Tekla Structures 2020

Upgrade to this version

March 2020

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1 Tekla Structures 2020 release notes

Welcome to Tekla Structures 2020!

Check the information below on the many new features and improvements in this version:

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Compatibility

We suggest that you complete any unfinished models using your current version of Tekla Structures.

This version is not backwards compatible. When you create or save a model in Tekla Structures 2020, you cannot open it in older versions due to database differences.

Tekla Structures 2020 can only be installed on 64-bit Windows operating systems.

See the Tekla Structures 2020 hardware recommendations (page 119) for more information.

Tekla Structures 2020 requires **Tekla License Server 2017** or later. To check which license server version to use with your current Tekla Structures version, see Tekla license server 2020 hardware recommendations (page 123).

Administrator's release notes

Advanced users should read the Tekla Structures administrator's release notes (page 89) for information on how to apply the additional customizations available in this release.

Localization release notes

Environment-specific changes are explained in the Localization release notes (page 118).

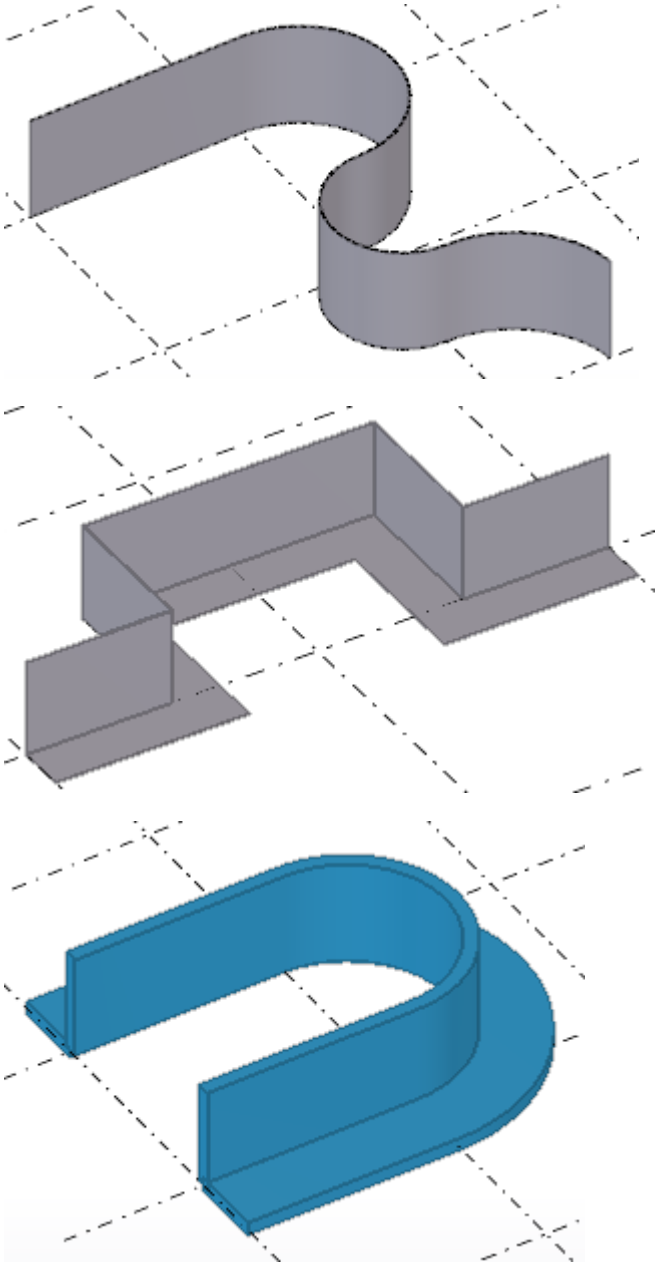
Tekla Open API release notes

The Tekla Open API release notes can be found in the Tekla Developer Center.

1.1 Easy creation of curved shapes: improvements in lofted plates and lofted slabs

In Tekla Structures 2020, the creation of lofted plates and lofted slabs has been further enhanced. You can now model even more complex curved shapes by using polycurve construction objects. Previously, in Tekla Structures 2019i, you could only use construction lines, arcs, or circles to create the lofted parts. Additionally, you can now unfold lofted plates in single-part drawings.

Examples of polycurve lofted parts:



Create a lofted plate or a lofted slab by using construction polycurves

1. Create the needed construction polycurves that pass through the points you pick and that can have straight and curved segments. The shape of the lofted part is based on the construction polycurve shape.

   To create lofted parts with tangential shape, use the **Create arc by tangent** or **Create tangent line** options  on the construction polycurve toolbar.

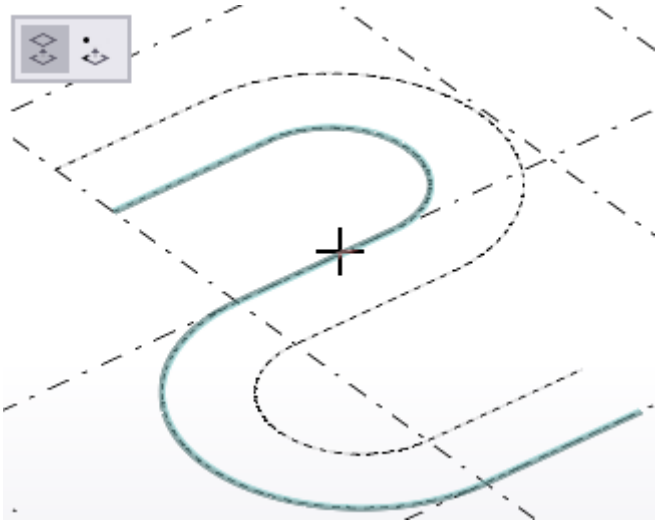
   To create lofted parts only with straight segments, use the **Create line** option  .

2. Start creating a lofted plate or lofted slab using the polycurve construction objects:
   - To create a lofted plate, click **Steel** --> **Plate** --> **Create lofted plate**.
   - To create a lofted slab, click **Concrete** --> **Slab** --> **Create lofted slab**.

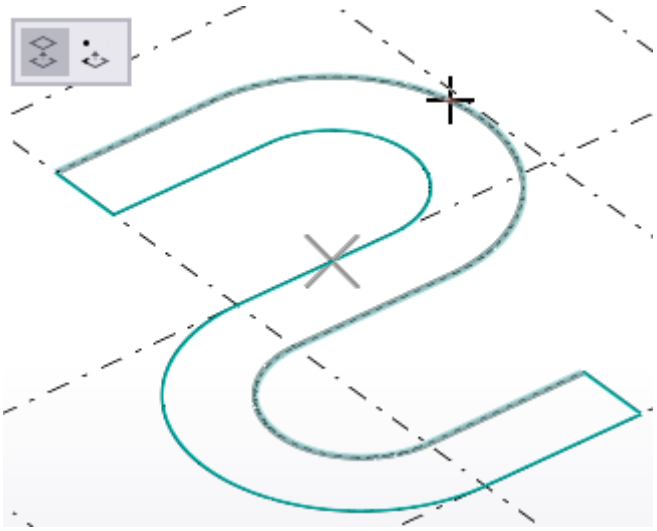
3. On the toolbar that appears, click a button to specify whether to create the part by using two construction polycurves, or by using a construction polycurve and a point.

   - Use two construction polycurves  to create the lofted part:

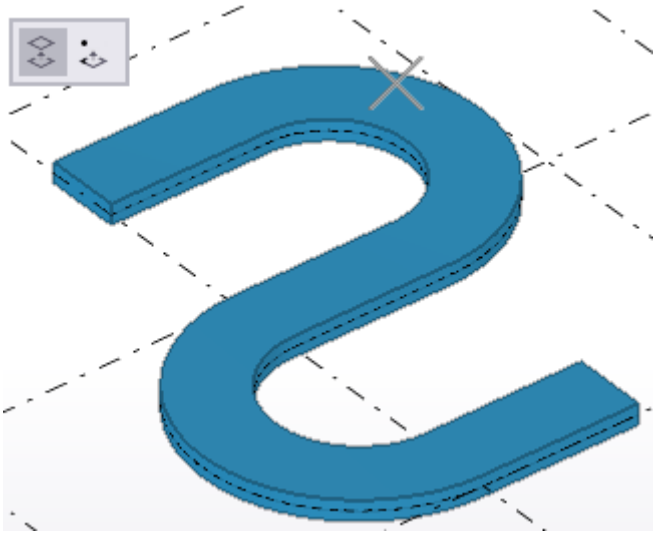
a. Select the first construction polycurve.



b. Select the second construction polycurve.



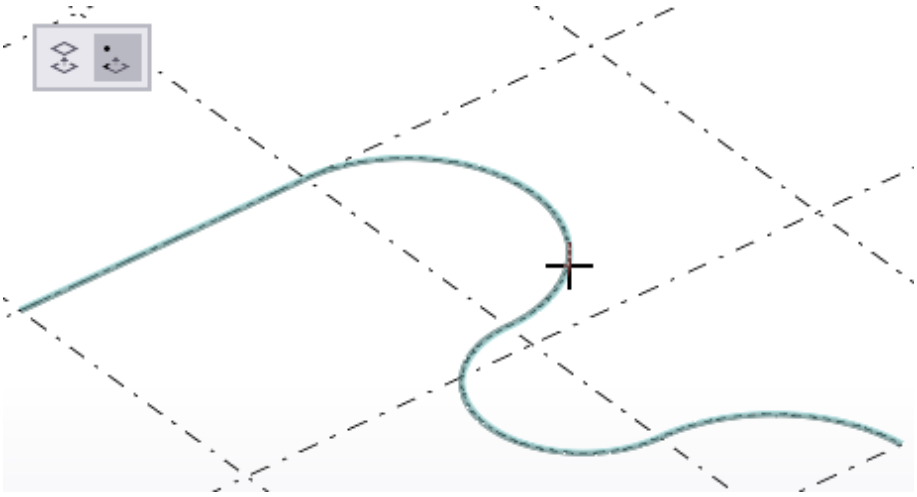
c. Tekla Structures creates the lofted part between the selected construction polycurves.



Note that the construction polycurves do not need to have the same number of segments, as long as both of them are tangential.

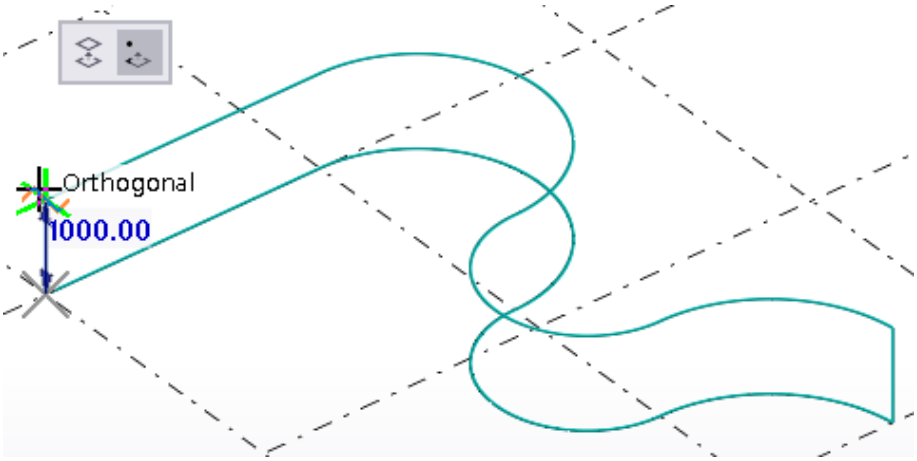
- Use one construction polycurve and a point  to create the lofted part:

  a. Select the construction polycurve.

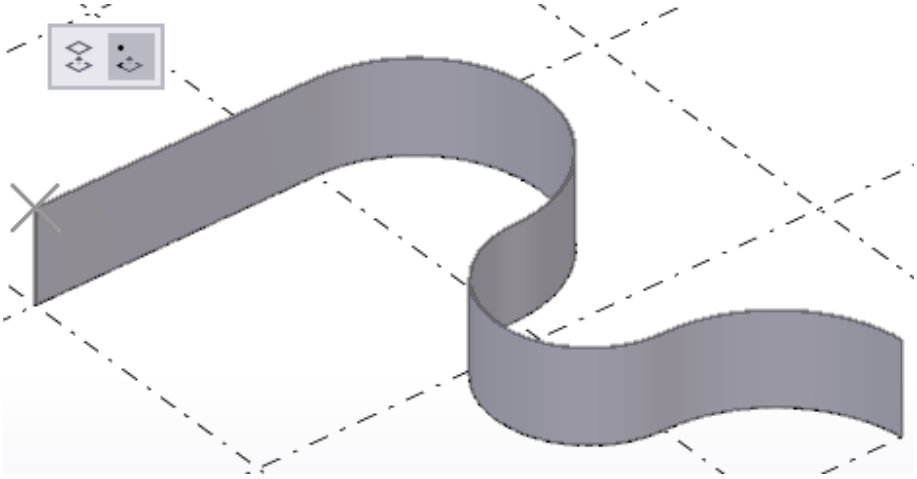


Tekla Structures shows a preview of the part geometry. Use the preview to set the direction and the height of the lofted part.

b. Pick a point.



Tekla Structures creates the lofted part based on the preview.



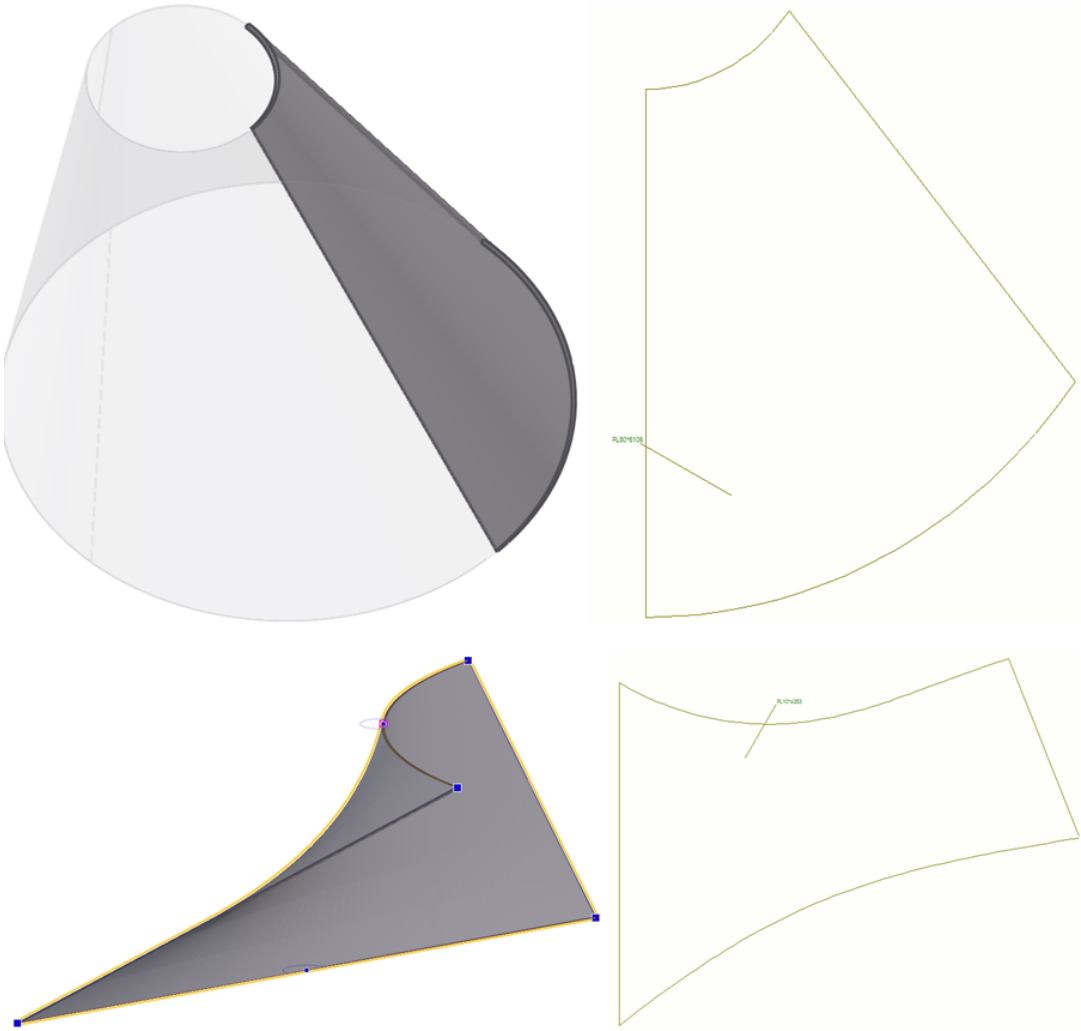
4. If you want to modify the shape of the lofted part, use the direct modification dimension handles and dimension values.

Unfold lofted plates

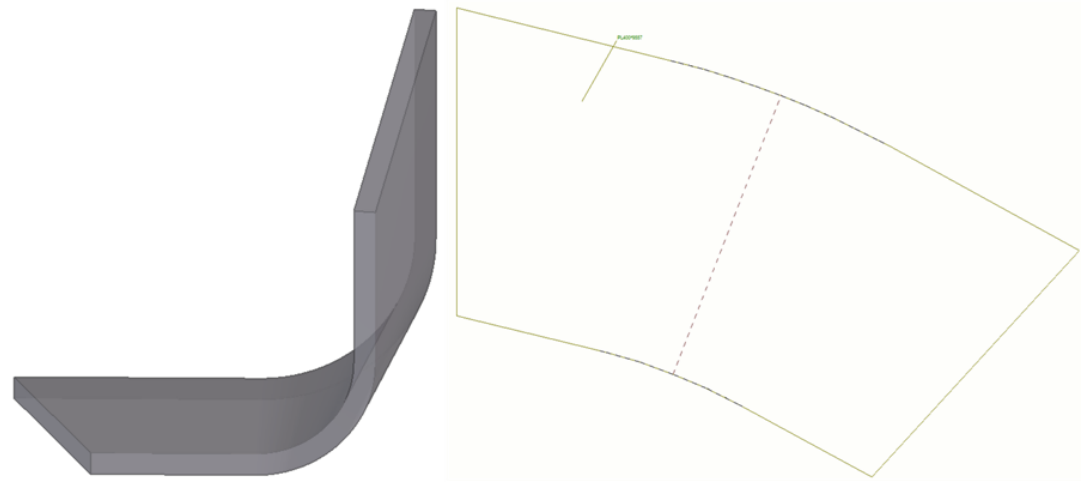
You can now unfold lofted plates in single-part drawings.

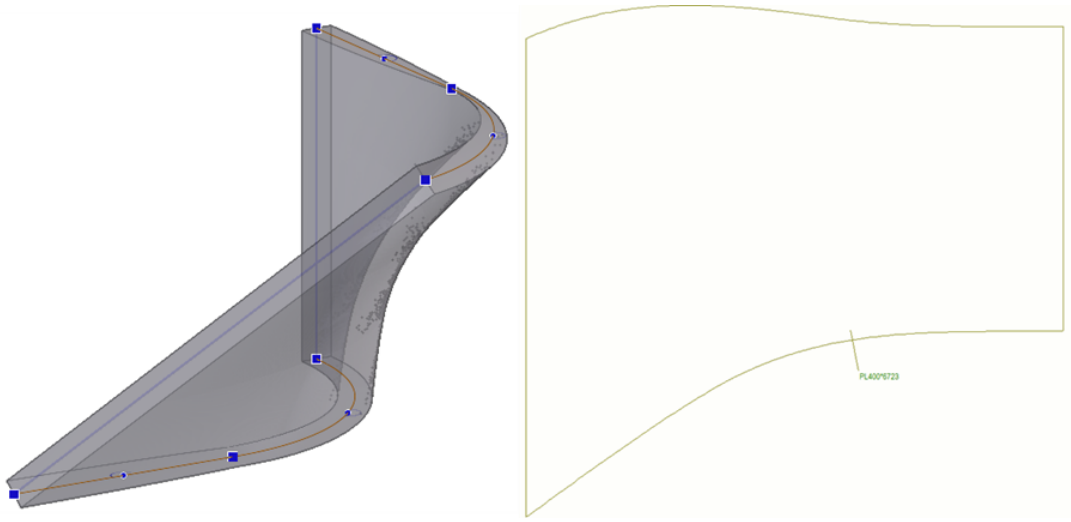
The unfolding works for lofted plates which have been created from single geometry to single geometry, and for tangential polycurve lofted plates.

Examples of unfolded lofted plates created from single geometry to single geometry:



Examples of tangential polycurve unfolded lofted plates:





1.2 Improvements in geometry editing and items

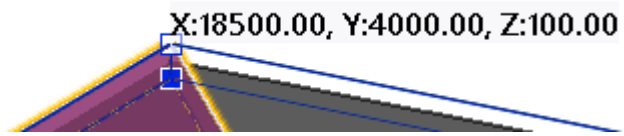
Tekla Structures 2020 introduces new ways to start geometry editing, to add and show item vertexes, and to create items and shapes using existing parts in the model.

When **Direct modification** is active, just select an item that has a solid shape, and the **Geometry editing** tab appears at the right end of the ribbon. Previously, you needed to use **Quick Launch**.

The **Geometry editing** tab has two new buttons:

- Click the  **Handles** button to display handles for the selected item. You can then start modifying the item geometry by moving faces, edges, and vertexes.
- Click the  **Point** button to add new vertexes to the selected item.

If you select a vertex, Tekla Structures now shows the absolute, work plane coordinates of the vertex in the model views using the **Units and decimals** settings. For example:



The **Cancel** button that was previously available on the **Geometry editing** tab has been removed. The **Enter geometry editing mode** command has also been removed from **Quick Launch**.

Convert parts to items

You can now change existing parts in the model to items. When you do this, Tekla Structures also automatically creates a new shape for each item and adds the shapes to the shape catalog.

