: number of strands or effective force entry

- Mode: spline or straight line
- Anchors (same as previous version)
- Shape: tendon end span shape as cantilever or straight
- Tendon trim/extend was improved to extend/trim only those tendons not snapped to a slab edge or opening and to trim/extend to the nearest slab edge.
- An improvement was made to suppress the green spline curve when moving a tendon set to straight/linear mode.
- A fix was made to the deletion of pattern loads when the 'Save As' function was used.

#### Design

- An improvement was made to the unity convergence for moment capacity of design sections such that the demand/capacity ratio is always approached from less than 1.00. This was meant to avoid convergence fluctuations caused by a two-sided approach to DCR of 1.00.
- A new feature was added to allow cracked deflection to be checked using the 'Investigate Sections' option rather than reliance on use of the 'Design Sections' option. This allows cracked deflection to be performed without manipulation of analysis/design option tags for load combinations or suppression of calculation of minimum reinforcement for a model.
- A correction was made to the default two-way shear strength reduction factor from 0.85 to 0.75.

#### Reporting/Results

- A new feature was added to check balanced loading relative to the sum of average uplift for tendons intersecting design sections less than a user-defined angle from support line to section. This allows users to check balanced loading with respect to tendons in the same direction as the support line with no contribution from tendons in another direction.
- An improvement was made to display column force and moment diagrams in the proper direction and about the proper axis.
- A refinement was made to the graphical and tabular reported length of reinforcement. When the outcome of bar length rounding is 12" the bar length increments by 1 ft.
- New graphical display options for punching shear design were added to 'Result Display Settings'. (Item 6681) These include:
  - Stress check (NA, Reinforce, Exceeds Code, OK) color coding
  - Stress ratios rr and ss directions or combined
  - Condition (end/edge, interior, or corner) including dashed indication of the critical section shape
  - Graphical reinforcement and rail summary
- New graphical display options for punching shear reinforcement were added to 'Result Display Settings'. The graphical summary notation includes:
  - Total number of rails
  - Rails along the rr direction
  - Rails along the ss direction
  - Total number of studs on each rail @ spacing (in or mm)
  - Total rail length (in or mm)
- A new feature was made to the 'Result Display Settings' to graphically report results for manual design cuts. These include:
  - Z-translation with span/deflection ratio
  - Section actions: Bending, axial, shear, torsion, and contour cut used for action distribution over a contour result from slab results.

- Stresses including top and bottom fiber stress and precompression
- Investigation: Moment Capacity and Demand values with demand/capacity ratios
- Contribution of moment capacity by prestressing
- Design criteria
- A new and improved dockable 'Result Display Settings' (red eyeglasses icon) browser is included with updated functionality, grid layout, expandable and collapsing quick tools, setting retention, and icons for setting recognition.
- Graphical reporting of crack widths was added to 'Result Display Settings' in Slab Actions.
- The punching shear tabular report (Reports->Punching Shear->RTF Reports->Punching Shear Reinforcement) now includes the envelope of all Strength combination output.
- The Tributary Load Check report contains the Cumulative Load Error% comparing applied to cumulative loads. This report was corrected to properly account for the sign.
- An improvement was made to allow the PDF Graphical Report selection to open from Reports->Open Report Compiler->File->Generate Compiled Report->PDF Graphical Report.
- A new XLS report was included from Reports->Punching Shear that reports all critical sections checked for columns. Separate sheets included are:
  - Critical section geometry
  - Stress check
  - As required
  - Stud rails
  - Required vs. Provided
- A new feature was added to include min/max filtering for any slab contour or wall contour result by selecting the result option in the 'Result Display Settings' and right clicking to set the filter range.
- An improvement was made to retain and save title block information from the File menu.
- A Buildersum issue was corrected where .SUI file headers were missing causing crashing in Builder when Buildersum was invoked.