When you change a part to an item, Tekla Structures deletes the original part and replaces it with the newly created item in the model. The name, material, finish, class, pour phase, and the numbering properties of the original part are saved as the corresponding item properties. Other part type specific properties and user-defined attributes are not saved. The objects that are attached to the original part, such as reinforcement and surfaces, are deleted.

Curved beams, spiral beams, bent plates, lofted plates, and lofted slabs cannot be changed to items.

To convert a part to an item:

1. Create the parts that you want to change to an item.
2. If you want to include more than one part in the item, attach the parts to each other.
3. Select the part.
4. Right-click and select **Convert part to item**.

   Alternatively, you can go to **Quick Launch**, search for and select the **Convert part to item** command, and then select the part.

Tekla Structures changes the part to an item and adds a new shape to the shape catalog. The shape name is generated using the part name and part location in the format <grid location>_<elevation>_<part name>. For example:

- 1/D_+0_FOOTING
- 3/C_+0-+3600_COLUMN
- 1-2/A-B_+3600_SLAB

If there is already a shape with the same name in the shape catalog, Tekla Structures adds two underscore characters and a running number at the end of the new shape name. For example, 1/D_+0_FOOTING__1.

1.3 Changes in numeric snapping and other modeling improvements

In Tekla Structures 2020, many modeling features have been improved, such as numeric snapping with direct modification, and solid error reporting. There are also changes in the Automatic User Feedback program.

Improvements in numeric snapping

Starting from Tekla Structures 2020, you can enter coordinate axis prefixes `x`, `y`, and `z` in the **Enter a Numeric Location** dialog box when you position or modify an object by using direct modification. Numeric snapping and axis prefixes are very useful when you modify the geometry of items, for example.

By using the axis prefixes, you can specify the directions that are available for snapping. The axis prefixes can be used with relative and absolute (work plane) coordinates, but not with global coordinates. For example:

- `@z500` only allows snapping in the z direction and relative to the current location. The x and y coordinates stay the same.
- `$y6000,z-500` only allows snapping in the y and z directions of the work plane, starting from the origin of the work plane. The x coordinate stays the same.
- `Z500,X100` only allows snapping in the x and z directions in the default snapping mode. The y coordinate stays the same.

The axis prefixes are not case-sensitive, and the prefixed values can be entered in any order.

If any of the entered coordinate values has an axis prefix, the other values need to have prefixes, too.

Diagnose and list solid errors

The solid errors found in the currently open model are now shown in the report that opens when you use the **Diagnose & repair** --> **Diagnose model** command on the **File** menu.

Using this report makes it easier to focus on the solid errors in the currently open model only and to check that the errors get fixed. The report is updated every time you rerun the **Diagnose model** command, so the fixed errors are not listed anymore. The report also lists the solid errors that are not visible in any model view.

As previously, solid errors are also listed in the session history log (`TeklaStructures_<user>.log`), but the session history log shows solid errors of all models that you open until you restart Tekla Structures.

The solid errors that occur in drawings are only listed in the session history log.

Changes in construction circles

You can again create construction circles on the view plane by picking two points: the center point and a point to define the radius of the circle. This is

the default option on the contextual toolbar that appears when you start the **Edit** --> **Construction object** --> **Circle** command:

More options for the date and time in Task manager

In **Task manager**, you can now select from 13 predefined options how the date and time are displayed in a task.

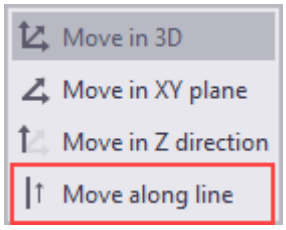
To set the date and time format, click  > **Date and time format**, and select the format that you want to use.

Adjustments in toolbar size and toolbar icon size

You can now adjust the toolbar size and at the same time the icon size on the toolbars by using option buttons in the **File menu** --> **Settings** --> **Toolbars**.

Previously, the size of the toolbar was adjusted by using a slider.

New handle dragging option on the contextual toolbar



You can now drag the end point handles of beams and polybeams along the reference line.

Previously, only moving in 3D, in XY plane, and in Z direction were possible.

Small improvements in the side pane window docking

Now the side pane windows stay docked or floated when you restart Tekla Structures.

In addition, clicking the header area of a side pane window does not immediately float the window anymore. To detach the side pane window, you need to slightly drag it.

Small improvements in the customization of the contextual toolbars

- The **Customize toolbars** dialog box's minimum width is now wider to make the **Preview** view of the toolbar more accurate.
- In the **Customize toolbars** dialog box, the list of contextual toolbars that can be customized now shows only the toolbars that are available in the current mode, meaning in the modeling mode or in the drawing mode.
- On the contextual toolbar, the tooltip for now reads **Minimize or maximize**.

Changes in Automatic User Feedback program

The **Automatic User Feedback** program is now called **Usage statistics** in **File** --> **Settings**.

Collecting the usage data is now on by default. Previously, the data collection was not on by default, and you had to separately accept the collecting of data. The collected data is anonymous information on how you use Tekla Structures and it is used to improve the software.

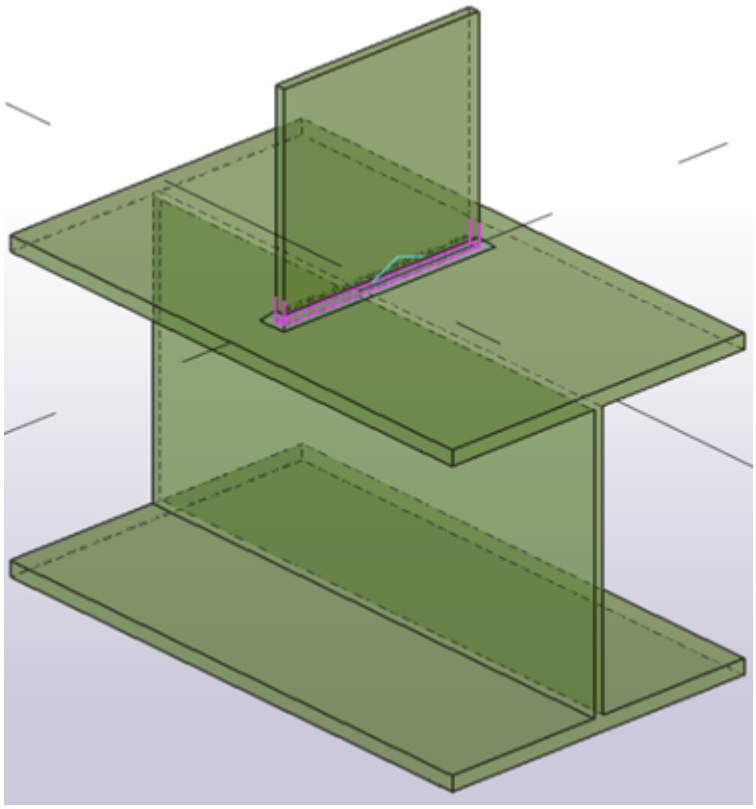
1.4 Small changes in the appearance of model and model objects

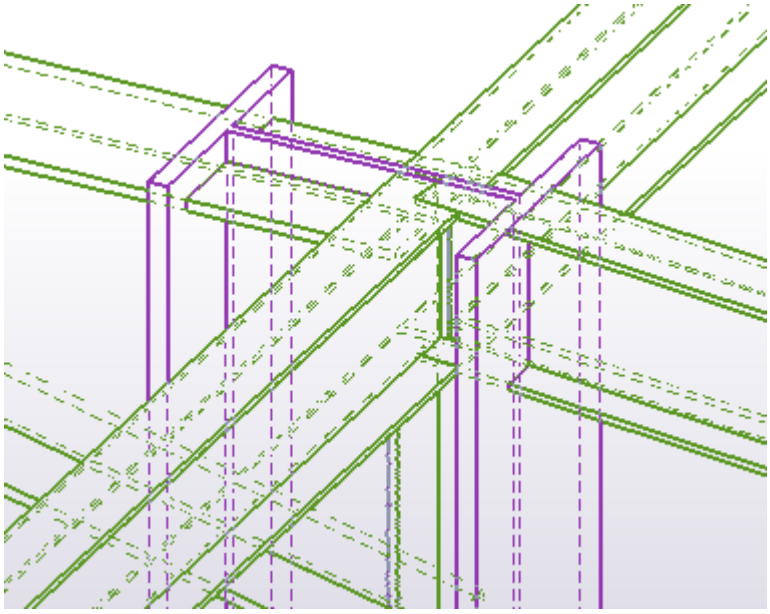
In Tekla Structures 2020 the DirectX rendered model views have been improved.

Part edge lines are shown as dashed lines in transparent model views

In DirectX rendered model views, the part edge lines that are hidden behind another part are now shown as dashed lines in all transparent views whose rendering option is one of the following:

- **Parts wireframe** / **Components wireframe** (**Ctrl/Shift+1**)
- **Parts shaded wireframe** / **Components shaded wireframe** (**Ctrl/Shift +2**)
- **Parts grayscale** / **Components grayscale** (**Ctrl/Shift+3**)
- **Show only selected part** / **Show only selected component** (**Ctrl/Shift+5**)





With the dashed hidden edge lines, you can clearly see, for example, if the part flange is facing towards or away from the web, or, in more complex 3D views, which part is on top of which.

Using the dashed lines also increases Tekla Structures performance in the transparent views.

If you do not want to show the part hidden lines in DirectX rendered views, set the advanced option XS_USE_DASHED_HIDDEN_LINES to `FALSE`. Restart Tekla Structures to activate the new value. Tekla Structures then uses the previous depth peeling method in transparent views.

If you set the advanced option to `FALSE`, the performance benefit is lost.

Model objects have thicker edge lines

In DirectX rendered model views, all model objects, except reinforcing bars, have thicker edge lines than previously. The edge lines for reinforcing bars remain the same as they have previously been.

This change improves the previously experienced blurriness of edge lines.

Changed default value for XS_USE_ANTI_ALIASING_IN_DX

Anti-aliasing is now on by default in DirectX rendered views. The advanced option **XS_USE_ANTI_ALIASING_IN_DX** is set to `TRUE` by default. Previously, the default value was `FALSE`.

Minor changes in the appearance of snap symbols

The snap symbols are now slightly thicker than previously. This change makes the snap symbols easier to see while modeling.

1.5 Bar layering and other improvements in rebar sets

Tekla Structures 2020 comes with many new features and improvements related to rebar sets. For example, rebar set creation commands and bar layering have been improved.

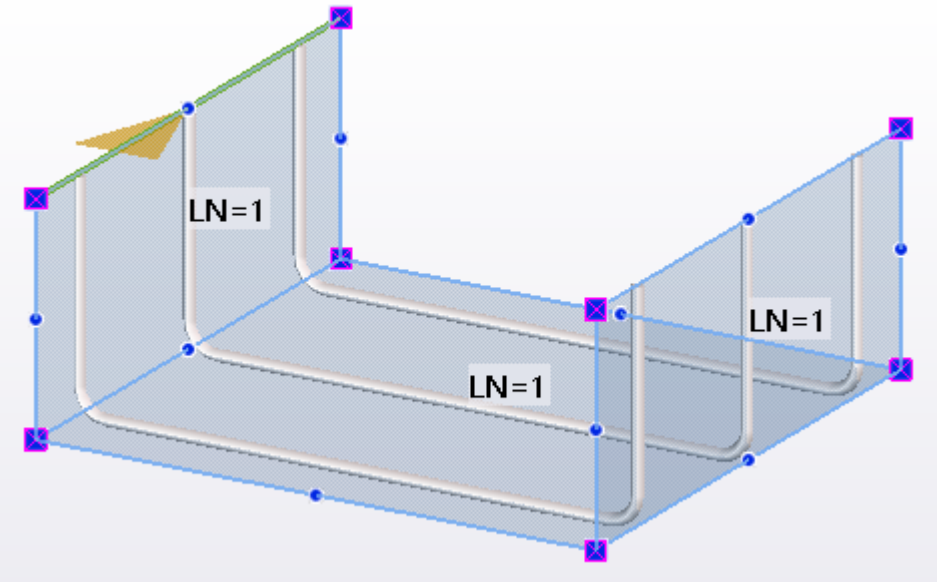
Changes in commands that create rebar sets

- Tekla Structures 2020 introduces a new command for creating rebar sets, **Create rebars by guidelines**. This command is useful when you want to create rebar set bars at multiple faces of a concrete part or pour object and want to add several guidelines at the same time. First select one or more faces, and then pick points to define one or more guideline locations.
- The command **Rebar set** --> **Create planar rebars** on the **Concrete** tab is now **Create rebars by face**.

  When you reinforce entire object faces using this command and the option, the orientation of the bars is now determined by the object face edge that is closest to the mouse pointer. The option creates the bars parallel to the edge, and the option perpendicular to the edge.

Improvements in defining and adjusting bar layers

In model views, the rebar set bar layer numbers are now shown on each leg face when you set the leg faces visible and select rebar set bars.



You can use the following new options to adjust the order of the rebar set bar layers. These options are available on the contextual toolbar for the selected rebar set or leg face.

- Click to move the bars to the outermost layer.
- Click to move the bars one layer outwards.
- Click to move the bars one layer inwards.

- Click  to move the bars to the innermost layer.

In the **Rebar set** properties and **Rebar set leg face** properties, **Layer order number** has been changed to **Layer number** and the arrow buttons have been removed.

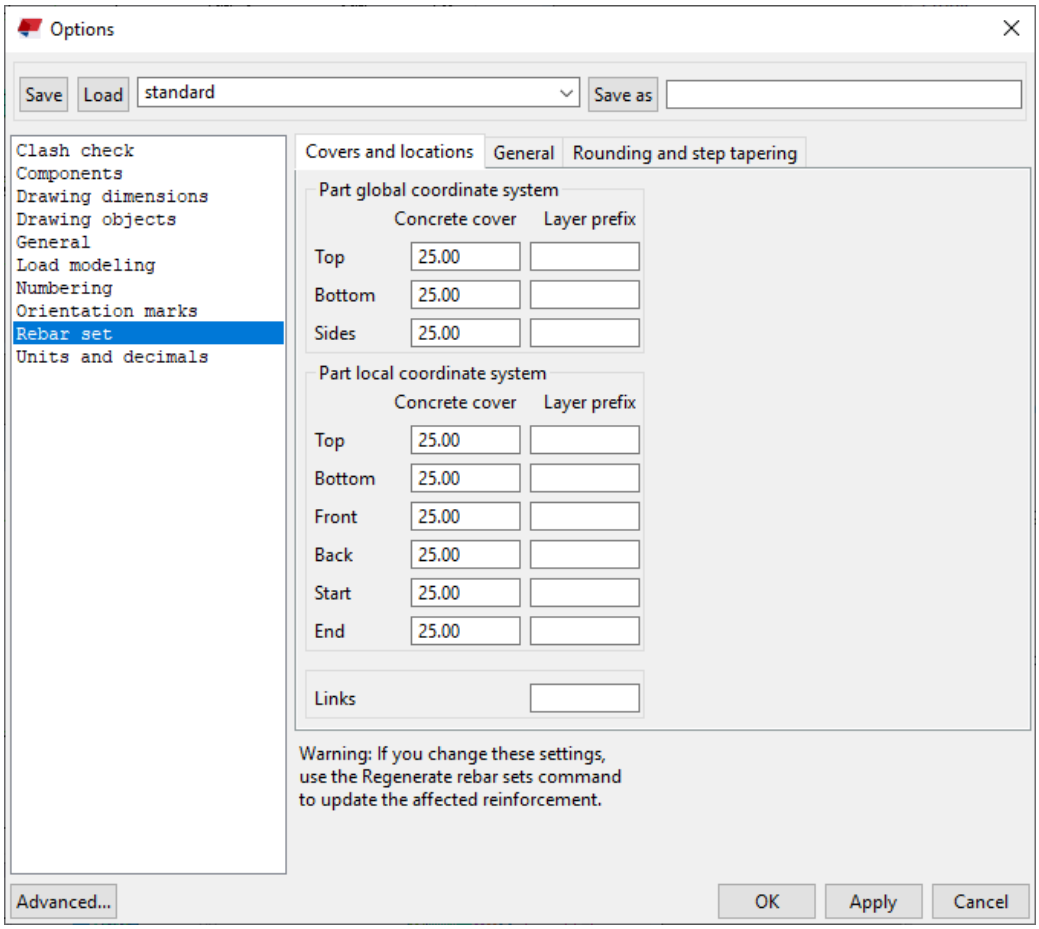
When you create a rebar set, its **Layer number** is set to **Auto**. **Layer number** also reverts to showing **Auto** after you have modified a rebar set by entering a new layer number.

Reporting bar layer information

There are new bar layer settings for rebar sets in the **Options** dialog box and in the user-defined attributes.

- Use the **Layer prefix** boxes on the **Covers and locations** tab in **File** --> **Settings** --> **Options** --> **Rebar set** to define the default prefixes for bar layers at different faces of concrete parts. For example, you could use the prefix `T` for top bars and `B` for bottom bars.

  You can define the prefixes for faces using the global coordinate system or each part's local coordinate system.



Use the **Links** box if you want to define a different layer prefix for bars that have four or more legs, for example closed stirrups.

- Use **Layer prefix** and **Layer number** in the user-defined attributes of rebar sets and property modifiers if you need to override the above prefix settings defined in the **Options** dialog box, or the layer numbers of specific rebar sets, leg faces, or bars.

The following new template attributes are then available for reporting the rebar set bar layers:

- LAYER
- LAYER_PREFIX
- LAYER_NUMBER

Use these template attributes with the advanced option XS_REBARSET_REBAR_LAYER_FORMAT_STRING to define how the rebar set bar layer information is presented in reports and drawings.

In drawings, add the new mark element **Layer** to the reinforcement marks of rebar set bars and/or bar groups to show bar layer information.

You can also filter rebar set bars based on their layer information. The **Layer** property is now available for the filter rules of the **Reinforcing bar** category.

New settings for defining concrete covers

You can now define the concrete cover of rebar sets in concrete parts using the global coordinate system or each part's local coordinate system.

- To change the default concrete cover thickness of the rebar sets in a model, go to the **Rebar set** settings in the **Options** dialog box and use the new **Covers and locations** tab to define the concrete cover thickness values in different coordinate systems and at different part faces.
- To change the concrete cover thickness of the rebar sets in a selected concrete part, do one of the following:
  - Go to the **Concrete covers for rebar sets** section in the part's property pane.
  - Go to the **Rebar set** tab in the part's user-defined attributes.

  Then select the coordinate system: **Global** or **Local**. The corresponding (global or local) default concrete cover thickness values from the **Options** dialog box will be used for the part. If you select the empty option, the global values will be used.

  If you want to override the default value at any part face, enter new values in the boxes below **Coordinate system**.

Changes in creating and modifying leg faces

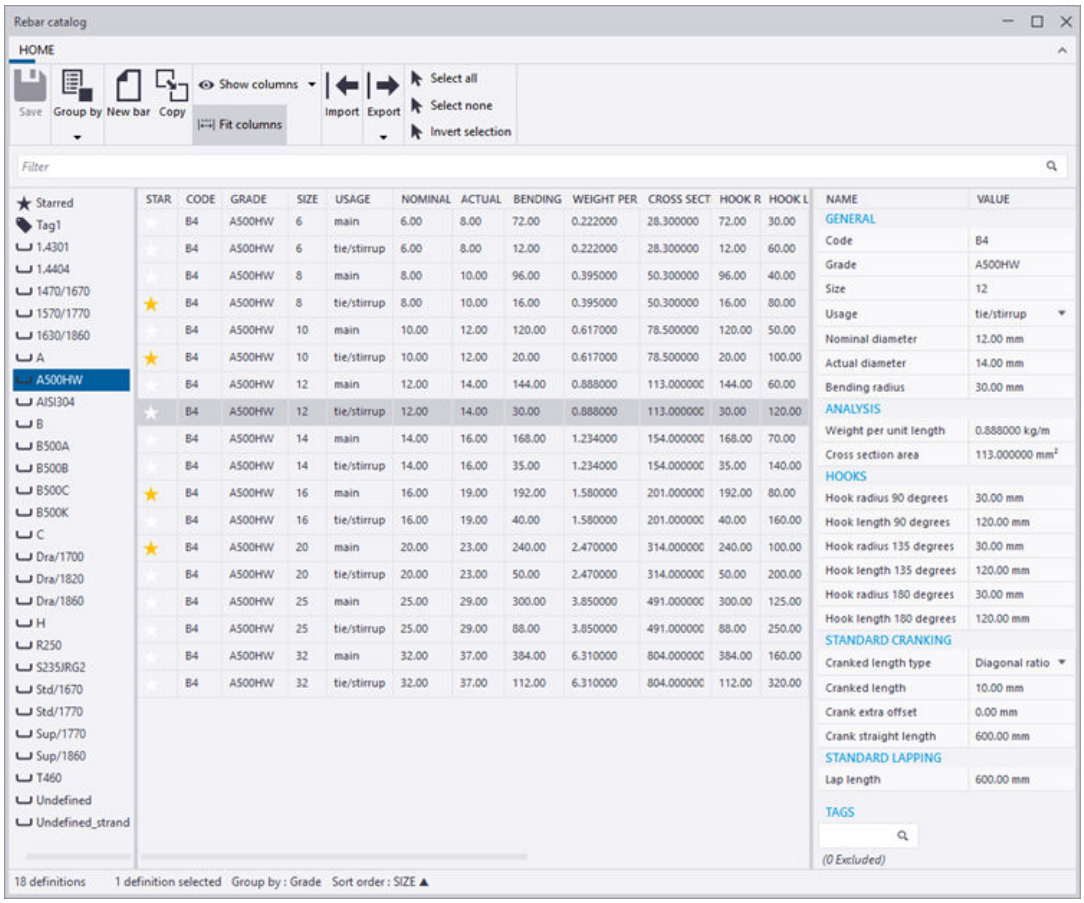
- You can now create new rebar set leg faces on the basis of their corner points.
  1. Select a rebar set.
  2. Switch **Picking mode** to  .
  3. On the contextual tab on the ribbon, click  **Add leg face**.
  4. Pick points to indicate the leg face corners.
  5. Click the middle mouse button to finish picking points and to create the leg face.
- When you copy or move rebar set leg faces, the bars are now automatically flipped over to the side of the leg face that has concrete.
- The **Add leg face** command now only creates one single leg face at a time on more complex surfaces. For example, on curved, triangulated surfaces several leg faces are no longer created at once.
- The option  **Enable leg face rotation** has been removed from the contextual toolbar for leg faces.

Improved secondary guidelines

In the secondary guideline properties, when **Inherit from primary** is set to **Yes**, you can now modify the **Start offset** and **End offset** values. The spacing values and zone lengths are automatically scaled by the ratio of the secondary guideline length to the primary guideline length.

1.6 New user interface for rebar catalog

Tekla Structures 2020 introduces a new user interface for the rebar catalog. The rebar catalog contains definitions for reinforcing bars and strands.



Previously the only way to manage the rebar definitions was to edit the `rebar_database.inp` file using a text editor.

To access and modify the rebar catalog in Tekla Structures 2020:

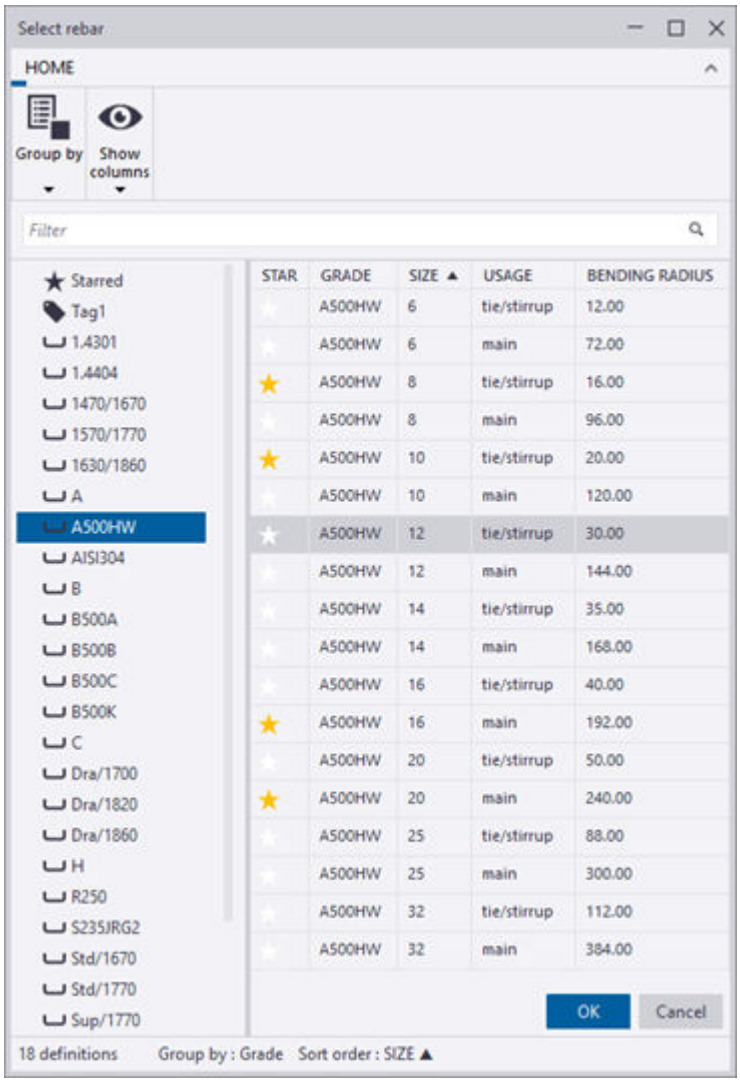
1. On the **File** menu, click **Catalogs** --> **Rebar catalog** to open the **Rebar catalog** dialog box.

2. Customize the rebar catalog as needed.

   For example, you can import rebar definitions, create new definitions from scratch, or add tags to the definitions. You can also mark important definitions with stars, and otherwise organize the rebar catalog view.

3. Click  **Save** to save the changes to the rebar catalog.
4. To use the newly added or modified rebar definitions in the model, reopen the model.

In Tekla Structures 2020, the **Select rebar** dialog box has also been renewed. The new dialog box opens when you click the **...** button next to the **Size** box in a reinforcement object's properties, or in a component dialog box to select a rebar definition.



Reinforcement meshes are not included in the rebar catalog. They are defined in their own catalog file, `mesh_database.inp`.

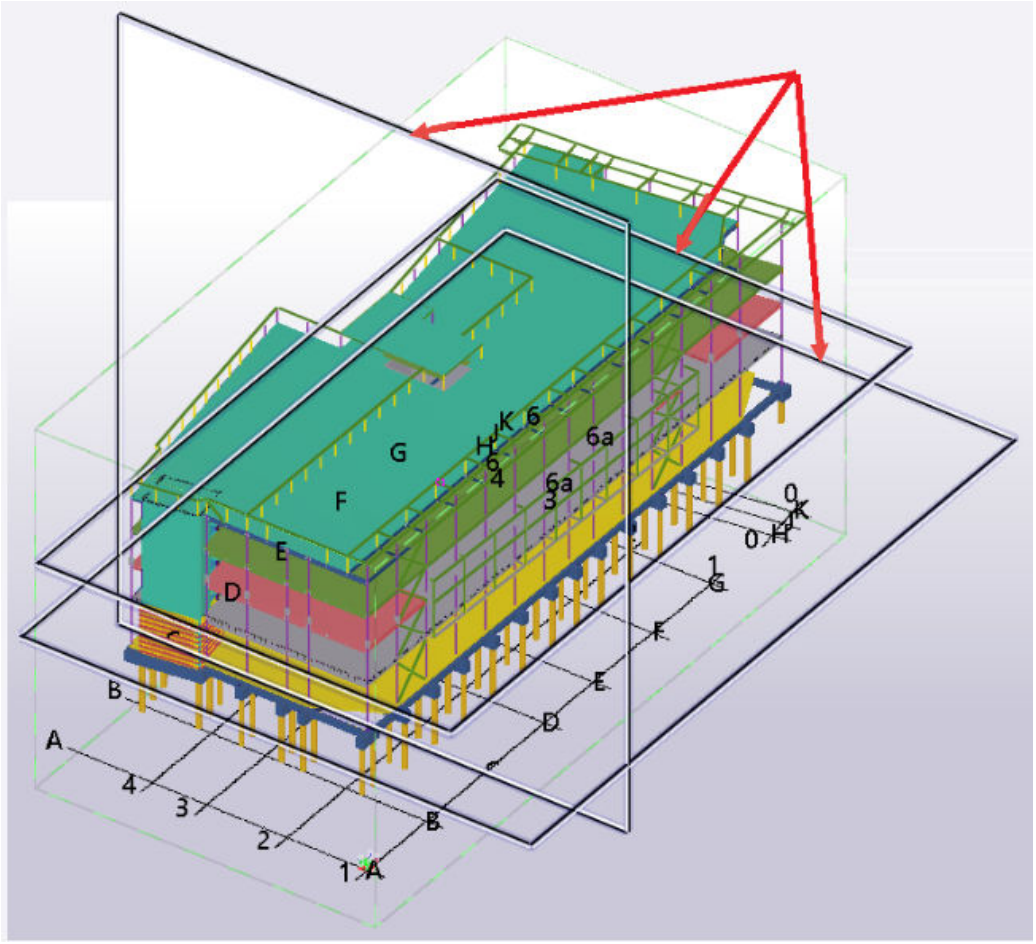
1.7 Show and modify drawing views in the model

You can show the drawing views of the selected drawings in any of the open model views to get a clearer understanding of exactly where a drawing view is located in the 3D model, the view direction, and the 3D extents of that view.

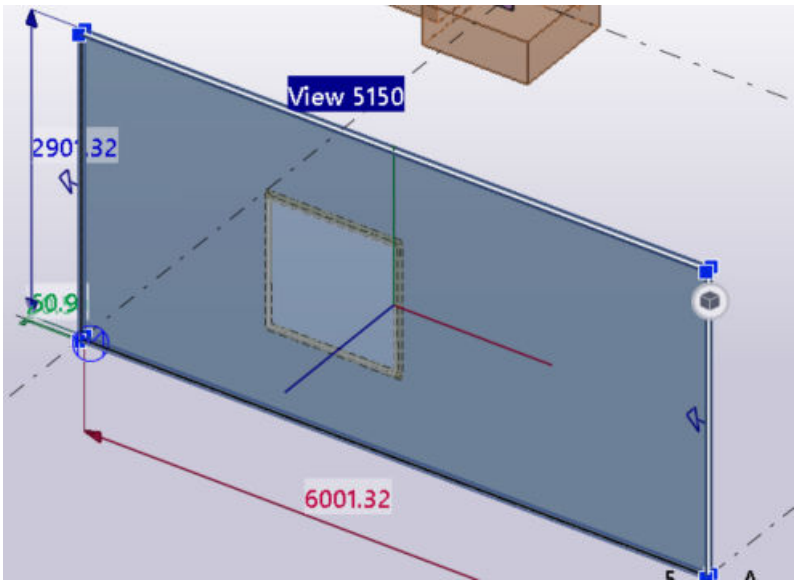
How to show the drawing views in the model

- In the modeling mode, go to the **Drawings & reports** tab, open the **Document manager**, and select one or more drawings in the document list. Then click the **Show drawing views in the model** button in the top-right corner of the **Document manager** window. When this button is activated, it changes color:

- The views in the selected drawings are now displayed in the model. You can then use direct modification to work with the view extents and view plane of every view that is contained within each selected drawing in the currently open model views.

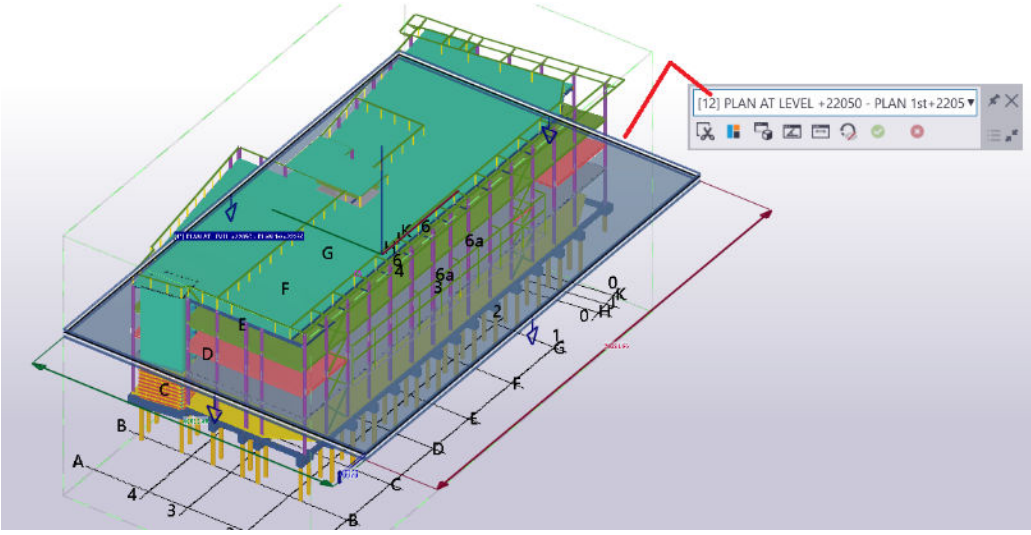


- When **Show drawing views in the model** is active, any changes to the selection of drawings will cause the **Show drawing views in the model** command to be automatically re-run. This way you can easily walk through a list of drawings, selecting one drawing at a time, and see the views for that drawing in the model.
- Labels show the name of each drawing view in the model when you move the mouse pointer over an unselected view edge or when a view is selected.



How to work with the drawing views in the model

- You can select a view of interest in the model view or in the contextual toolbar list and then work with it:



- When you select one drawing view, all other views are hidden. To deselect the drawing view, hold down **Ctrl** and click the edges of the selected view.

If you want to save your changes to the associated drawings, click the middle mouse button.

- Direct modification dimensions show the width, height, and depth above and below the view plane.

  You can modify the dimensions to change the drawing view.

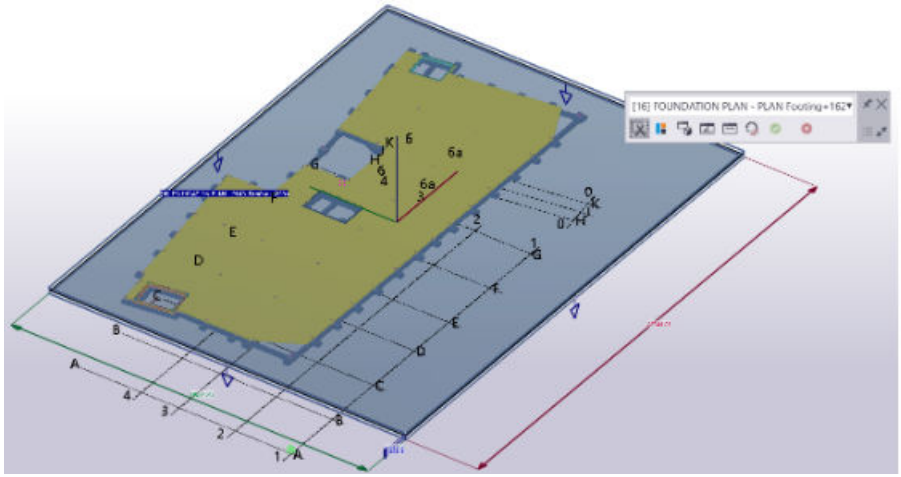
- Now a direct modification handle under the mouse pointer will be selected regardless of how far out you have zoomed out. Earlier, the handles were not selected to be active when you zoomed out.
- The edges, corners, and faces of the drawing view, and the edges of the view plane can be dragged to increase or decrease the view extents.

  Note that you can override the current snap switches by holding down **Shift** while dragging.

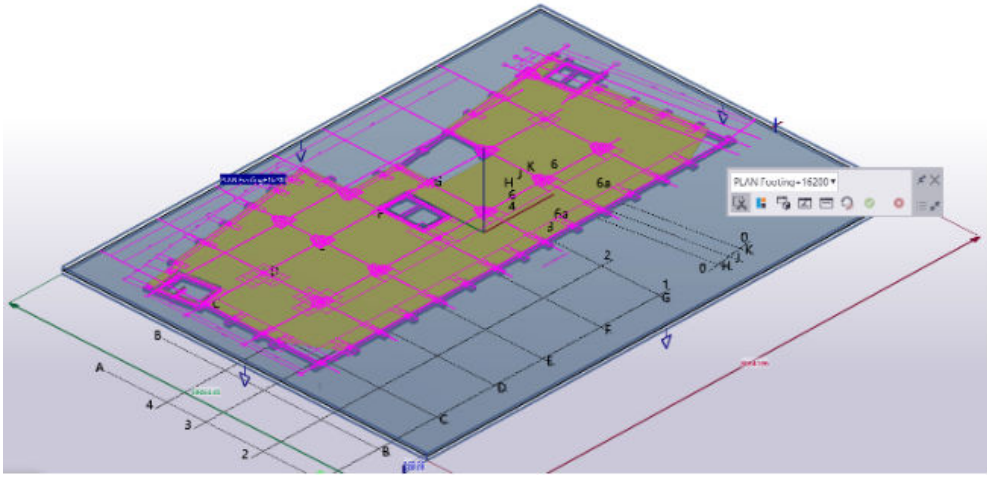
- Use the contextual toolbar to modify the selected view:

  - **Clipping around selected view bounding box on/off**: Creates six clip planes aligned with the drawing view extents.

    When you modify the drawing view, the clip planes are automatically adjusted to keep their alignment to the view extents.



You can also use drawing snapshot overlays with the **Show drawing views in the model** command and the clip planes mode to isolate the view.



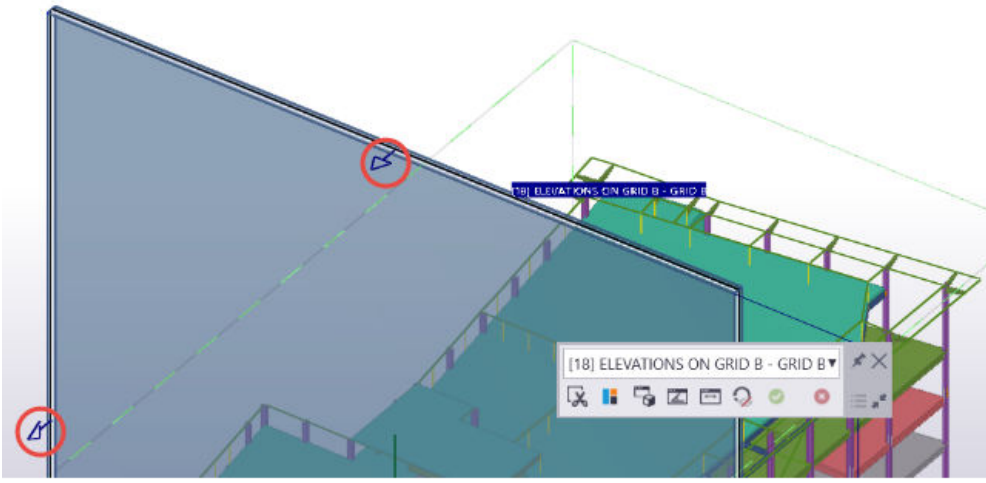
- **Emphasize objects intersecting the view bounding box on/off**: Every object that roughly intersects the drawing view is colored red and every object that roughly does not intersect is made semi-transparent.

- **Display selected view as a new model view**: Creates a new temporary model view based on the current model view's properties, and sets the camera direction of the new model view to match the camera direction of the selected drawing view.

- **Change view angle in selected views to match current model view**: Sets the selected drawing view's camera direction to match the camera direction of the current model view.

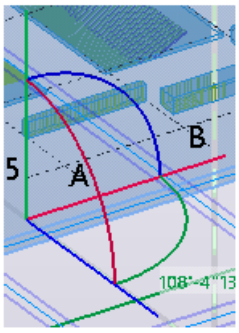
- **Reverse view direction**: Reverses the drawing view camera direction.

  The direction of the selected drawing view is shown by open arrows on the four edges of the view plane.



- **Show/hide rotation handles**: Controls the visibility of the drawing view direct modification rotation handles.

  The direct modification axis and rotation handles allow you to move or rotate the drawing view.

  The rotation handles are hidden by default.

- **Update drawing**: Saves any drawing view changes to the drawings.

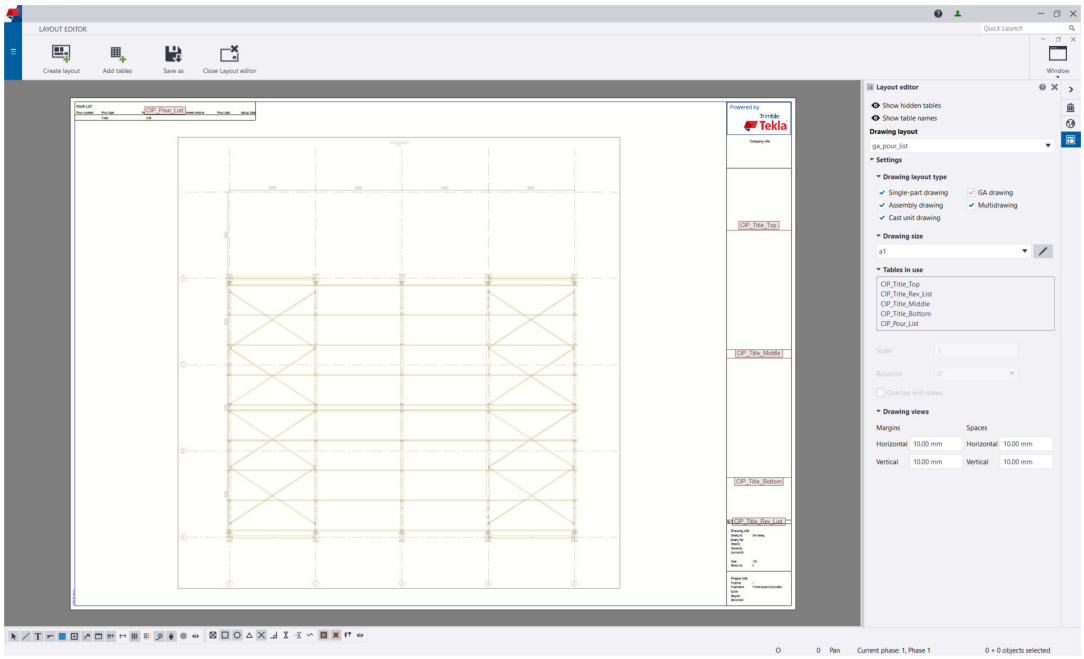
  Drawing view changes are only saved when you click the **Update drawing** button or the middle mouse button. You can edit a drawing view, then select a different drawing view in the model view and edit that, and keep going and then click **Update drawing**.

- **Discard changes**: Discards any drawing view changes that have not been saved by clicking the **Update drawing** button.

- To end the command, use **Interrupt** or **Esc**. If you have made changes but have not saved them, you are asked to save the changes or discard them.

1.8 Improved Layout editor - Customize drawing layouts easily

Tekla Structures 2020 introduces the new and improved **Drawing layout editor**. You can now customize drawing layouts easily in a separate layout editing mode that shows all changes you make in real time.



Note that:

- The **Drawing layout** tool is no longer available.
- New drawing layouts are saved as `.lay` files, which are not compatible with the **Drawing layout** tool or the **Drawing layout editor** that were available in previous versions of Tekla Structures. This means that you cannot use the new layout with older versions of Tekla Structures.
- Table sets are no longer defined separately in drawing properties. Instead, they are created in **Drawing layout editor**.