#### Graphics/UI

- An improvement was made to show more than a single digit for gridline tags.
- Warp increase now functions properly for model warping of global translation (show/hide 3D warp) from Visibility->Render Model.
- The program was modified to allow and store keyboard shortcuts. Customization of the ribbon was removed since these functions are hard-coded currently to the program entry state.
- Spelling correction to 'Visicon' was made in the File->Export window.
- An issue was resolved where opening Layer Settings from the Home menu was crashing Builder.
- A correction was made when opening Buildersum from Support Line properties or from the 'Floor Design' ribbon resulted in a series of errors/warnings.
- An issue was corrected related to the option of centering bars over supports from Rebar->Rebar Lengths.
- An improvement was made to retain default tendon colors as set in Visibility->Color Palette when the background color is changed.
- A correction was made to the program crashing when the Undo/Redo functions were selected more times than could be completed.
- Improvements were made to the default colors from Visibility->Color Palette for support line, line support and area support. A rebar entry duplication was removed.
- The graphical scale was improved to include frequency and period for vibration modes.



- The scale for Investigation options from the 'Result Display Settings' sub-tree was corrected to show the proper values.
- A correction was made to the operability of the tendon intersection detector.
- An improvement was made to the Loading ribbon to include new visibility options for loading 'View Settings' and graphical loading reports.
- An improvement was made to the graphical display of beam actions to correlate to the proper direction of bending and not the projected plane. For bending about the local ss beam axis, the diagram is displayed in the XZ plane. For bending about the local zz axis the diagram is displayed in the XY plane.

#### Integration

- An improvement was made to import correct beam data to Builder from INP files generated from the Integration Console.
- A change was made to tendon comments in the .INP file data for effective and calculated force.
- A change was made to the units for Hagg material factor in the .INP file data so that mm is used and converted to US and MKS from base metric.
- Units for tendon auto-swerve straight length in the .INP file data was corrected.
- A correction was made to the tendon system description note in the .INP data.
- A correction was made for imported reactions from Etabs through .INP format that were not displayed correctly when selecting another imported load case.
- A fix was made related to the concrete beam section ID parameter setting for beam exported from Integration Console through .INP file format.
- A spelling error was corrected in the .INP file in the tendon data block.

## Version 2018.0 Enhancements/Corrections

#### Analysis

- New design codes were added to the program: Australian AS3600-2009 and Hong Kong CoP 2013.
- Meshing options have been consolidated and new options are available for applying an advanced meshing algorithm for meshing of walls with or without openings. The simplified meshing option is similar to previous versions and will disregard wall openings by default.
- For slabs-on-grade, mat slabs and slabs-on-piles with steel fiber, the selection for nonlinear behavior can be used for consideration of post-elastic capacity for flexural behavior.
- For slab-on-grade designs with steel fiber, the program calculates joint spacing requirements and load transfer factors across joints for edge and corner zones of a slab panel.
- An issue was corrected where the program was creating a redundant entry in the input file to frame.exe for building loads created by use of the Lateral Load Wizard.
- A load combination indexing issue was fixed where incorrect stress diagrams appeared when CRACKED DEFLECTION combinations were run with combinations of other analysis/design option types necessary for checking concrete stresses.

#### Modeling

- Walls can now be modeled with openings in a simple-to-use input window embedded in the wall properties. The user enters the opening start coordinates and the length and width of the wall opening. Multiple wall openings can be added to walls.
- Steel fibers can now be modeled as part of a defined concrete material property. Multiple fiber types are available with dosage ranges for selection. Steel fibers can be applied to slabs-on-grade, mat

slabs, slabs-on-piles and elevated slabs and are considered for calculation of minimum reinforcement, one- and two-way shear and flexure.

- Improvements were made to slab modeling by coordinate commands CANCEL and UNDO.
- Models created prior to v2018 that include default beam rebar that are opened in v2018 will have the beam rebar removed. This function for beam rebar is no longer included in the program. User should create beam rebar using REBAR>Base>Banded.