  Usually, in previous Tekla Structures versions, table sets were associated to drawing sizes when the **Fixed sizes** or **Calculated sizes** options were used. However, if you used the **Specified size** option, the table sets were not associated to any drawing size.

  In case you open a layout file (`.lay`) with unassociated table sets created in previous versions of Tekla Structures, Tekla Structures generates a drawing size to every table set automatically, and names the size as follows:

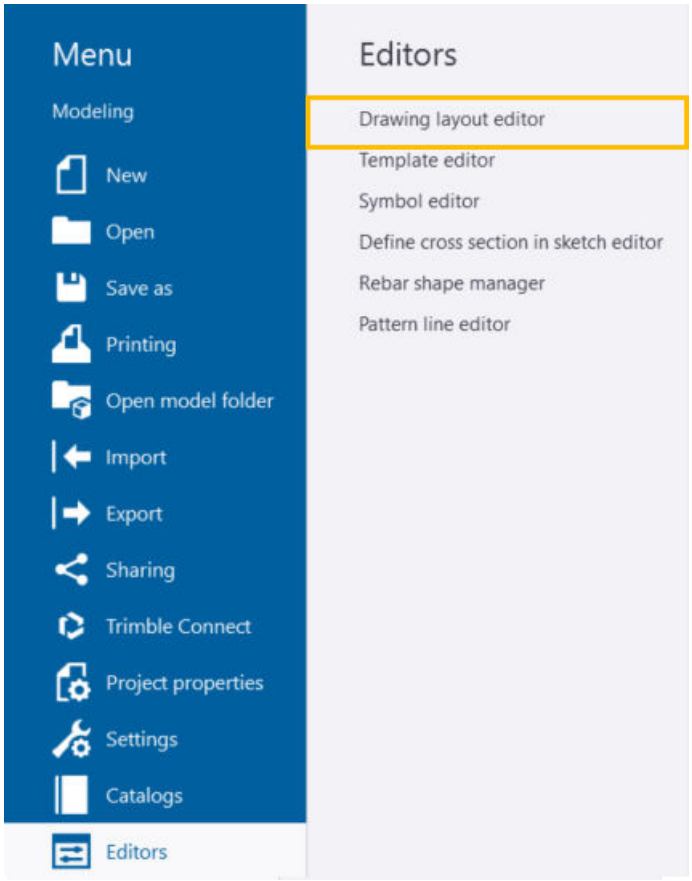
  `###_[TABLE LAYOUT NAME]`
- The **Calculated sizes** option has been removed from Tekla Structures. The remaining options for drawing sizes are **Autosize** and **Specified size**. The **Autosize** option is the same as the previous **Fixed sizes** option.
- The frame settings have been moved from the **Print Drawings** dialog box to the **Drawing layout editor**.

Opening Layout editor

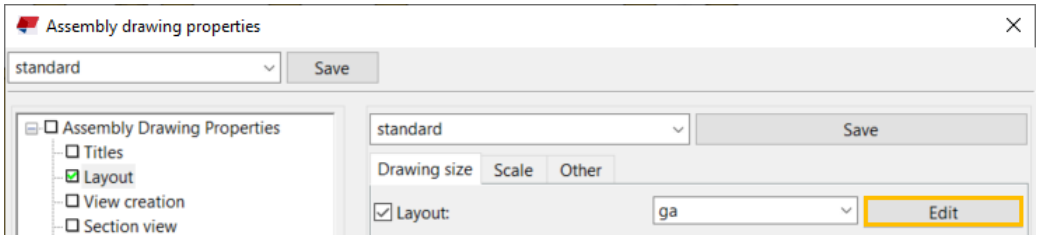
You can open the **Drawing layout editor** while working either in the modeling mode or in the drawing mode.

You can do any of the following to access **Drawing layout editor**:

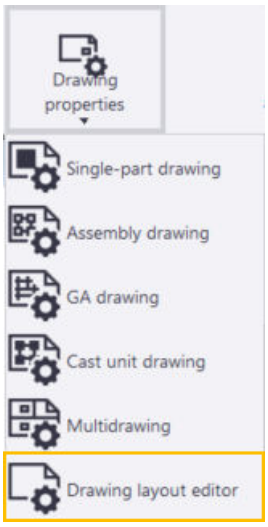
- On the **File** menu, select **Editors** --> **Drawing layout editor** .



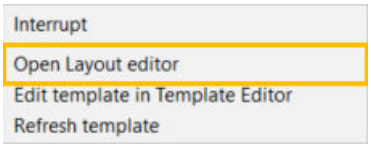
- In a drawing properties dialog box (for example, the **Assembly Drawing Properties** dialog box) , go to **Layout**, and click **Edit** on the right side of the **Layout** list.



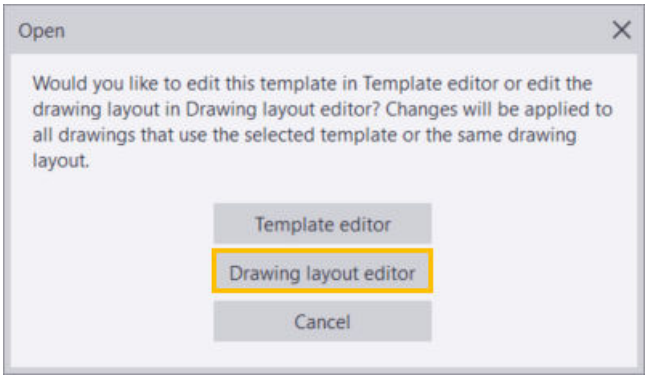
- On the **Drawings & reports** ribbon tab, click **Drawing properties** --> **Drawing layout editor** .



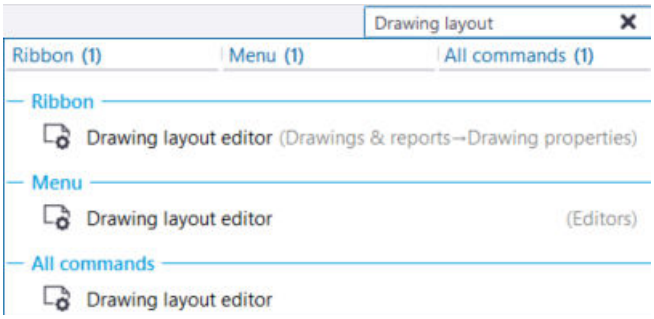
- In an open drawing, right-click a table set and select **Open Layout editor**.



- In an open drawing, double-click a table set and select **Drawing layout editor**.



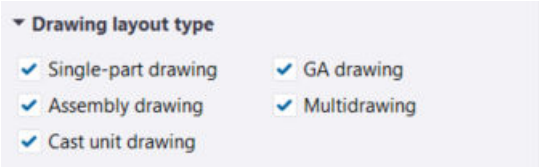
- Type `Drawing layout` in the **Quick Launch** box, and then, select **Drawing layout editor** in the list.



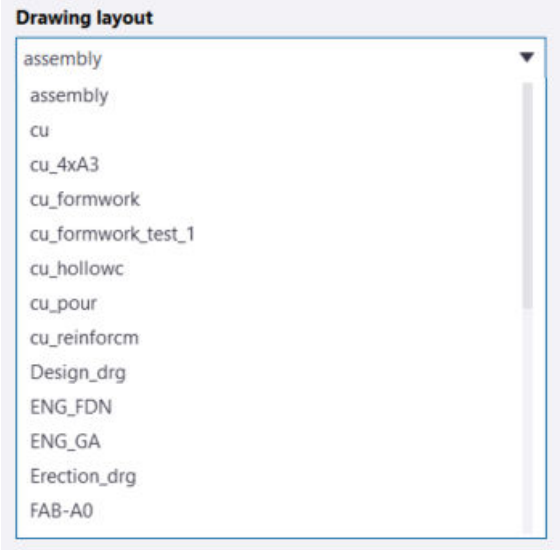
Create and edit drawing layouts

In the layout editing mode, you can:

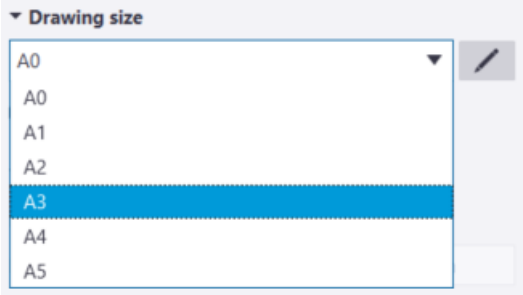
- Create drawing layouts from scratch by clicking  **Create layout**.
- Select to which drawing types drawing layouts apply.



- Select the drawing layout that you want to use in the current drawing.



- Select the drawing size whose table sets you want to modify

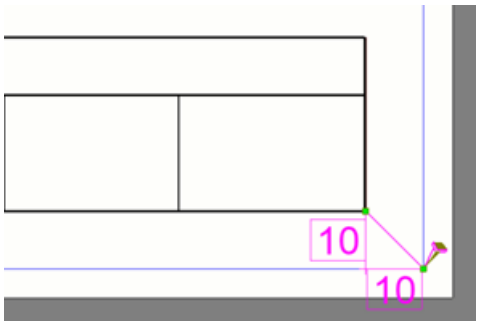


- Add new tables for the drawing layout by clicking **Add tables**.

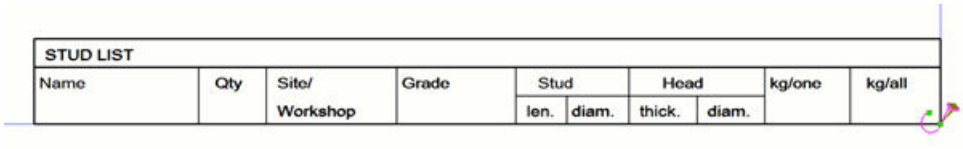
  You can also have different table sets for different drawing sizes, so that everything that is necessary fits the drawings.

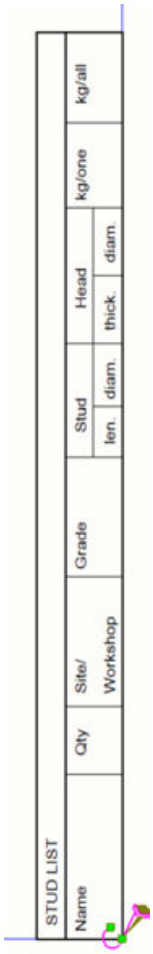
- Drag and drop tables to new positions.

  The tables snap to offsets of 1 millimeter in metric environments, or 1/16 inch in the US imperial environment.



- Change the scale and rotation of tables.





- Adjust the spaces between drawing views, and the margins between frames and the drawing edge.

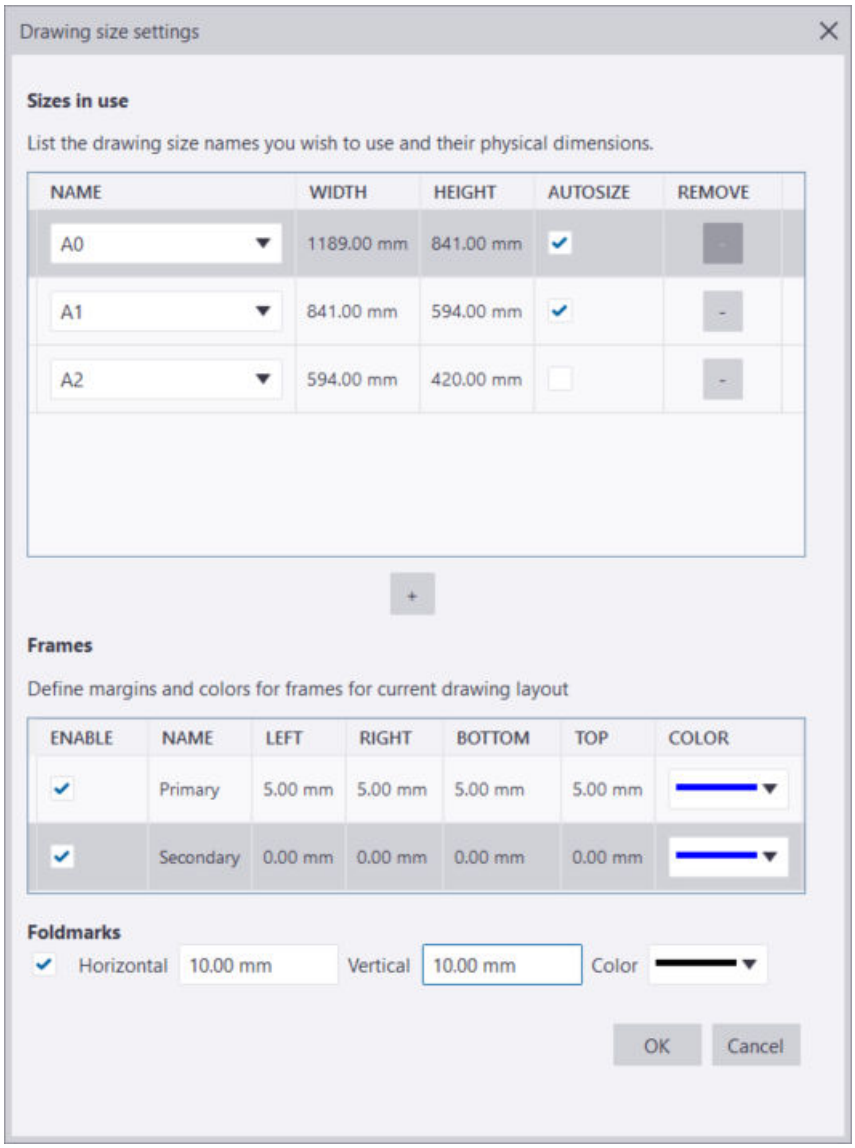
When you save a drawing layout, the layout is saved in the `\attributes` folder under the model folder as a `.lay` file.

Adjust drawing sizes

You can add new drawing sizes, and adjust the frames and margins for each table set in the **Drawing size settings** dialog box.

To access the **Drawing size settings** dialog box:

- On the **Layout editor** side pane, click **Edit** on the right side of the **Drawing size** list.

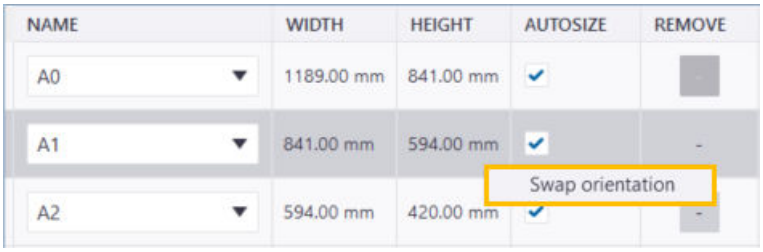


Here, you can:

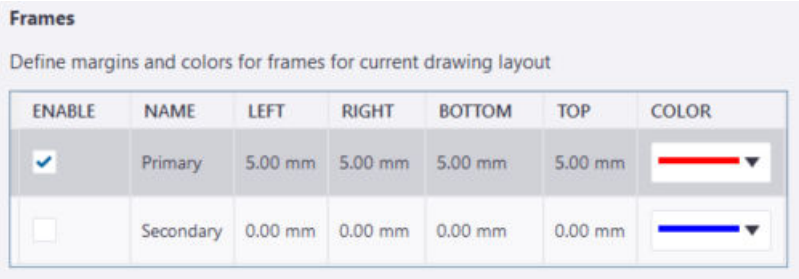
- Add new drawing sizes by clicking **+**.

  You can either select one of the pre-defined drawing sizes or create custom ones.

- Change the orientation of drawing sizes by right-clicking the width or height of a drawing size.

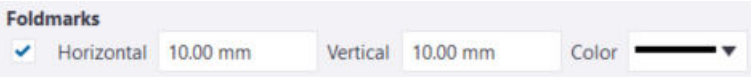


- Allow Tekla Structures to use a drawing size when automatically selecting suitable drawing sizes by selecting the **Autosize** check box.
- Delete unnecessary drawing sizes by clicking **-**.
- Select if you want to use one frame or two frames in your drawings, and define the frame margins and colors.



- Select if you want to use fold marks, and define their color and the spaces between them.

  Note that you need to select both the **Primary** frame and the **Secondary** frame to use fold marks.



1.9 Improved rebar coupler and end anchor symbols

Displaying rebar shapes in drawing templates and in reinforcement mark pull-out pictures has been enhanced, and the rebar scheduling workflow is now more effortless and straightforward.

You can now show graphical symbols representing the rebar couplers and end anchors in bending schedules and in rebar mark pull-out pictures using the Pullout graphical attribute.

You can also adjust the font name, font size, font color, end mark, bending radius visibility and a number of other bending schedule attributes individually for the Pullout graphical attribute in Template editor, according to your company or country standards.

Previously, displaying the rebar coupler symbols in reinforcement bending schedules was only possible with the `CUSTOM.REBAR.SHAPE.COUPLERS` attribute, and the functionality was limited in terms of customization flexibility.

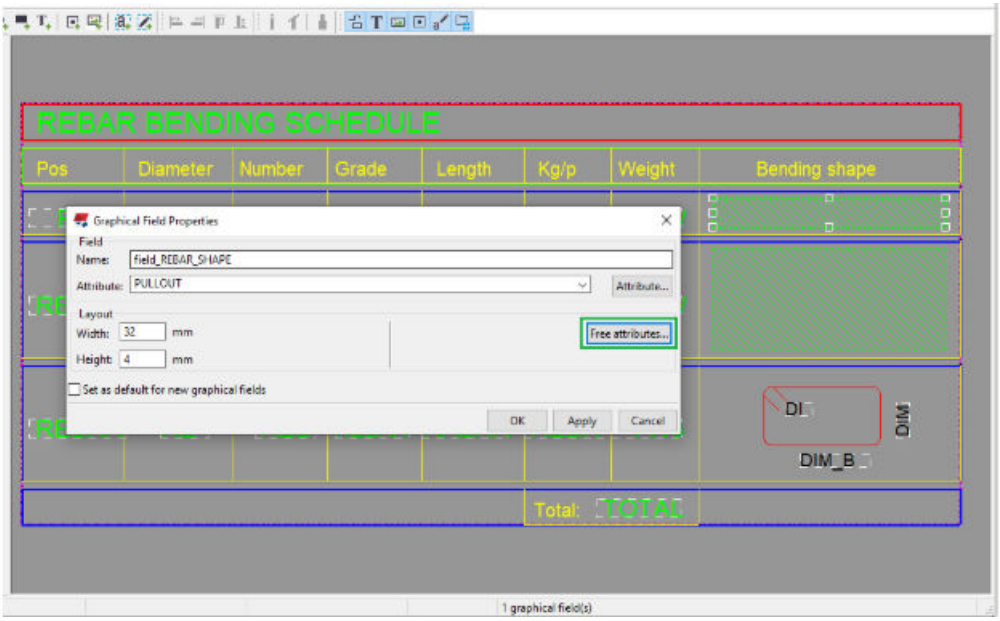
Note the following:

- The symbols are read from the file defined in `RebarCoupler.Symbols.dat`, by default `CouplerSymbols.sym` located in `..\ProgramData\Tekla Structures\<version>\environments\common\symbols`.

- You need a precast concrete or cast-in-place structure model with generated rebar detailing drawings (GA or cast unit drawings), and the reinforcement details need to be modeled by using any of the rebar coupler or rebar end anchor tools available in the **Applications & components** catalog. The rebar coupler and end anchor symbols work based on rebar UDAs, and these UDAs are controlled by the rebar coupler and rebar end anchor tools.

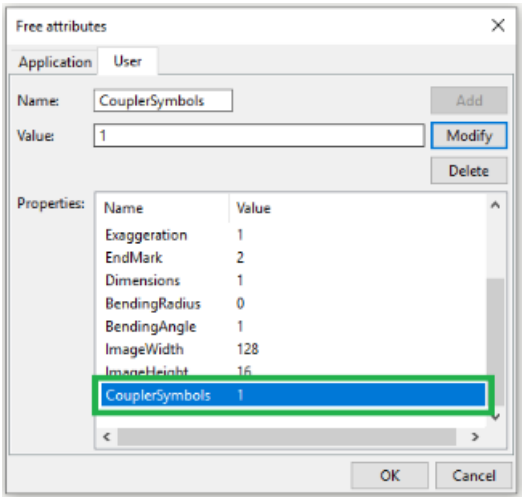
Display rebar coupler and end anchor symbols in rebar bending schedules

- In a drawing that contains rebar couplers or end anchors shown in a rebar bending schedule, open the bending schedule template in Template editor by double-clicking a rebar shape in the bending schedule. Double-click the graphical field containing the bending shape. In the **Graphical Field Properties** dialog box, ensure that the PULLOUT attribute is displayed in the **Attribute** field, and open the **Free attributes** dialog box.

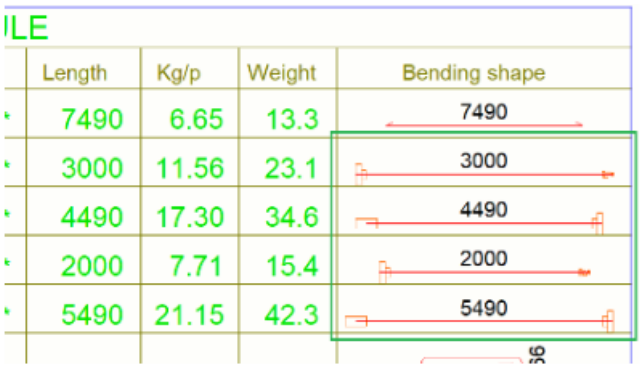


- Select the CouplerSymbols attribute, and enter 1 in the **Value** field. Adjust other properties as required.