#### Design

- For slenderness check of walls in the Wall Designer, a modification was made to properly convert the external units of the variable "Lu/16." The converted units will be [in],[mm],[cm] the same as wall thickness units. Previously the wall height was always taken in [in].
- The max. spacing for one-way shear reinforcement was modified from 300mm to 600mm per EC2.
- For EC2, the program now includes a check to ensure reinforcement is provided to meet  $1.15 \cdot M_{cr}$  for unbonded, PT beams. This complies with requirements in Section 9.2.1.1- 4 of the EC2 code.
- The program is now in sync and includes all codes as permitted by S-Concrete for column design. The codes are set from COLUMN DESIGN>Settings>Design Settings.

#### Reporting/Results

- A correction was made where reporting of graphical wall or column reactions were always opening the column reactions dialog.
- Wall zone bar length and bar fit status are reported as OK or NG in the wall design section summary report for improved correlation with the design summary at the top of the report.
- The slenderness check status is no longer highlighted within the slenderness block of the wall design summary report.
- The bar spacing check was removed from the zone confinement block in the wall design summary report.

#### Graphics/UI

- The program user interface has been completely overhauled with an updated program user interface (UI) for improving the user experience and offering an easy-to-use, efficient and intuitive program environment. The UI is now ribbon based containing contextualized ribbons including general categories like visibility, modeling, analysis, design and reporting. Each ribbon contains ribbon-specific tool panels with updated, refreshed icons. New summarized and extended tool tips have been included for each tool and tool panel.
- The program has a new simplified and condensed splash screen with an expandable selection window. The splash screen shows the current program state.
- The program now auto-filters the available tools that apply to the splash screen selections made by the user prior to entering the UI. Only ribbons, panels and tools applicable to the state will be shown to streamline usage. Ribbons, panels and tools not applicable to the current modeling, meshing, analysis, design or level state will be grayed out and inactive.
- Walls can now be modeled with openings in a simple-to-use input window embedded in the wall properties. The user enters the opening start coordinates and the length and width of the wall opening. Multiple wall openings can be added to walls.
- The option for "Save as Default" was removed from the FILE menu.
- The load combination names are now checked for compatibility with allowed characters including:
  - numbers
  - letters
  - brackets []

- parentheses ()
- spaces
- underscore \_

All other characters are not allowed.

- An issue was fixed where the loading font and symbol size entries were resetting to zero in the select/set view items (blue eyeglasses) window.
- In the Tendon Display Options when the total force is selected to be displayed for decimal the program uses actual decimal number rather than the strand integer.
- The drop-down list of load combinations in 'Render Model' (teapot tool) is now available only for when deflection tools in the Solid Modeling UI are active.
- An improvement was made to return the state of a model back to the HOME ribbon and screen after importing a file from FILE>INP.
- If a combination that includes Hyperstatic is selected for a deflection display (warped or deformed shape view) in the 'Render Model' tool, the following message will be shown: "This combination includes the Hyperstatic load case. When solved analytically, due to self-balanced loads and to reduce rigid body motion, special support conditions are used. The displacements for combinations including the Hyperstatic load case will appear as a cantilevered system and should not be used in evaluating displacements. If the effects of post-tensioning are to be considered for displacements, review combinations that are set to the "Service" analysis type and ensure that the PT load case is used. This considers both primary and secondary effects of PT."
- An improvement was made to the punching shear status incorrectly showing "Reinforce" rather than "Exceeds Code."
- An improvement was made to allow the user to navigate and set the S-Concrete executable path for updated versions of that program necessary for column design integration with Builder. The new option is located in the COLUMN DESIGN ribbon.
- An improvement was made to display the graphical representation of supports after creation of supports from the MODEL>Supports panel.
- An improvement was made to add tools on the COLUMN DESIGN and WALL DESIGN ribbons that isolates all columns or walls in Single- or Multi-level view.

#### Integration

- New ADAPT-Revit 2019 and updated ADAPT-Revit 2018 Integration Links were created for compatibility between ADAPT-Builder 2019 and Revit 2018. Features included are:
  - Import geometry to ADAPT
  - Import applied loads to ADAPT
  - Import load combinations to ADAPT
  - Export geometry and gravity load to Revit
  - Export reinforcement and post-tensioning to Revit
- An issue was corrected where reinforcement written to .INP file at a single level was being imported back to all levels of a multi-story model and vice versa.
- A correction was made to properly import column and wall reactions from a .INP file to version 2018.
- A correction was made to the tendon area written to the .INP file that was incorrect.
- An issue was fixed for the Etabs Integration Console where import of a single level was not writing the correct level data to the .INP file.