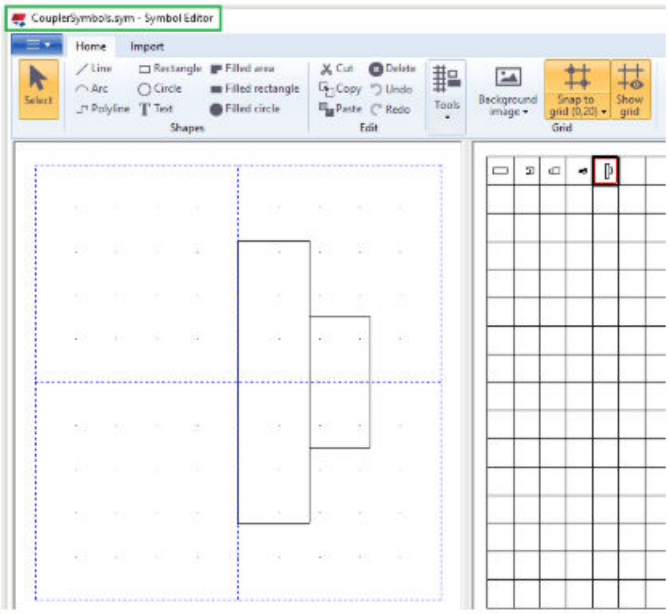
  Rebar coupler symbols will be shown if CouplerSymbols property value is set to 1 and disabled if 0 is entered. The default value is 1.



- Save the changes and close Template editor, and then refresh the drawing template by right-clicking the template and selecting **Refresh template** from the context menu.

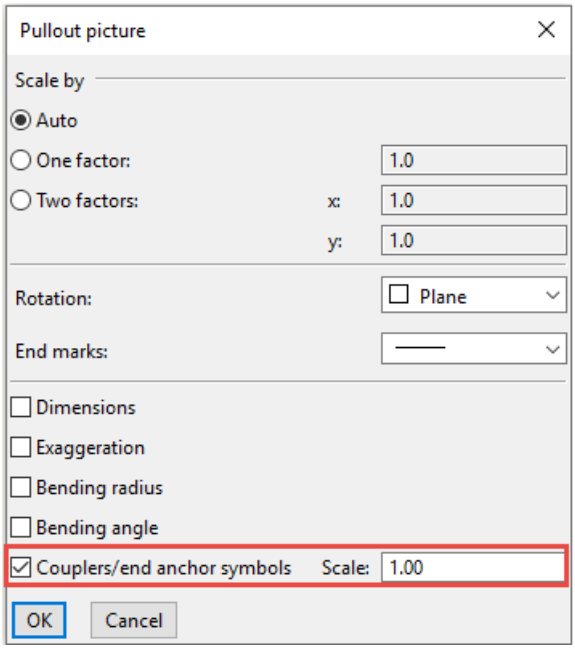


- Note that you can customize rebar coupler symbols in Symbol editor by modifying the `*.sym` file defined in the `RebarCoupler.Symbols.dat` file. By default, `CouplerSymbols.sym` is used.

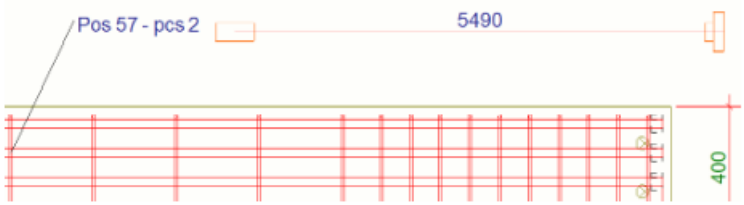


Display rebar coupler and end anchor symbols in rebar mark pull-out pictures

- In an open drawing that contains reinforcement with couplers or end anchors, double-click a rebar mark for which you want to enable a pull-out picture, and double-click the **Pullout picture** element. The **Pullout picture** dialog box is displayed.



- Select the **Couplers/end anchor symbols** check box, set the desired scale and click **OK**.



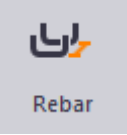
1.10 Rebar dimensioning improvements

The creation of dimension marks has been simplified. There are also changes in the **Rebar dimension properties** dialog box, integrated cast unit rebar dimensioning, and **Rebar group dimensioning**.

Single command for creating various types of rebar dimension marks

The workflow for creating rebar dimensions marks has been simplified. In Tekla Structures 2020, there is only one rebar dimension mark command that uses the current applied dimension properties for creating dimension marks without tags, tagged dimension marks, distributed dimension lines, or variants of these styles. You can also use predefined settings files for creating different types of rebar dimension marks.

The new command **Add Mark** --> **Dimension Mark** is available in the context menu for rebar objects, on the **Dimensioning** ribbon, and in **Quick Launch**. You can also create a keyboard shortcut for it.

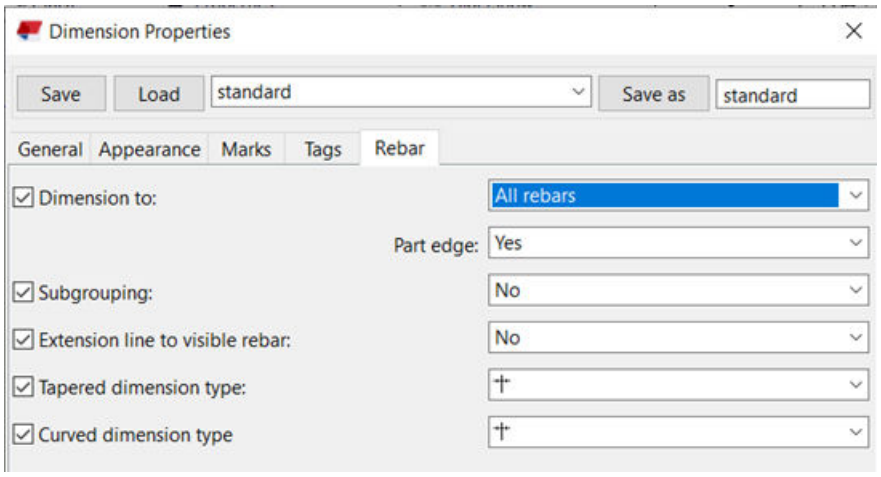


Previously there were three separate commands for creating rebar dimension marks:

- **Add Mark** with options **Dimension Mark** and **Tagged Dimension mark**
- **Create dimension line** for showing the distribution of the reinforcing bars to rebar groups

Rebar dimension properties

The style of the rebar dimension mark is controlled by the properties on the new **Rebar** tab in the **Dimension Properties** dialog box.



- **Dimension to** specifies whether dimensions are created between **All rebars** or between the **Start and end rebars** only.
- **Part edge** adds closing dimensions to the edge of the part in reinforcing bar group dimensions. This setting is only available if **Dimension to** is set to **All rebars**.

  Because of this new setting, the advanced option `XS_REBAR_DIMENSION_MARK_MANUAL_CLOSE_TO_GEOMETRY` has been removed.
- **Subgrouping** specifies whether subgroups are created for different rebar spacings within a rebar object so that dimension marks can display the subgroup properties. **Subgrouping** is only available when **Dimension to** is set to **All rebars** and is disabled for **Start and end rebars**.
- **Extension line to visible rebar** controls the display of extension lines to the visible rebars.
- **Tapered dimension type** specifies whether skewed dimensions have skewed or horizontal representation. This setting was moved here from the **Options** dialog box.
- **Curved dimension type** specifies whether curved dimensions have curved or horizontal representation. This setting was moved here from the **Options** dialog box.
- You cannot change the following properties when you have a drawing open and you are editing a rebar dimension mark:

  Dimension to

  Part edge

  Tapered dimension type

  Curved dimension type

Predefined dimension settings files

Predefined dimension settings files allow easy creation of the three common rebar dimension mark types. You can now define dimension properties on the different tab pages in the **Dimension Properties** dialog box and save the settings files on the **Rebar** tab.

Previously, the files controlling the rebar dimension mark settings were defined in the **Options** dialog box in the **Drawing dimensions** settings. The options defining the settings files have now been removed from the **Options** dialog box.

The Default environment now contains the following settings files to be loaded in the **Dimension Properties** dialog box:

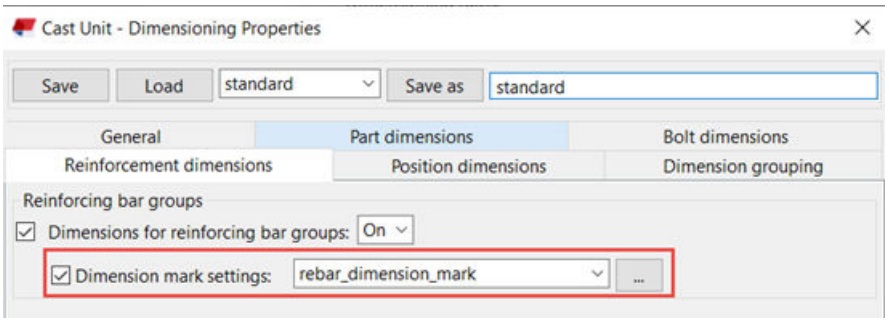
- `rebar_dimension_line` (old option **Dimension line settings** in the **Options** dialog box)
- `rebar_dimension_mark` (old option **Dimension Mark settings** in the **Options** dialog box)
- `rebar_tagged_dimension_mark` (old option **Tagged Dimension Mark settings** in the **Options** dialog box)

Add rebar dimension marks using the ribbon command

- First open the dimension properties by pressing down **Shift** and clicking the **Rebar** command on the **Annotations** ribbon tab. Modify the dimension properties as required, or load one of the predefined rebar dimension mark settings files, and click **Apply**. Then select a rebar object to create the rebar dimension mark. You can continue selecting rebar objects or press **Esc** to end the command.
- Alternatively you can use the rebar object context menu or the **Quick Launch** to create a rebar dimension mark. Ensure that the dimension properties have been set as desired.

Updated integrated cast unit rebar dimensioning

- Automatic integrated cast unit rebar dimensioning has been changed so that you can now specify a dimension settings file to use. The referenced settings file controls the type of the created rebar dimension mark, just like in the applied dimension properties.



- Clicking the **...** button opens dimension properties, and you can view the settings and also change the settings, if needed.

Rebar group dimensioning

- There are new options available for showing the mark element **Number** on the **Extra marks in front** and **Extra marks behind** tabs: **Total number in rebar group**, **Number displayed in view**, **Total number in drawing** and **Total number in cast unit**.

  The option **Number displayed in view** replaces the mark element **Number visible**.
- Total number in cast unit now gives a correct result.
- The second combo box for positioning the extra mark on the right side of the group was sometimes incorrectly disabled. This has now been fixed.

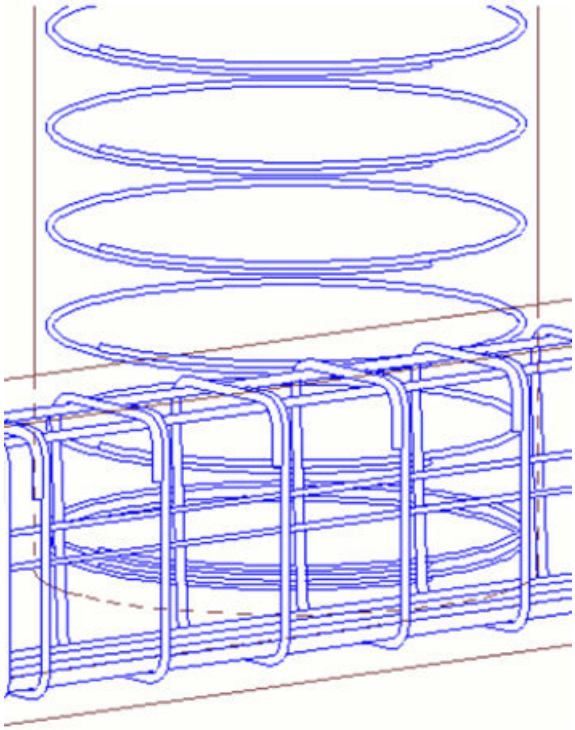
1.11 Other drawing improvements

Tekla Structures 2020 also introduces improvements in displaying rebars, **Rebar pull-out picture and marking**, marks, **Document manager**, macros, curved dimensions and drawing performance.

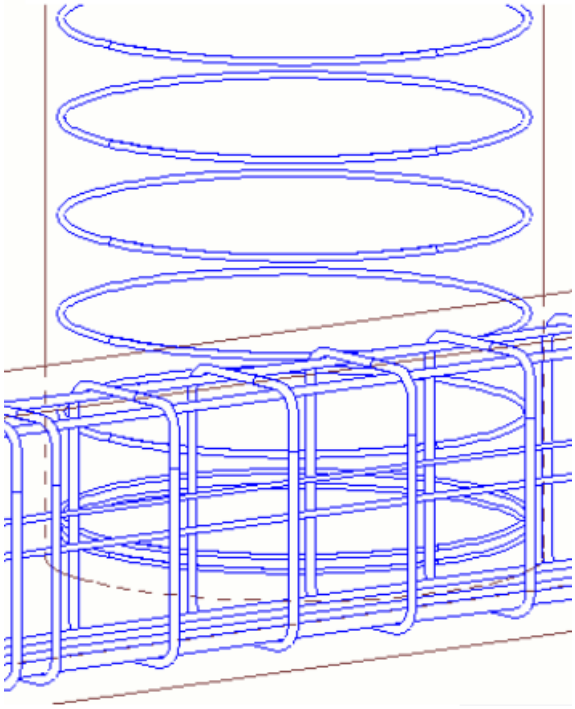
Display rebars with overlap

- A new advanced option `XS_DRAW_REBAR_SELF_INTERSECTING_LEGS_WITH_OFFSET` has been added. When set to `TRUE`, this advanced option displays rebars in drawings with overlap in all representations. The option **filled line** already showed the overlap earlier. Note that `FALSE` has no impact on the **filled line** representation. The default value is `FALSE`.

  `XS_DRAW_REBAR_SELF_INTERSECTING_LEGS_WITH_OFFSET` set to `TRUE`:



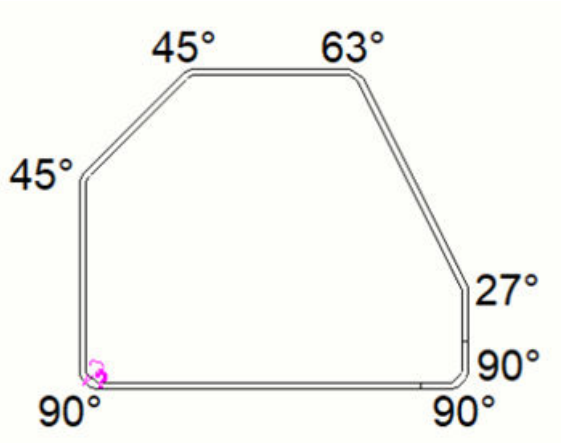
`XS_DRAW_REBAR_SELF_INTERSECTING_LEGS_WITH_OFFSET` set to `FALSE`:



Rebar pull-out picture and marking

- You can now rotate rebar pull-out pictures. The new setting **Rotation of bars perpendicular to view** is available on the **Rebar** tab. This setting affects single bars perpendicular to the view only. By default, the pull-out pictures were always placed vertically. Now you have the option to also place them horizontally.

  The new setting **Custom rotation angle** allows you to rotate all pull-out pictures using the same rotation angle.
- You can now show the bending angles of the rebar pull-outs. The new setting **Angle dimensions** is located on the **Dimensions** tab.



- Duplicate dimensions are now supported. To allow duplicate dimensioning, set `PullOutShowDuplicateDims` to the desired value in the `rebar_config.inp` file. For example, `PullOutShowDuplicateDims=3` shows all dimensioning, and `PullOutShowDuplicateDims=0` does not show duplicate dimensions. The default value is `0`. For more informaton, see Reinforcement settings for drawings (rebar_config.inp).

Improvements in Document manager

- The type of the attributes CC_MIN*, CC_MAX* and CC_TARGET was changed to doubles. New CC_DIAMETER_MIN/MAX* attributes were added.
- You can now use the **Ctrl+A** keyboard shortcut in **Document manager** to select all drawings.

For more information about **Document manager**, see Document manager.

Updated drawing macros

- The following macros were updated in the Common environment so that they work with either the old **Drawing list** or the new **Document**

manager, depending on the value of the advanced option `XS_USE_OLD_DRAWING_LIST_DIALOG`:

Clone Drawing

Select All Drawings

Select Assembly Drawing

Select Parts By Drawing

Select Single Part Drawing

Open Shop Drawing

- Now the **Close** button (**X**) in **Document manager** also works with macros.

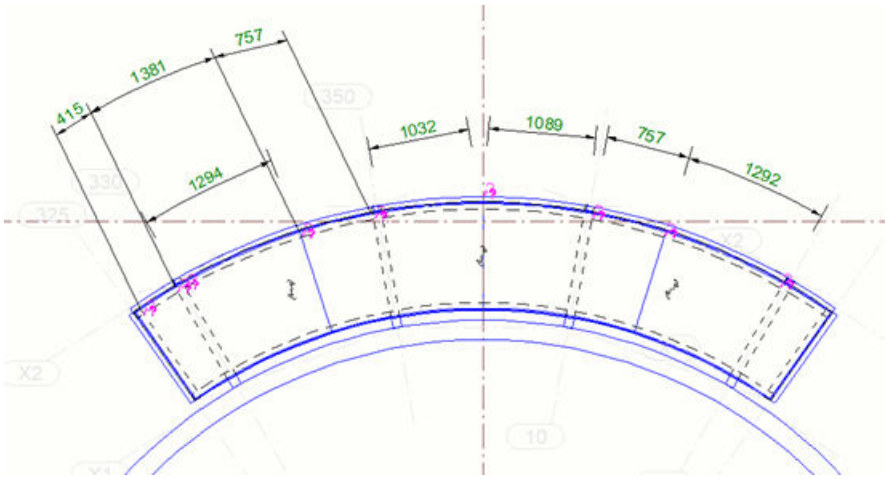
Improvements in marks

- Decimal **feet** is now available in mark properties as the unit for length, height, spacing and diameter.
- Decimal **feet** is also available in mark properties in the view properties dialog boxes.
- Non-intelligent (dummy) detail marks can now be:
  - moved using **Shift**+drag
  - copied using **Ctrl**+drag

  Note that the detail marks can only be moved or copied within a view. When moved beyond the view frame, the view frame will adjust so that the detail mark will always be within the frame.

Short extension lines for curved dimensions

- Curved dimensions in drawings can now be drawn with short extension lines. Earlier, the **Short extension line** setting in dimension properties did not work for curved dimensions.



Improved drawing performance

The performance of the drawings has been improved in Tekla Structures 2020. The improvements affect

- Drawing opening time
- Zoom performance
- Pan performance - dragging the drawing from one end of the screen to another
- Drawing editing - adding add marks, text, lines, and moving views, among other things

Showing the level of detail in drawings

Starting from Tekla Structures 2020, the point at which the level of detail is reduced in drawings has been set earlier. This means that zooming out in drawings will drop drawing related detail earlier than before.

As a result, overall zooming and panning are smoother while some drawing content is simplified and some are left out when zoomed out over certain extent. The effect is easy to notice in large drawings with a high amount of content.

The change in the level of detail affects

- Hidden lines, which are not drawn
- Very short lines, which are not drawn
- Hatches, which are drawn as a cloud of points
- Text, which is replaced by a line

TIP For some cases using the advanced option `XS_USE_SMART_PAN` can further improve performance but will cause a checkerboard effect during panning operations.

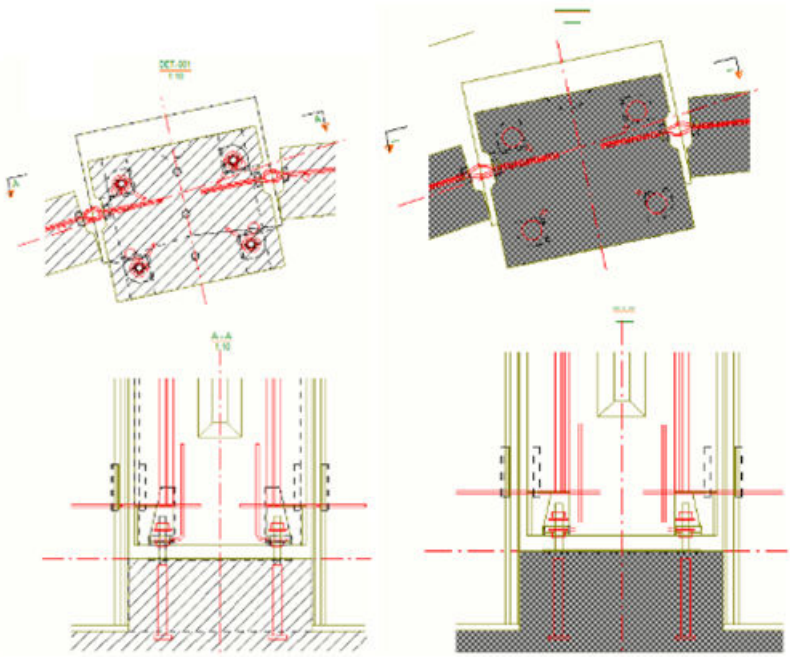
To enable optimized zooming and panning in drawings, in the **Advanced Options** dialog box, set `XS_USE_SMART_PAN` to `TRUE`. The default setting is `FALSE`. Restart Tekla Structures to activate the new setting.

This advanced option is user specific and is saved in the `options.bin` under the user folder.

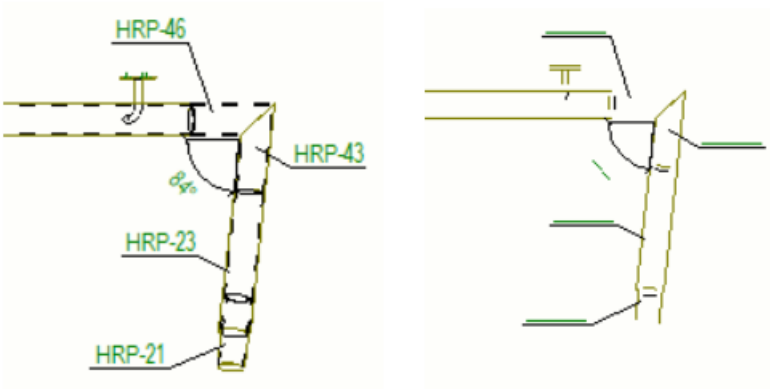
Examples

The following examples show how the hatches, hidden lines, text, and very short lines were drawn before (on the left), and how they are drawn now when the level of detail is reduced (on the right).

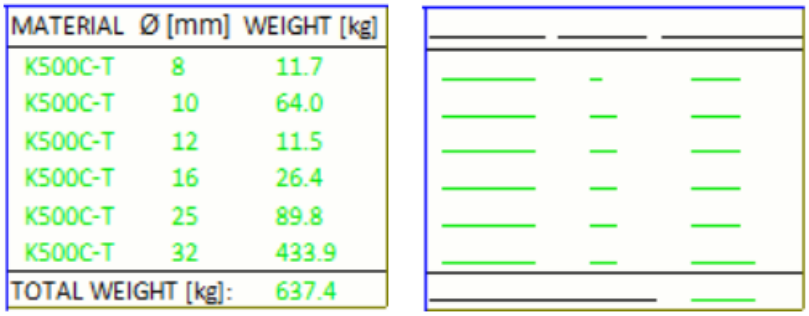
Hatches are now drawn as a cloud of points:



Hidden lines are no longer drawn:



Text is now replaced by lines:



MATERIAL	Ø [mm]	WEIGHT [kg]
K500C-T	8	11.7
K500C-T	10	64.0
K500C-T	12	11.5
K500C-T	16	26.4
K500C-T	25	89.8
K500C-T	32	433.9
TOTAL WEIGHT [kg]:		637.4

Very short lines are no longer drawn:

1.12 Updates in Template Editor, template handling and reports

Template Editor 4.0.xxxxx release notes

NOTE Files saved with Template Editor 4.0 cannot be opened with older Template Editor versions due to new features in version 4.0. So template definition files (.tpl and .rpt files) have now a new version number 400 (previous was 360).

For more information about Template Editor 4.0, see Template Editor 4.0 User's Guide.

- Updated the latest help files.

- Multiline value field should have its content attached to the top, so the data is filled from top to bottom. Default will remain from bottom so as not to break old behavior.
- Template object colors can now be overridden in row rules by defining an override parameter for the Output() function. For more information, see "Overriding template object colors with row rules in Template" in Template Editor 4.0 User's Guide.

  The following rule overrides the colors when the LENGTH attribute is longer than 1000. Value fields are orange, text objects are yellow and the drawing color is blue (i.e. lines are blue).

  Rule
  ```
  if (GetValue("LENGTH") > 1000) then
    Output("#VFC=ORANGE;TXC=YELLOW;DRC=BLUE")
  else
    Output("#VFC=BLUE;COLOR=GREEN")
  endif
  ```

  Choose from the 14 colors that you can use in Template Editor. Valid color names are black, white, red, green, blue, cyan, yellow, magenta, brown, darkgreen, navyblue, greenblue, orange and gray. The color names are case-insensitive.
- Added automatic font resize for a value field when the content exceeds the defined length of the value field.

Template handing - dkit 4.0.xxxxx release notes

- Reduced memory usage during template output by using dynamic allocation for components.
- Template width was spread according to the total text length in a multi-line text object, because line breaks were ignored when the length was calculated. This has now been fixed.
- The performance is now better for large templates.
- Reduced memory usage during template output (pooling for objects and more precise allocation of object identifiers).
- The template height calculation was wrong when template used a table with horizontal fill direction and a variable number of columns. This has now been fixed.
- Multiline value field should have its content attached to the top, so the data is filled from top to bottom. Default will remain from bottom so as not to break old behavior.
- Tekla Structures crashed when a drawing had a pull-out rebar mesh. This has now been fixed.
- PageBreak() function in a row was creating an extra page if it was used after a table. This has now been fixed.

- Two different cases exist for header and footer output:

  1) If rows don't have rules, then headers and footers)are always output.

  2) If at least one row has a rule, then if no rows are output, the headers and footers will not be output either.
- Template object colors can now be overridden in row rules by defining an override parameter for the Output() function.
- Added automatic font resize for a value field when the content exceeds the defined length of the value field.

New content type HIERARCHIC_CAST_UNIT in Template Editor

- Template Editor contains a new content type `HIERARCHIC_CAST_UNIT` for reporting. Now you can create reports listing subassemblies of concrete.

  The content type `CAST_UNIT` is flat, contrary to the steel `ASSEMBLY`. The new content type, `HIERARCHIC_CAST_UNIT`, supports hierarchy with the same logic as `ASSEMBLY`. It enables reports that list the hierarchic content of cast units with multiple levels of subassemblies, for example, double walls. The existing `CAST_UNIT` has not been changed.

Other Template Editor updates

- Numbers that exceed the length field of a template are now correctly truncated with * symbols.
- Modifying a report in Template Editor was very slow. This has now been fixed and the performance of Template Editor has been improved.

1.13 New point cloud settings and other improvements

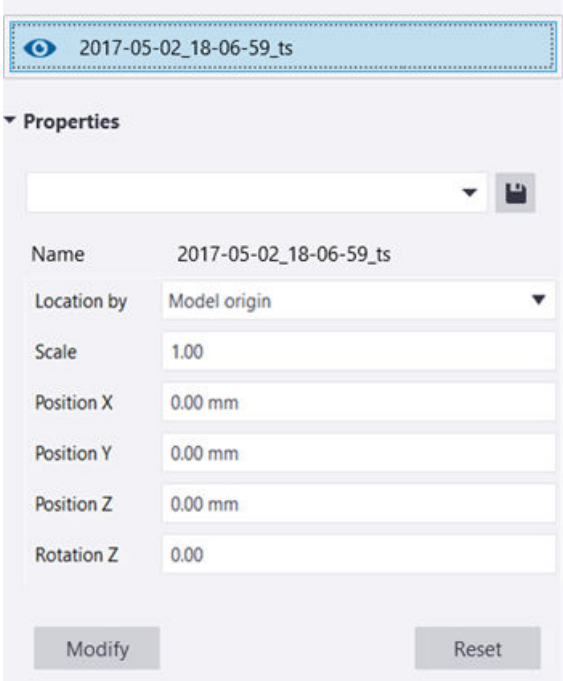
The **Point clouds** side pane has been completely renewed for Tekla Structures 2020.

The new point cloud functionalities are available when you have attached a point cloud, and **DirectX rendering** is active.

Note that the point cloud **Visualization** settings are view specific and settings are enabled for the one view only the name of which can be seen at the top of the **Point clouds** side pane (if you have not selected multiple views). The **Properties** settings are enabled only if point cloud is selected from the list.

Now you can do the following:

- Adjust the point cloud location, scale and rotation. To modify the values, you need to select the point cloud in the side pane.

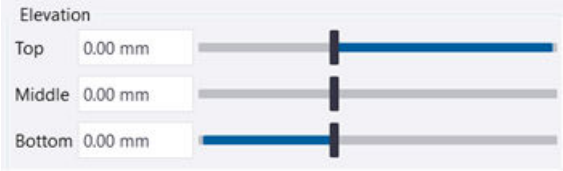


The **Reset** button returns the values that set for the point cloud the last time.

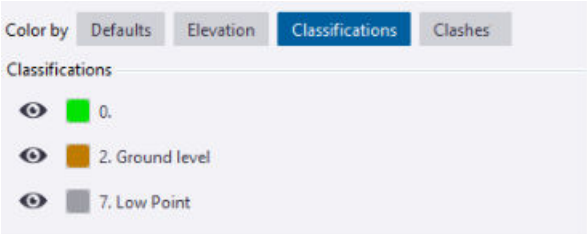
- Use the EDL (Eye-dome lighting) effect to improve the depth perception of the point cloud. Drag the sliders to increase or decrease the outline thickness and strength of the point cloud. You can deactivate the EDL effect by clicking the **EDL** button.

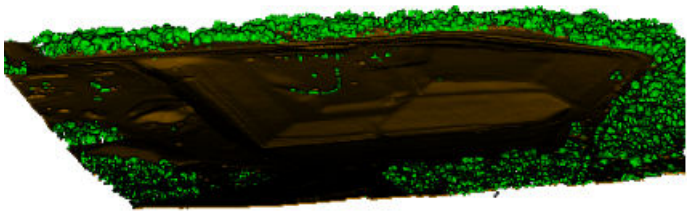
- Adjust the size and density of the points by dragging the sliders.

- Normally, the default color values are in use. You can also color the point cloud by elevation.

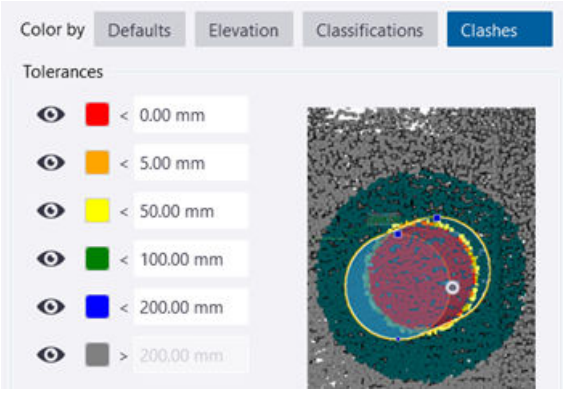


- If the point cloud contains classifications, you can change the color of the classification category points or hide them.





- Check clashes and deviations: Detect points that are inside or within a distance from the selected parts and selected reference models objects based on adjustable settings.



- The tolerance settings are view specific and therefore it is possible to use different tolerances in different views.
- Save the properties and visualization settings in settings files for future needs.

Other improvements in point clouds

- In addition to the new functionalities, the view detection has been improved, and selecting the view is not always needed anymore. The name of the view that the current settings affect is shown on top of the side pane.
- Now point cloud default cache folder is common for all versions, and the version-specific folders have been removed.
- The usability of the **Point clouds** side pane has been improved in the following way:
  - The recycle bin now appears on top of the point cloud name, which makes it easier to delete point clouds with long names.
  - The horizontal scrolling has been disabled. To see the whole point cloud name, adjust the width of the side pane.
  - The pane no longer changes its width automatically.

For more information on point clouds, see Point clouds.

1.14 Other interoperability improvements

Tekla Structures 2020 contains improvements in IFC4 export, IFC object conversion, DWG export, **Layout manager**, and Tekla Structural Designer import, for example. There is also a new model format `.tekla` available.

IFC4 export

- Spatial hierarchy from Organizer now supports pour units. Note that objects in the Organizer uncategorized category are not exported.
- When you select the option **Pours**, pour objects and pour units are exported but cast-in-place concrete parts and cast-in-place cast units are not exported. If you do not select this option, cast-in-place concrete parts and cast-in-place cast units are exported without pour objects or pour units.
- You can now include pour and pour unit template fields and UDAs in the IFC4 export. Pour template fields and UDAs are set to IfcBuildingElementProxy and pour unit to IfcElementAssembly in Property Set Definitions. UDAs are set with template field setting using USERDEFINED."UDA".
- Now the IFC4 export supports the export of project properties, such as town and country.

IFC object conversion

- The IFC object conversion now supports multi-geometry conversion and updating.
- Information of how a profile was detected has been added to the results list in the IFC object conversion.
- Multi-geometry BREP part IFC object conversion now works also in update.

DWG export

- It is now possible to cancel the DWG drawing export/preview.
- Drawing DWG export now handles base point offsets better.

Layout manager

- In **Layout manager**, you can now import or export points relative to the current work plane in the model.

SketchUp

- Tekla Structures now supports SketchUp version 2020.

New .tekla model format

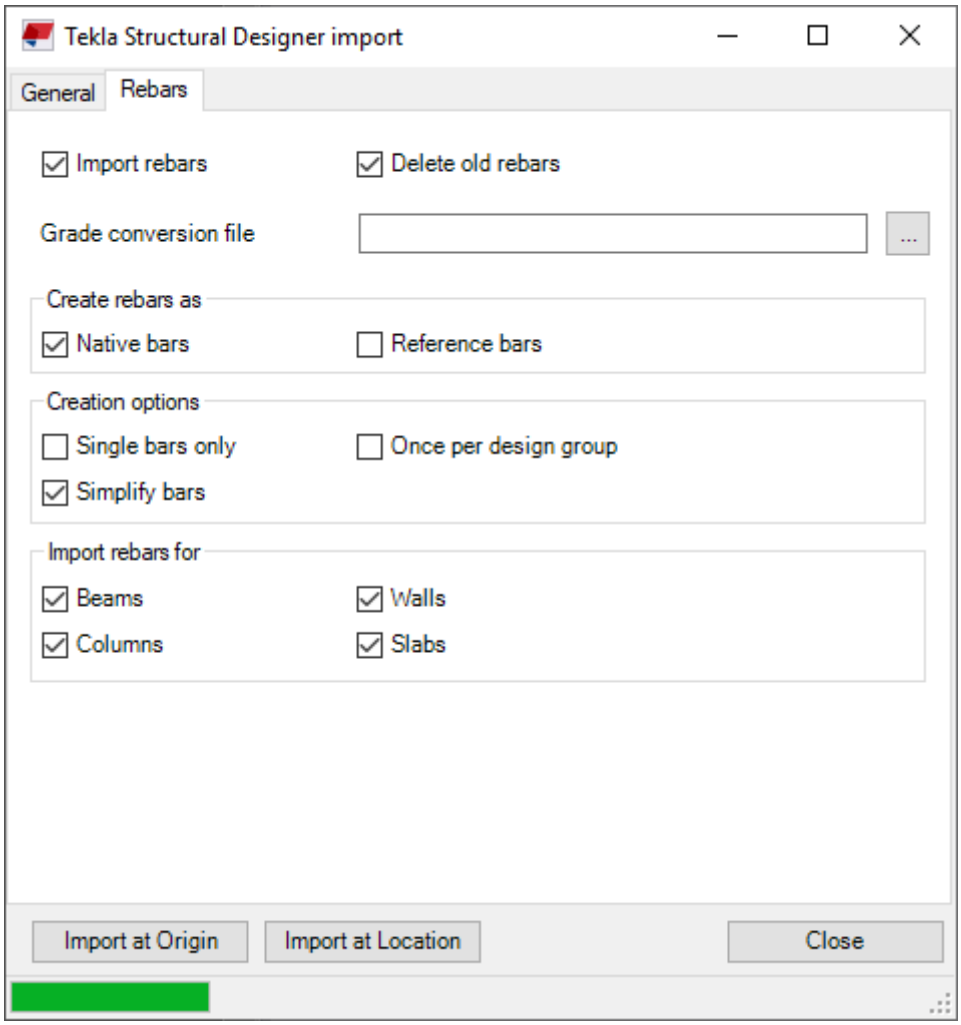
- `.tekla` model is a new lightweight Tekla Structures model that can be used as reference model. It basically enables Tekla Structures model referencing from Trimble Connect as an overlay model or as a normal reference model.
- This format lists and visualizes objects, parts, rebars, bolts and assemblies, but not pours or pour units. The format can be created to a Trimble Connect project with the **Upload model** command.

Import from Tekla Structural Designer

- The **Rebars** tab is now available in the **Tekla Structural Designer import** dialog box. The **Rebars** tab will only be active if compatible versions of Tekla Structural Designer and Tekla Structures are installed on the same computer and if the original Tekla Structural Designer file (`.tsmd`) is selected. Currently only the 2020 versions of both Tekla Structures and Tekla Structural Designer are compatible.

  It is no longer necessary to install a separate extension from Tekla Warehouse to enable rebar import.

  Use these new settings to define how reinforcement is imported from Tekla Structural Designer to Tekla Structures:



- Openings in concrete walls can now be imported from Tekla Structural Designer to Tekla Structures.

  Openings in sloped walls are not imported.
- The option **Remove previously imported openings** to remove all existing openings that were previously imported from Tekla Structural Designer has been added to the **General** tab in the **Tekla Structural Designer import** dialog box.

Base points

- The base point location in the model can have a maximum value of +/- 10 km from the model origin. Modeling is meant to be done near the model origin, and the offset is to be given with the **East coordinate** and **North coordinate** values.

Export MIS

- The word **Fabtrol** was removed from the **Fabtrol/KISS** export user interface texts. So now it only says **KISS** in the **Export MIS** dialog box and in the status bar messages.

1.15 Updates in tools for automated precast fabrication

Export Unitechnik (79), **Export EliPlan file**, **BVBS Export** and **HMS Export** contain several improvements.

Export Unitechnik (79)

Export Unitechnik (79) has been improved in the following ways:

- The cutpart former embed polygon is now exported fitted to be within the contour polygon.
- The visualization in Tekla Structures model for the scanned geometry of the embeds is now drawn in the respective double wall shell.
- STEELMAT insertion point, length and width were previously incorrectly exported for some meshes. This has now been fixed.
- **Main** tab:
  - You can now specify **Output file structure** as **Single layer, 1 slabdate, n steelmats**. This new option only exports the main part of the cast unit as SLABDATE, and meshes and embeds from whole cast unit in one row in export X axis direction with a 1 mm gap between them.
- **SLABDATE block data specification** tab:
  - The braced girder diagonal wire rebar handles at arcing points affected the double wall total and production thicknesses when bent rebars were excluded. This has been fixed.

    Also a new option **Double wall width** has been added for the settings **Total thickness** and **Production thickness**. This option exports the template report property `CAST_UNIT.WIDTH`.
- **Embeds** tab:
  - Special assembly symbol definition file now supports template property values or embed part names. Embed template property values or embed names have to be enclosed in quotation marks. Embed template property values or embed names have to be enclosed in quotation marks.
  - Previously, when the corner symbol option was selected for the **Export assemblies** setting, and a special export assembly file was used, there were problems in the export. This has now been fixed.

    - Previously, when a double wall shell was created from more than one part and the **Cut outer assemblies** setting was switched on, the embeds in the secondary part were missing from the export with certain **Export Groups** settings. This has now been fixed.
    - Electric tubes are now not excluded for the whole length when you use the **Cut outer assemblies** option together with non-turned double walls
- **Reinforcement** tab:
    - A new option **All without hooks** has been added to **Rebars export** --> **Straight** to export straight rebars without hooks only. The **All** option has been renamed to **All including hooked**.

      Note that the hooked bars are controlled by the **Straight** setting, not by the **Bent** setting.
    - **Braced girder classes or names**: You can now export braced girders within the STEELMAT block using the new option **Within the STEELMAT block**. By default, the braced girders are exported outside of the STEELMAT block.
    - Initially, when you exported braced girders within the STEELMAT block without any mesh, the braced girders were excluded. Also the braced girders with lower concrete cover didn't affect the father STEELMAT-block coordinates. These issues have now been accounted for in the final functionality.
    - The **Spacer type** option **Automatic** has been renamed to **Automatic, rebar type 1**, and its behavior has been changed so that when the element is thinner that 100 mm, the spacer type is always exported. A new **Spacer type** option **Automatic, all rebar types** has been added to export spacer types for all rebar types.
    - Braced girders modeled with only two chords are now correctly recognized and exported.
    - It is now possible to export braced girders Z coordinate as 0 using the new option **Without concrete cover**.
    - When the BRGIRDER block is exported within the STEELMAT block, the STEELMAT insertion coordinates are now correctly adjusted in case the girder minimum coordinate points are outside the mesh.
- **TS configuration** tab:
    - You sican now set **Export CONTOUR** to **Simplified**, which exports a simplified contour using 4 x, y corner points of the element.
    - The **Extend contour and add formwork** setting has been improved. Now formwork is not added if there already is an embed with the same geometry. Also, the contour is not extended for electric tube embeds.

- Previously, line attributes were not exported for second shell of the double wall when **Double wall turned** was set to **No, shell-specific coordinate systems**. This has now been fixed.
- The **Double wall turned** setting has been improved. The **No** option has been renamed to option **No, one coordinate system** and a new option **No, shell-specific coordinate systems** has been added to export the second shell in the Z direction from the bottom of the pallet upwards.

Export EliPlan file (68)

Export EliPlan file has been improved in the following ways:

- All geometrical data with the Plotter and Pieces blocks are now exported rounded to the closest millimeter in metric environments.
- Previously, full depth cuts placed at hollow core profile chamfer lines with certain profiles were exported with incorrect geometry. This has now been fixed.
- Rectangular openings at the edge of hollow core slabs with certain profiles were occasionally exported as a thin line, instead of a box shape.This has now been fixed.
- A new tab **Data settings** was added, and some settings were moved to the new tab from the **Data content** tab.
- Hollow core slab thickness is now read from the profile instead of the geometrical thickness (in case the complete top or bottom face is cut).
- Plotter data for cuts and recesses exported as lines will have the thickness/depth value in case the cut is of even depth.
- Recesses that cut the complete area of the element are now plotted.
- **Parameters** tab:
  - EliPlan export now supports export version **3.0 (FloorMES)**. You can find the new version in the **Export version number** list. The **3.0 (FloorMES)** version file format is intended for interfacing with newer Elematic FloorMES versions, and is based on GUID. The file format has been extended with additional data fields, and therefore it is not backwards compatible.
  - Version 3.0 of the export supports the export of accessory code to plotter data.
  - Export version 3.0 supports the export of accessory code for openings.
  - The **Filter by part** setting has a new option **Selection filter** which uses a selection filter for filtering element data, materials or secondary concrete elements.