## Version 2017.3 Enhancements/Corrections

### Modeling

- A new feature was added for the modeling of Bekaert Dramix steel fiber material. The program includes the option for modeling concrete material with the presence of steel fiber. Fiber type and dosage can be assigned to a system type of Elevated, Mat, Slab-on pile, and slab-on-grade. Modifications to one-way shear, two-way shear, and flexural capacity now consider the presence of fiber when modeled. The program includes an option for designing a slab-on-grade, slab-on-pile or mat slab with non-linear effects when fiber material is assigned to the system.

### Design

- A new feature was added for the calculation of a joint load transfer factor for point, line, and patch loads modeled on a slab-on-grade design when the slab is set to a fiber material property.

## Version 2017.2 Enhancements/Corrections

### Analysis

- A correction was made to the load type "Seismic - Applied Loads" was incorrectly being flagged as "Special Lateral."
- Improvements were made to the discretization of patch loads such that they are being fully resolved in equilibrium with reactions. This occurs where point or line loads are discretized over course arrangement of shell elements.

### Modeling

- An issue was corrected where Builder crashed when a new tendon was added that had the option for straight span-spline override selected in the tendon properties menu was retained upon re-opening the model.

### Design

- An issue was corrected where Designer.exe and Punshear.exe crash when an imported .INP file contains the duplicate concrete material name CONCRETE 1.

### Reporting/Results

- An improvement was made that now includes the tributary loads in the Column Design XLS report when this option is used for column design.

### Integration

- A correction was made where variable area loads were not imported correctly from the .INP format.
- An issue was corrected for improper units of area load moments imported from the .INP format.
- A correction was made to the assignment of the generic material property to imported components from the .INP format.
- An improvement was made to stabilize Builder when exporting a slab located outside of the slab region using the .INP format.
- An issue was corrected for applied lateral story forces being properly written to the Lateral Loading generic tabular input dialogue when importing from .INP format.
- An issue was corrected that allows for inclined columns with non-zero X and Y offsets to be imported from the .INP format.
- The .INP import format was improved to merge slabs based on both similar thickness and material assignment for imported slab regions.
- Column labeling when exporting from .INP was modified to match the unique Builder ID sequentially.

- Component reactions, releases and stiffness modifiers written to the .INP format were modified to be mapped using GUID's.
- An issue was corrected where load case reactions were being duplicated in the .INP file for each analysis run made prior to exporting the data.
- The load type "Standard" was included in the Import Options dialogue when importing general load cases using the .INP format.
- A correction was made for import of load combinations from the .INP format where all combinations were only available to import and not a partially selected group.

## Version 2017.1 Enhancements/Corrections

### Design

- An issue was corrected where the sign for axial loads generated from the tributary load takedown tool to be taken as the opposite in the .SCO file for column design.
- An improvement was made to the minimum reinforcement requirements for sections cutting over walls was greater than that required by code.
- A column design parameter name for optimization constraint 'B' dimension was not mapped properly to the .SCO file.
- Tendon Optimizer was stabilized so that the current stress was not updating causing the Optimizer to loop in solving for the estimated force.
- An improvement was made in ADAPT-MAT that allows the user to calculate required minimum reinforcement in addition to reinforcement for Strength.

### Reporting/Results

- An issue was corrected where the number of strands were not being displayed when generating chair heights.

### Graphics/UI

- Selecting multiple entities using CTRL + click or window was improved so that the currently selected components were not de-selected when CTRL was used.
- An issue related to crashing when a concrete material assignment was renamed was fixed.
- An issue related to import of generic sections was fixed.