- **Plotter data** tab:
  - - New setting **Export of weep holes**: Version 3.0 of the export supports the export of weep holes.
    - You can now specify plotting of additional reinforcement as bounding box or as lines using the setting **Plot additional reinforcement** or **Plot cutout/embed as lines**.
- **Data content** tab:
  - The new EliPlan export version 3.0 supports the export of stack results. You can select if the UDA is read from the main part or from the cast unit.
  - You can now specify the accessory code for standard embeds such as steel parts. This will be the code written to each embed in the #Plotter (if applicable) and #Materials blocks, and the chosen option should be used as a base for further data conversion mapping. The default option is NAME|PROFILE-LENGTH|MATERIALGRADE.
- **Data settings** tab:
  - It is now possible to specify a UDA to read the strand code. **Default** reads the value from the UDA TS_STRAND_CODE. It is also possible to export strand code from a template attribute, including custom properties.
  - The **Tag for lifters** setting has been improved and now also rebars can be specified as lifters using a class or a name. Now **Tag for lifters** also has an option to specify how the lifters geometry should be plotted - as outline or as center point.
  - It is now possible to specify multiple classes or names for the **Tag for lifters** setting. If the name consists of multiple words then it has to be enclosed in quotation marks.

HMS Export

HMS Export has been improved in the following ways:

- The height of braced girders is now calculated more accurately. The height is now measured as the distance between the top and bottom rod center line points.
- Rebar strands are now exported from strand objects only.
- **Reinforcement** tab:
  - New functionality was added on the **Reinforcement** tab to include slab cross bar reinforcement in the export. For the new settings **Custom top strands** and **Custom bottom strands**, enter the quantity, diameter,

distance and pull force. For the new settings **Additional strands** and **Reinforcement**, enter the name, class, UDA or template attribute.

The custom strand settings are meant to be used if no strands are modeled. If there are modeled strands, the custom strands will be included in addition. **Additional strands** can be used to designate any other specific rebar object to be exported as strand, as only strand objects are included in the export by default. Reinforcement can be included in the export as cross bars by specifying them in the **Reinforcement** setting.

BVBS Export

BVBS Export has been improved in the following ways:

- Circular rebar sets are now exported in the same way as circular rebar groups.
- New **Settings** tab:
  - The groups **Drawing data** and **Reinforcement position** were moved from the **Parameters** tab to the new **Settings** tab.
  - There is a new setting **Project number** with the following options:
    - **Project properties**: The export fetches the project number information from the project properties set in Tekla Structures.
    - **Project properties UDA**: The export uses the UDA name entered in the **User-defined project number** box.
    - **Fixed text**: The export uses the text entered in the**User-defined project number**.
- **Advanced** tab:
  - A new setting **Bent leg arc radius** was added with options **Inner edge** and **Center line**.

    This new setting defines which bending radius is used to calculate the arc length: Bending radius to the rebar center line, which is the default for most interfaces, or to the rebar inner edge, in which case the bending radius is shortened with half of the rebar nominal diameter.

    BVBS export uses arc geometry in two cases:

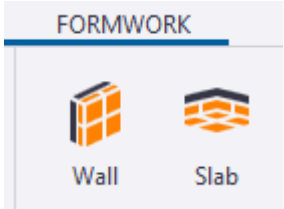
    - For circular rebars such as spirals or hoops.
    - When bent rebar has more than 1 bending radius, the bends with the larger radius are exported as arc sections.

1.16 New formwork placing tools for walls and slabs

Tekla Structures 2020 includes new formwork placing tools: **Formwork placing tools - Walls** and **Formwork placing tools - Slabs**. Previously, these tools have been available in Tekla Warehouse.

The formwork placing tools enable the efficient modeling of different wall panel and slab panel formwork systems.

The formwork placing tools are available in the **Concrete Contractor**, **General Contractor** and **Rebar Detailer** roles in the **Default** environment. **Formwork placing tools - Walls** and **Formwork placing tools - Slabs** are placed on the **Formwork** tab, and the individual sub-components included in the tools are available also in the **Applications and components** catalog.



With **Formwork placing tools - Walls** you can place, for example, wall panels, ties, clamps, braces, walers, and pouring platforms.

With **Formwork placing tools - Slabs** you can place, for example, slab panels, girders, shuttering, stop ends, and railings.

1.17 Easier Trimble Connect collaboration

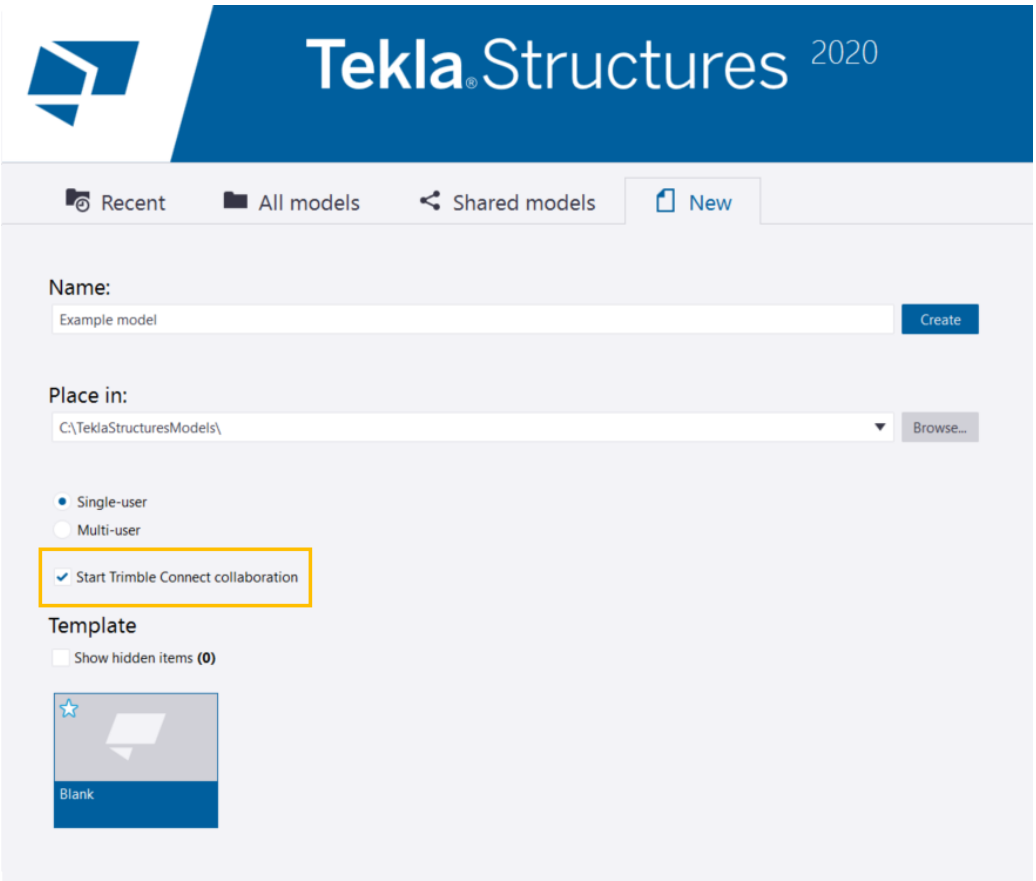
Tekla Structures 2020 introduces several improvements regarding the use of Trimble Connect and Trimble Connector. Starting Trimble Connect collaboration is now easier, and new lightweight reference models have been added. New buttons on the ribbon also make it faster to access and work with Trimble Connect and Trimble Connector.

All operations between Tekla Structures and Trimble Connect use the project base point. This means that, for example, reference models exported or downloaded from Tekla Structures are placed in relation to the project base point in Trimble Connect. If you have not defined a project base point, the model origin is used.

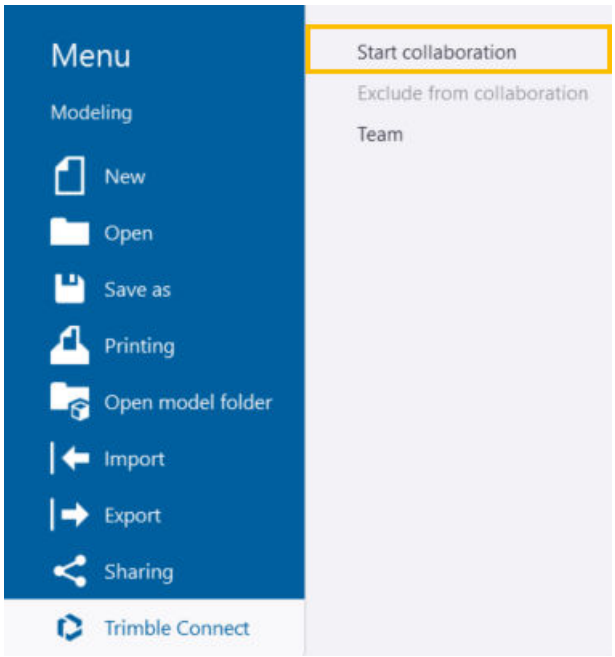
Starting collaboration is quicker

You can now link your Tekla Structures model to a Trimble Connect project either right away while you are creating a new model, or later through the **File** menu.

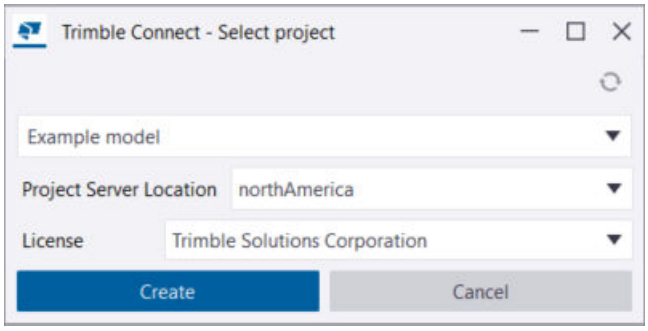
- To link a new model to a Trimble Connect project, select the **Start Trimble Connect collaboration** check box on the start screen.



- To link an open model to a Trimble Connect project, on the **File** menu, select --> **Start collaboration**.



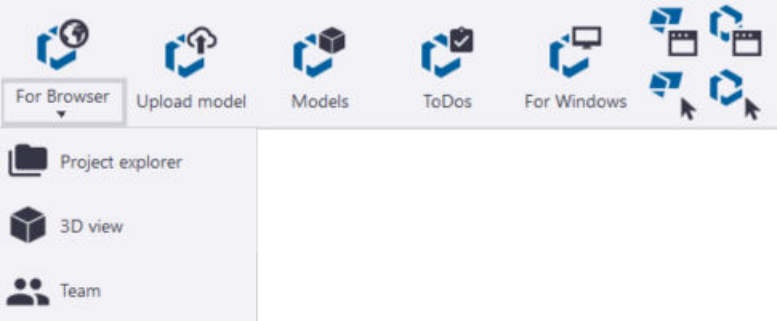
In both cases, the **Trimble Connect - Select project** dialog box opens. Here, you can select if you want to link your model to a new Trimble Connect project or an existing one.



- To link the model to a new Trimble Connect project, type a name for the project in the field at the top of the dialog box, and click **Create**.
- To link the model to an existing Trimble Connect project, select the project from the list at the top of the dialog box, and click **OK**.

New buttons on the Trimble Connect tab

The tab has new buttons that make it quicker and easier to access different Trimble Connect products and Trimble Connector. See the new buttons below.



Button	Action
For Browser	Opens the linked Trimble Connect project in the Trimble Connect for Browser web application. The **For Browser** button has the following sub-commands: • **Project explorer**: Opens the Project explorer page for the linked Trimble Connect project. On the Project explorer page, you can create new folders, Sketchup models, or map workspaces. You can also upload new files, and sync the project from Trimble Connect for Windows. • **3D view**: Opens the Trimble Connect 3D model view of the linked project. In the 3D model view, you can adjust how 3D models are shown, select objects, and add ToDo notes, views, markups, clip planes, or measurements. • **Team**: Opens the Team page for the linked Trimble Connect project. On the Team page, you can invite new users to the project, create user groups and add members to them, and manage user roles.
Upload model	Uploads the Tekla Structures model to a Trimble Connect project folder as a read-only `.tekla` reference model. The `.tekla` reference model is an overlay model that works as the counterpart of

Button	Action
	the Tekla Structures model in the linked Trimble Connect project. Uploading the Tekla Structures model as a `.tekla` reference model allows you to use ToDos and other Trimble Connect commands with the model. **NOTE** The **Upload model** button is not available in models that have been shared with Tekla Model Sharing. Instead, you can select if and when a shared model is uploaded to a Trimble Connect project folder. In the **Advanced Options** dialog box, set the value of the `XS_UPLOAD_SHARED_MODEL_TO_CONNECT` advanced option to one of the following: • `BASELINE`: The shared model is automatically uploaded to the set Trimble Connect project folder each time a user creates a new baseline. • `WRITEOUT`: The shared model is automatically uploaded to the set Trimble Connect project folder after each successful write out. If you do not want to upload the model to a Trimble Connect project, clear the **Value** field.
Models	Opens the list of models in the linked Trimble Connect project. You can adjust how models are shown, add Connect models as overlays on top of the Tekla Structures model, create new sub-folders for models, and remove models from the list of used models. You can also download or export reference models.
ToDos	Opens the list of ToDo notes in the linked Trimble Connect project. You can add and modify ToDo notes, add markups or comments for ToDo notes, and assign ToDo notes to users or user groups.

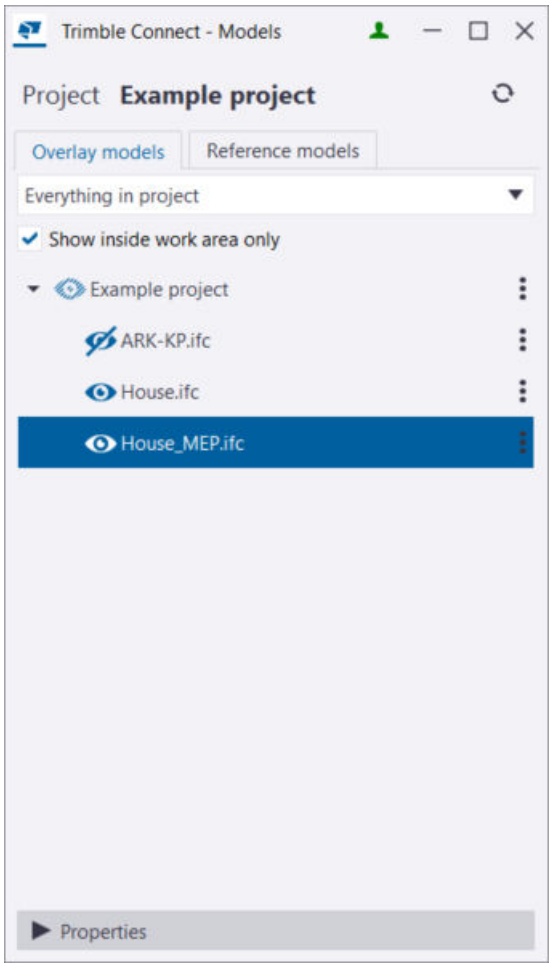
Button	Action
For Windows	Opens the Trimble Connect project linked to the current Tekla Structures model in the Trimble Connect for Windows application.
Match with Trimble Connect for Windows view	Adjusts the camera, zoom level, and projection of the Tekla Structures model view to match the current 3D view in Trimble Connect for Windows.
Match with Tekla Structures view	Adjusts the camera, zoom level, and projection of the Trimble Connect for Windows 3D view to match the current model view in Tekla Structures.
Select in Trimble Connect for Windows	Selects the objects that are currently selected in the Tekla Structures model also in Trimble Connect for Windows.
Select in Tekla Structures	Selects the objects that are currently selected in Trimble Connect for Windows also in the Tekla Structures model.

New Connect overlay models

An *overlay model* is a lightweight reference model that is stored in a Trimble Connect project. Overlay models show model objects, parts, rebars, bolts, and assemblies on top of Tekla Structures models. However, pours and pour units are not shown. You can attach overlay models to your Tekla Structures model, view the attached overlay models in a clear tree structure, and manage overlay models in several ways.

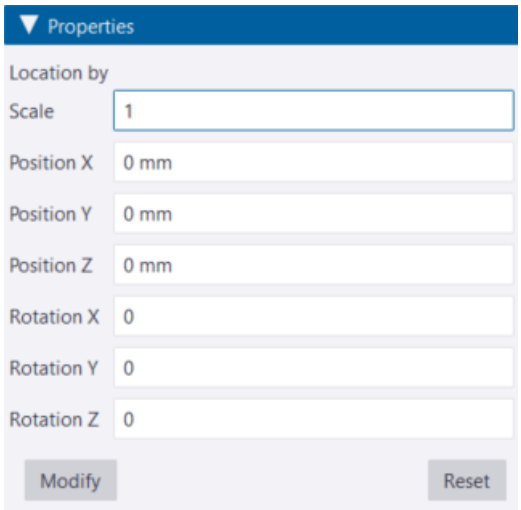
To start managing Connect overlay models:

- Click **Models** on the tab, and ensure that the **Connect models** tab is open.



Here, you can:

- hide or show overlay models by clicking the and icons
- adjust the scale and position of overlay models in the **Properties** section



RESTRICTION	The **Rotation X** and **Rotation Y** values are currently ignored when you insert a reference model to Trimble Connect.

- remove overlay models from the model list and from the local computer
- create sub-folders for overlay models under a Trimble Connect folder
- attach new overlay models to your Tekla Structures models
- zoom to overlay models in a Tekla Structures model view

1.18 New VR mode and other improvements in Trimble Connect Visualizer

You can now view your rendered models in virtual reality mode using Trimble Connect Visualizer. New materials have also been added for material mapping between Tekla Structures and Trimble Connect Visualizer.

View the rendered model in virtual reality mode

The new VR mode in Trimble Connect Visualizer allows you to quickly switch to viewing the rendered model in virtual reality mode. When you are working in the VR mode, you can move either with the keyboard or with an Xbox One controller that is connected to your computer. Moving in the VR mode imitates the speed of walking or running.

The VR mode uses the OpenVR API. That is why to use the VR mode:

- A VR device that is compatible with OpenVR must be attached to your computer and configured according to the instructions of the hardware vendor. Among others, HTC Vive, Oculus Rift, Windows MR, and VarjoVR devices are compatible with OpenVR.

  Check the technical specifications of the device to see if the device has enough capacity for working in the VR mode in Trimble Connect Visualizer.
- Steam and SteamVR need to be downloaded and installed onto your computer, and SteamVR needs to be configured.

1. To start working in the VR mode, click  in the Trimble Connect Visualizer side pane.

If you use the keyboard to move in the VR mode, the keyboard controls are the same as in the regular 3D mode of Trimble Connect Visualizer. To move at running speed, hold down **Shift**.

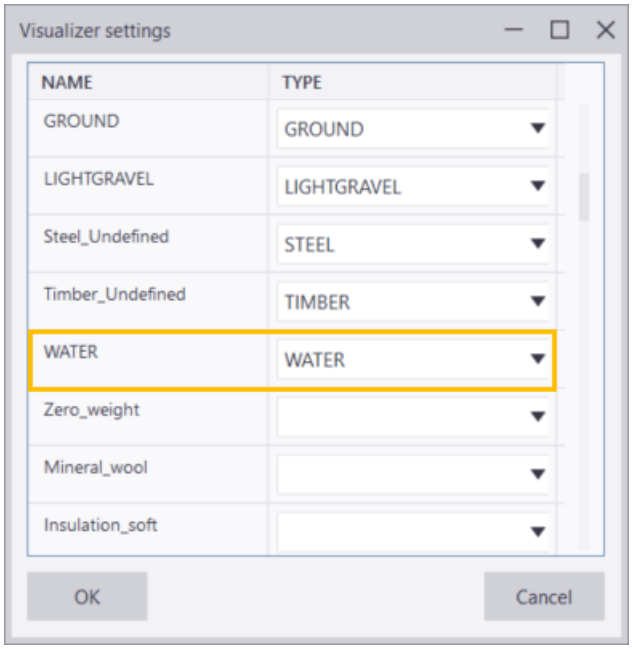
If you use an Xbox One controller:

- To move the viewer relative to the view direction, use the left stick.

- To rotate around the global vertical axis, use the right stick.
- To move up and down, use the left and right triggers.
- To move at running speed, hold down the left stick.

New mappable material: water

The **Visualizer settings** dialog box now has the option to map Tekla Structures materials to water.



1.19 Tekla Model Sharing improvements

Tekla Structures 2020 introduces several improvements to Tekla Model Sharing. For example, you can now view the local changes that you have made in the model but that you have not yet shared to other users.

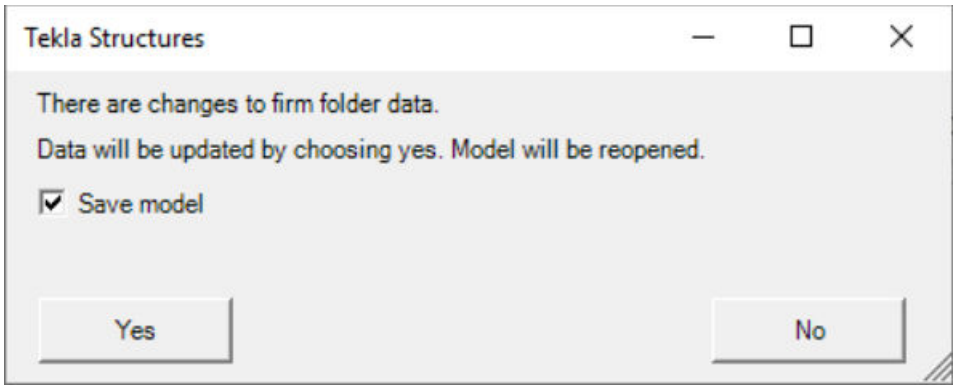
Use Trimble Connect folders as XS_PROJECT and XS_FIRM folders

You can now use a folder in a Trimble Connect project as the project or firm folder in Tekla Structures. This makes it easier to use the `XS_PROJECT` and `XS_FIRM` features when multiple teams on different sites are working on the same model.

Note that the project and firm folder data is only updated from the Trimble Connect project to local versions of the shared models, not vice versa. In

practice, this means that Tekla Structures downloads new files from the project or film folder to the local model and updates any changed files. If a local file is not in the Trimble Connect project sub-folder, it is removed from the local model.