### Integration

- An improvement was made in Builder that was related to the option for importing applied loads from the .INP Import Options to be blank.
- An issue was corrected where only one opening was imported for files containing multiple openings when imported using INP format.
- An issue was fixed where components were not imported with a unique ID.
- An issue was fixed related to unassigned tendon material properties when importing tendons using INP format.
- An issue related to import of variable area loads was fixed.

## Version 2017.0 Enhancements/Corrections

### Analysis

- An issue was corrected where Builder was crashing when analyzing models containing lateral loads assigned using the Lateral Load Wizard or imported, due to incorrect indexing of nodes in the INP file.

- An improvement was made to properly incorporate global gravity reactions when selected in single-level mode when in ADAPT-MAT.
- An improvement was made to properly include load takedown forces initiated from Loading>Tributary Loads, in a single-level punching shear check, when re-analyzing a single-level with inclusion of tributary reactions using the Load Takedown option.
- ADAPT-MAT and SOG were modified to allow for "Compression only" soil supports.

#### Modeling

- Improvements were made to more accurately and rapidly model tendons and make modifications to tendons. These include:
  - Tendon modeling as splines with accurate in-plane curvature versus linear segment representation.
  - Improved accuracy in tendon losses and elongation calculations when "Calculated Tendon Force" option is used.
  - In-plane tendon swerving using swerve points. Three swerve points can be modeled in any tendon span. Automatic swerve points are added to tendon ends as a default.
  - Adding and deleted tendon spans with easy insertion of control points by right-click options or new insertion point tools.
  - Tendon anchorage – Fixed or free tendon anchorage options allowing for tendons to lock to slab edges.
  - Centralized and easy-to-access Tendon Display Manager from the Tendon Toolbar.
  - Tendon display option toggle for strand round-up or decimal input.
  - Tendon force display for effective, average, max or min force.
  - Tendon display options for control points, swerve points, and inflection points.
  - Improved layer control for export of tendon information to DWG and DWF formats.
- With tendons modeled using the new curved, spline representation, the program color codes tendons for different zones of curvature relating to the requirement of "hairpins" or bursting reinforcement.
- An issue was corrected where if a column or wall stack didn't have a slab above the component, the cumulative load for tributary load takedown was zero and the self weight of these components at the level where the slab is missing was not considered for reported loads in the levels below.
- The "Mapped Banded Tendons" tool was improved to allow the user to define the shape of the first and last span, in addition to the middle span.
- An issue related to the CGS reference plane when using the "Extended Reversed Parabola" profile was corrected.
- An instability that caused the number of design sections to be reset to '1' was corrected.
- An instability in the program when transforming polygons into walls was corrected.
- An issue causing the program to crash when a support line vertex is deleted was fixed.
- An issue related to the incorrect stiffness of line spring when defined in MKS units was corrected.
- A modification was made to create design sections 2", by default, from faces of columns, beams or drop caps.
- A modification was made related to the creation of incorrect geometry when using the "Beam/Frame Wizard" was corrected.
- The "Line Load Wizard" was improved to prompt the user to select graphical entities for line load placement.

#### Performance

- A multi-core algorithm was implemented for analysis preprocessing.

- The processing speed for “Generate Design Sections Automatically” has been improved.
- The 3D Viewer was made faster to display models with numerous tendons.
- The option to abort the “Import DWG/DXF” operation through use of the “Esc” button has been implemented.

## Design

- The Canadian Standard, CSA A23.3-2014, was implemented.
- The program now includes an integrated tendon design optimizer that allows the user to optimize selected groups of tendons for serviceability requirements –precompression, allowable tension and compression stress and balanced loading. Solutions provided by the optimizer allow for on-demand updating of the structural model by adding tendons or modifying the selected tendons to be optimized. The optimizer includes dialogue windows for user interaction and on-demand feedback. An edit mode allows users to override program-optimized forces and number of strands for custom checks of selected slab regions. The program includes on-screen and exportable text output for calculations for a given optimization instance.
- A new feature includes the ability to design concrete shear walls, with or without boundary elements for seismic lateral resisting systems. The program includes a native ADAPT Wall Designer and integration with S-Concrete’s wall design program. Walls are grouped into piers for the purpose of generating wall design sections. A Wall Manager stores section information such as geometry, reinforcement, material, etc. Single or multiple design sections can be processed for design or code check. The program produces both graphical and tabular output for wall code checks, interaction diagrams, utilization checks and wall intersection zones where reinforcement congestion is of concern.
- An option to exclude minimum spacing requirement for RC structures has been added.
- An issue related to the calculation of design section actions for pattern loading envelopes was corrected.
- An issue related to the incorrect units being reported for “Jacking Force” in the “Tendon Elongation Report” was corrected.
- An issue related to the generation of input data for the “Friction and Elongation” module was corrected.
- A modification was made to the stress data of the “Prestressing” block of the DSI file so that when a design section cuts through a tendon, the prestress is reported.
- The calculation of one-way shear reinforcement was corrected for the BS code.

## Reporting/Results

- A new option for display of analytical, discretized tendon segments is now made available in the Tendon Display Manager. After meshing and analyzing the model, the user can use this option to view tendon segments.
- Colorization has been added as a new Result Display Settings category for graphical results. This allows the user to easily determine identical wall design properties and characteristics in complex models. Colorization can be applied to wall thickness, material, pier labels and reinforcement in zones and panels.
- Walls can now be grouped into piers for determination of combined wall pier reactions. Reactions and pier geometry can be reported graphically and in tabular format.
- An improvement was made for graphical reporting of load takedown forces. The program now displays the cumulative loads in the form of axial force diagrams when using Load Case results from Result Display Settings (red eyeglasses).

- A problem was fixed where the axial force diagram for beams contained the wrong sign. The fix includes proper sign of (-) for compression and (+) for tension.
- Point and Line Spring Reactions reports have been added to Tabular Reports.
- An issue related to the incorrect stress calculation for design sections that cut walls was fixed.
- An issue related to the incorrect initial stress calculation for the 1994 and 2004 Canadian Codes was corrected.
- An issue related to the incorrect reported rebar length when the option, "Adjust length and center top bars over supports," is used, was corrected.
- A problem that caused a discrepancy in rebar results between Buildersum and the graphical beam elevation was fixed.
- An issue related to the incorrect quantity of beam corner bars shown in the support line elevation view was fixed.
- An issue related to the tabular report not displaying enveloped shear reinforcing and spacing was fixed.
- The reporting of a deflection ratio was corrected for manual design sections.

#### Graphics/UI

- A fix was implemented that saves user-defined live load reduction input from Loading>Live Load Reduction so that it does not need to be re-entered each time the model is opened.
- The item display features of ADAPT-Builder have been improved, including "Select/Set View Items", "Layer Settings" and individual component display tools.
- The "Generic ADAPT File" import feature located in the "File" pull-down menu, has been improved.
- The design section length has been included in the "Manual Design Section" dialogue window.
- The "Load Combination" window was improved to not allow a user to save any cracked load combination including the "hyperstatic" load case.
- The default load factors for the "Initial Load" combination were changed to include  $1.0*SW+1.15*Prestressing$ .
- A problem was corrected causing the deletion of the pattern loading envelope when a user selects to delete a load case not assigned to any load.
- An issue causing the program to crash due to the name of a load combination was fixed.

#### Integration

- A new ADAPT-Revit Link 2018 was introduced and is compatible with this version of Builder.
- The generic exchange file format (.INP) now has the ability to pass tendon data for incorporation in a Builder (.ADM) file.
- An issue was fixed where the program did not properly write applied gravity load case data correctly to the INP file in the "Include Lateral" option is selected in single-level mode and selected load combinations did not contain lateral load cases.
- A correction was made related to the incorrect load factor for SDL exported to ADAPTRC from Builder was fixed.
- A correction was made related to the export of Builder models using the ACI 2008 code to ADAPT-PT was corrected.

\*Release notes for versions prior to v2017 can be found in the program files at C:\Program Files (x86)\ADAPT\ADAPT-Builder 2020\log\_builder.text