When you open a model, Tekla Structures searches for differences between the local model data and the data in the Trimble Connect project or firm folder. If Tekla Structures detects a change in the project or firm folder data, you get the following notification:



If you click **Yes**, the model is saved and closed. Then, the local model data is updated. When the data has been updated, the model opens again.

If you click **No**, the local model data is not updated.

Use a Trimble Connect project sub-folder as the XS_PROJECT folder

To use a Trimble Connect project sub-folder as the project folder:

1. On the **File** menu, go to **Settings** --> **Advanced options**.
2. In the **Advanced Options** dialog box, find the `XS_PROJECT` option.
3. Set the value of the advanced option to `%CONNECT_FOLDER_SYNC%`.

   `%CONNECT_FOLDER_SYNC%` points to `:\Users\<user>\AppData\Local\Trimble\Tekla folder sync\<folder>`.

NOTE If you use the same Trimble Connect project as the `XS_PROJECT` folder and for collaboration, you need to use a sub-folder that is separated from the Trimble Connect collaboration information as the `XS_PROJECT` folder. In this case, the sub-folder is set as `%CONNECT_FOLDER_SYNC%\<folder>\<sub-folder of the folder>`.

For example, you could save the project folder under the `Project settings` folder with the name `Project`. In this case, the value should be set to `%CONNECT_FOLDER_SYNC%\Project Settings\Project`.

Use a Trimble Connect project sub-folder as the XS_FIRM folder

To use a Trimble Connect project sub-folder as the firm folder:

1. On the **File** menu, go to **Settings** --> **Advanced options**.
2. In the **Advanced Options** dialog box, find the `XS_FIRM` option.
3. Set the value of the advanced option to `%CONNECT_FOLDER_SYNC %<ProjectID>;<region>`.

   You can see the project ID in Trimble Connect for Browser:

   The region is the same as the project server location setting. The options are:

   - asia
   - europe
   - northAmerica

   So, for example, the value could be `%CONNECT_FOLDER_SYNC%m1G-M21Ca_o;northAmerica`.

NOTE If you use the same Trimble Connect project as the `XS_FIRM` folder and for collaboration, you need to use a sub-folder that is separated from the Trimble Connect collaboration information as the `XS_FIRM` folder. In this case, the sub-folder is set as `%CONNECT_FOLDER_SYNC%\<ProjectID>;<region>%<folder>%<sub-folder of the folder>`.

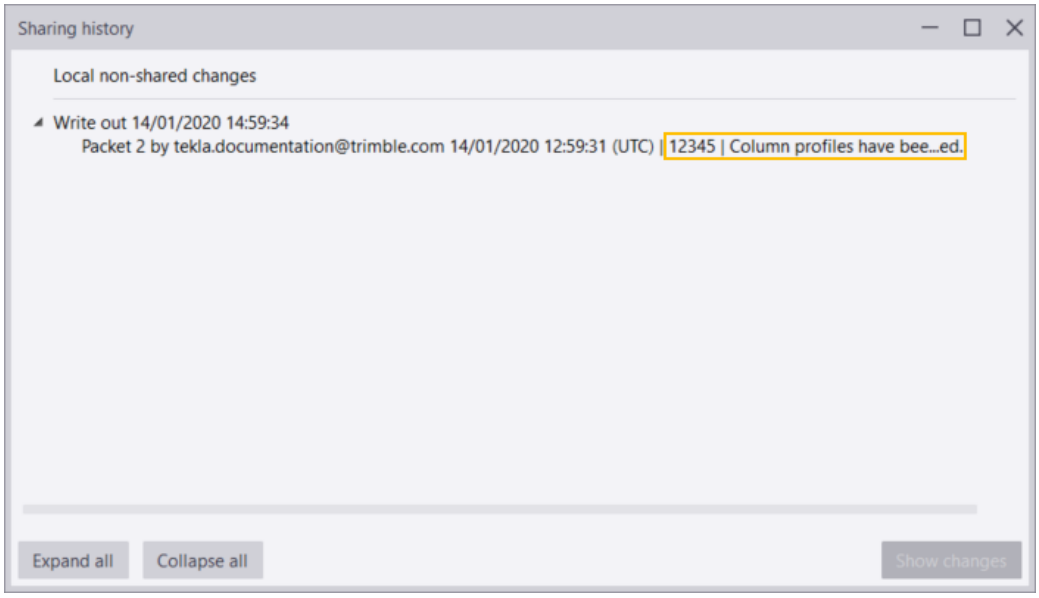
For example, you could save the project folder under the `Project settings` folder with the name `Project`. In this case, the value should be set to `%CONNECT_FOLDER_SYNC%\m1G-M21Ca_o;northAmerica%Project Settings%Project`.

Sharing history dialog box: view update codes and comments and local changes

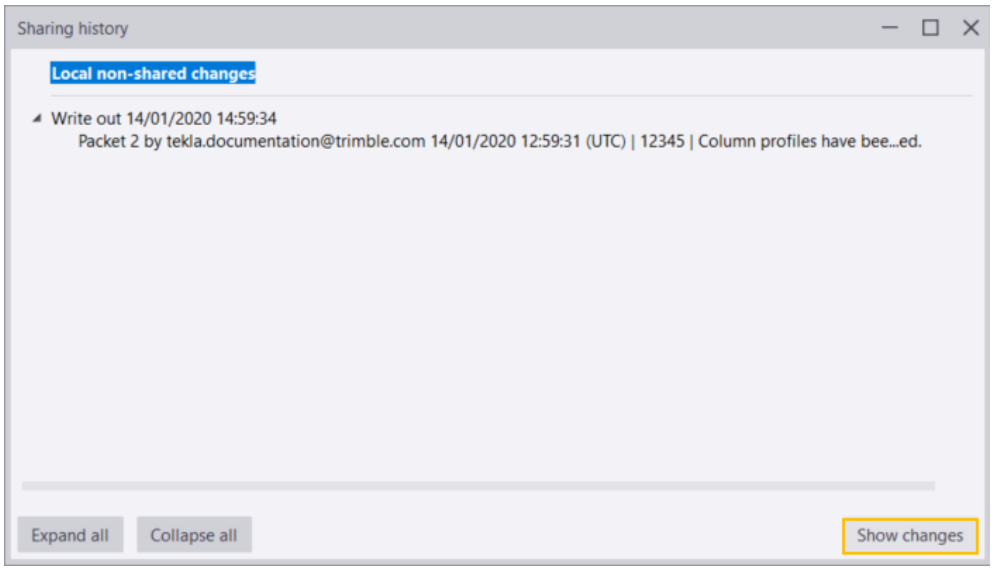
The **Sharing history** dialog box has two main improvements:

- The packet information now shows the update code and comment. Note that if the comment is long, it might not be shown entirely.

  For example, a packet with the code `12345` and the comment `Column profiles have been edited` would show as:

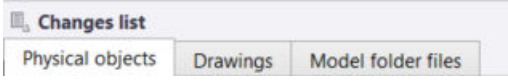


- You can view the local changes that you have made in the model before sharing them. You can currently view changes made to physical model objects, drawings, and files in the model folder:
  - Select **Local non-shared changes** and click the **Show changes** button.



  The local changes are shown in the **Changes list** at the bottom pane of Tekla Structures.

  You can see different types of changes by clicking the tabs at the top of the **Changes list**.



Stronger object locks

Object locks have been strengthened in Tekla Model Sharing so that users that do not belong to the right organization can no longer modify the `privileges.inp` file. This prevents mistakes in shared models, because users in different organizations cannot accidentally unlock and modify each others' objects.

If a user is not allowed to modify the `privileges.inp` file, the file is either:

- not included in the packets that the user reads in (the case of regular packets)
- restored in the next writeout after a user has made changes to it (the case of new baselines)

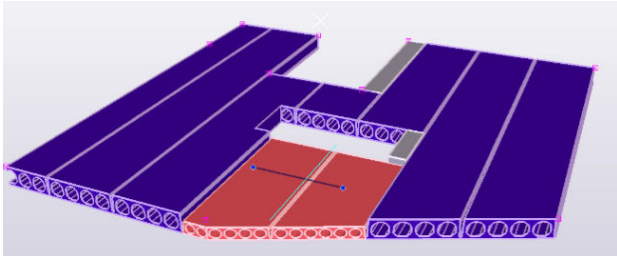
  Note that even when the `privileges.inp` file is restored, the file has no comments that show if a user has tried to modify the file.

1.20 Improvements in components

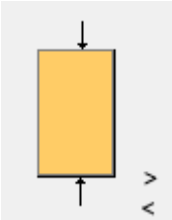
There are several improvements in concrete components and steel components in Tekla Structures 2020.

Concrete components

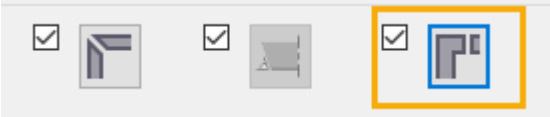
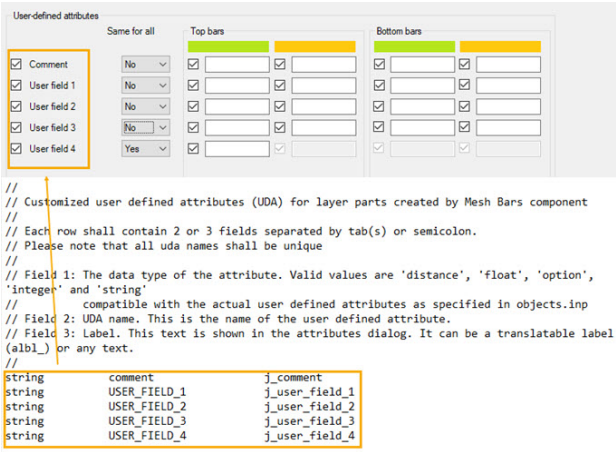
Component	Description
Floor layout	• You can now define property strips that have certain properties and detailing components, and use the property strips according to your needs in the floor layout. Note that property strips only affect the main layer parts. To define a property strip, click  on the contextual toolbar of **Floor layout**. This opens a dialox box where you can define the property strip, and select which detailing component is used. Property strips are added as lines in the floor layout plane. Property strips affect the parts that they are touching. You can also set

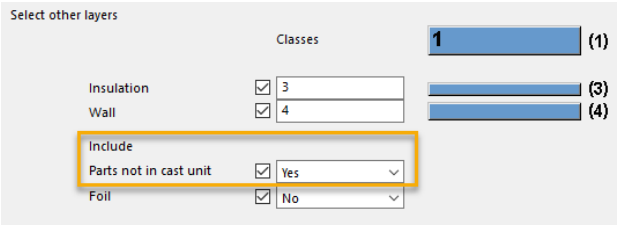
Component	Description
	property strips so that they affect through the slab line. The image below shows an example of a property strip. The two slabs have a different class and profile because of the property strip.  Note that property strips cannot change the width of the line of slabs. Define the width using the width properties of **Floor layout**. • You can now use the new **CIP filler parts** tab to control the creation and properties of all CIP filler parts. Previously, you used the separate **Floor layout CIP filler** component to do this. **Floor layout** creates the filler parts together with any other floor parts. In addition to the empty areas in floors, CIP filler parts can be created when: • The allowed slab width is smaller than the needed width. • The opening is larger than needed because of allowed width zones. • The slab is split into two because of a large opening. • The slab nose is not created because it is too narrow. • You can now define the maximum slab length on the **Advanced** tab. If the slab

Component	Description

	length is longer than the given maximum length, the slab is not created.
	 
	In addition, you can now define the profile and width specific minimum/maximum lengths in the `FloorLayout.ini` file as shown below. If the file contains any values for the profile, these values will be used and they override the minimum/maximum lengths defined in the **Floor layout** dialog box.
	`/`
	`// Min/max lengths by slab profile & width min/max`
	`//`
	`// Profile Width min/max Length min/max`
	`SLAB_LENGTH P20(200X1200) 0-1200 2000-9000`
	`SLAB_LENGTH P32(320X1200) 0-601 2500-10000`
	`SLAB_LENGTH P32(320X1200) 601-1200 2500-12000`
	• The `floorlayout.objects.inp` file can now be located in the model folder, or in any of the folders set in the `XS_FIRM`, `XS_PROJECT`, or`XS_SYSTEM` advanced options.
	• You can now use the new **Align the openings by allowed widths** option on the **Advanced** tab. Select **Yes** to re-align the opening/cut longitudinal edges to match the allowed width zones. The default value is **No**. Existing floor layouts are not affected until you modify the option value to **Yes**.
	• When **Floor layout** is updated, the GUIDs of the first and last end slabs are not changed. This ensures that any detailing, such as wire loop notches made to the first or last slabs, is maintained as far as possible.

Wall layout	• The `WallLayout.Udas.dat` file can now be located in the model folder, or in any of the

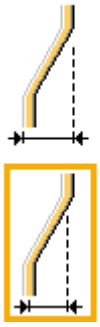
Component	Description
	folders set in the `XS_FIRM`, `XS_PROJECT`, or `XS_SYSTEM` advanced options. • In **Wall layout connector**, you can now define how the parts forming the turning corner are modeled. When you select this option, **Wall layout connector** creates an additional part that is added to the cast unit. The turning corner part is created with the (first) name given in the system file `SandwichWallCornerPartNames.dat`. 
Mesh bars / **Mesh bars by area**	• You can now define user-defined attributes (UDA) for reinforcing bars on the **Attributes** tab. You can select for which rebars the UDAs are defined, or you can define them for all rebars. UDAs can be set for the rebars in reinforcing bar groups and meshes. The UDAs are predefined in the `meshbars.udas.dat` file. The file can be located in any of the folders set in the `XS_FIRM`, `XS_PROJECT`, or `XS_SYSTEM` advanced options, and in the model folder.  • You can now set the bar edge distance as a negative value. Note that this will only offset the bars. To get a fully offset mesh, set the cover thickness for the sides on the **Bar end conditions** tab to a negative value.

Component	Description
	• On the **Detailing** tab, the **Create cuts around selected parts** function has been improved. Filter recognition in the list of filters has been improved and the selected filter is now visible when you reopen the component dialog box in the model.
Geometry detailing strip	• You can now define the strip offset from the input line.  • You can now select how the cut is modeled. The options are **Cut only**, **Cut and part**, and **Part only**. • You can now control the properties of the created part. With the **Use main part properties** option, the added part gets the properties of the main part. Otherwise, you can select the saved standard attributes for the concrete beam. Note that if you change the saved properties afterwards, you need to modify the geometry detailing strip to get the properties of the added part updated.
Sandwich wall horizontal seam **Sandwich wall vertical seam**	On the **Rabbets** tab, there is now a new tongue joint connection type based on the center line and a new groove joint connection type based on the outer geometry.
Sandwich wall window	• On the **Picture** tab, you can now select that parts not belonging to the cast unit are cut.  • You can now create the frame as an assembly. You can add window and door frames to a shell as one subassembly by selecting **Subassembly** for **Wooden frame to** on the **Connections** tab.
Embedded anchors (8)	• You can now define a rounding value for anchor distances on the **Placement** tab.

Component	Description
	• The center of gravity calculation for assemblies now takes parts with negative material density into account.

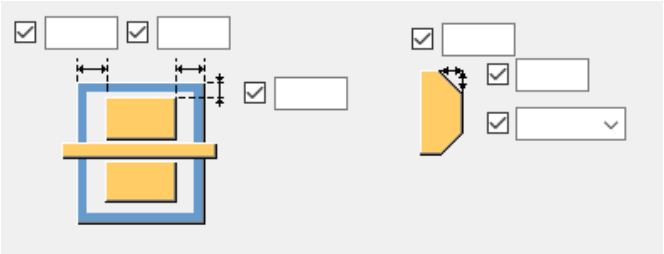
Automated reinforcement layout - Double tee beam (51)	• You can now use the **Ignore cutouts in strand layout** setting on the **Attributes** tab to ignore cutouts when counting the strand layout.
	• You can now define stem mesh creation at voids on the **Attributes** tab.
	  • You can select whether individual stem mesh layers are created when the layer touches a void.
	  • You can select whether to cut the meshes at void locations.

Stirrup reinforcement (67)	• You can now filter holes and recesses based on the name or class on the new **Holes and recesses** tab. • You can now reinforce areas in hole segments and define an extra cover thickness for them on the **Holes and recesses** tab.
Beam reinforcement (63) **Strip footing reinforcement (75)** **Corbel reinforcement (81)** **Rectangular column reinforcement (83)**	There is now a new U-shape stirrup available.
Strip footing reinforcement (75)	You can now create straight stirrup rebars on the **Stirrups** tab. 
Pad footing reinforcement (77)	On the **Picture** tab, you can now set the alignment of the secondary bars of the created mesh perpendicular to the primary bars, or align the primary and secondary bars to the skewed edges.
Lifting anchor (80)	You can now select to allow anchor distribution based on percentage of the length.
Corbel reinforcement (81)	• On the **Transverse stirrups** tab, you can now select whether the column is reinforced with transverse stirrups.

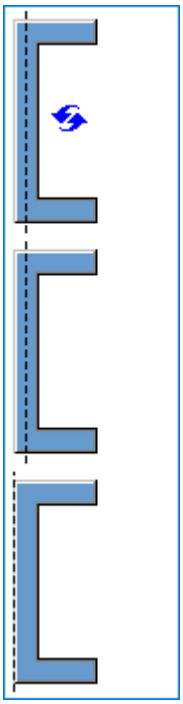
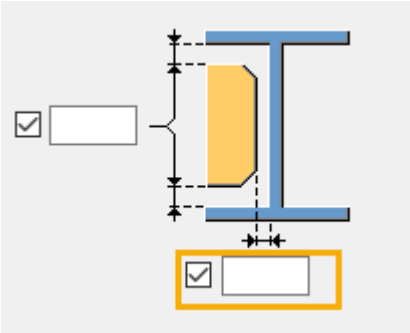
Component	Description
	• Reinforcing corbels which are thicker than the column now work correctly.
Rectangular column reinforcement (83)	On the **Bar ends** tab, there is a new cranking option where cranking is measured from the center line of the rebar. 
Round column reinforcement (82) **Rectangular column reinforcement (83)** **Rectangular area reinforcement (94)**	You can now define the end conditions for the main bars and the side bars.
Precast foundation block (1028)	You can now define angles for grooves on the **Grooves** tab.

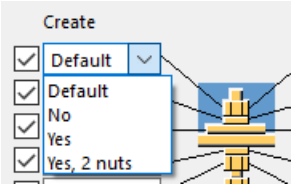
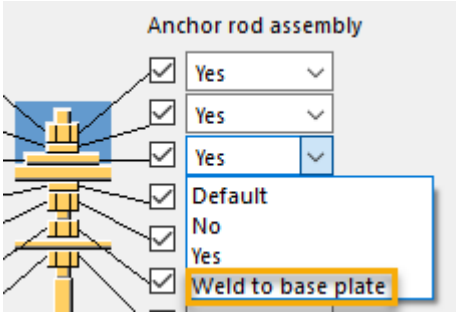
Steel components

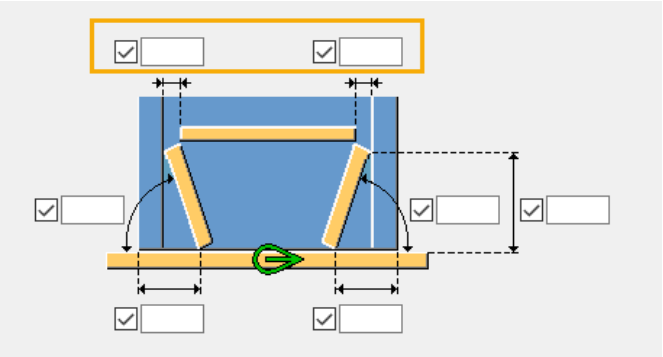
Component	Description
Cold rolled overlap (1)	You can now define the stay rotation on the **Stays** tab.
Tube gusset (20)	You can now create chamfers to the stiffeners on the **Stiffeners** tab.
Tube crossing (22)	On the **Brace conn** tab, you can now define the size of the end plates by distances from the

Component	Description
	edges of the secondary part. You can also create chamfers on the end plates. 
Stiffened end plate (27)	You can now create chamfers to the shear tab on the secondary part side.
Cranked beam (41)	You can now define a gap between the stiffener plates and beam flanges on the **Parameters** tab.
Welded shear plate (43)	You can now use weld 7 between the shear tab and the secondary part.
Brace corner tubes and pl (44)	Weld creation has been changed and new welds have been added. • Weld 1 now controls the weld between the gusset and the parts. • Weld 2 controls the weld between the brace and the connection plates. • Weld 3 now controls the weld between the brace and the cap plate. • Weld 4 now controls the weld between the connection plates and the spacer. • Weld 5 now controls the weld between the gusset and the doubler plate.
Corner tube gusset (56)	Weld creation has been changed in the following way: • You can now use weld 1 for welding the gusset plate to the main part. • You can now use weld 4 for welding the gusset plate to the last secondary part. • On the **Gusset** tab, there is a new option for setting the creation of both of these welds at the same time. 

Component	Description
Wraparound gusset (58)	You can now define a clearance between the connection plates/clip angles and the gusset plate on the **Gusset** tab.
H&V Shear Pl (64)	You can now create plate washers using the options on the **Parts** tab. 
Shear plate built-up T (69)	You now control the creation of haunch plates on the **Parameters** tab, and define the haunch plate properties on the **Parts** tab.
Splice connection (77)	You can now define a different number of bolts and different spacings between the bolts for the main and secondary web and flange bolts.
Extend full depth tab (82)	You can now define the tab plate name on the **Parts** tab.
Batten plates (S85)	On the **Picture** tab, you can now define equal distribution of batten plate spacing on both sides of the input point.
Bolted moment connection (134)	On the **Flange Blt** tab, you can now define if slotted holes are included for deck fill and loose fill plates.

Component	Description
Clip angle (141) **Two sided clip angle (143)**	On the **Parts** tab, you can now define the center of the bolt gage line from the back of the secondary part web.  You can use this option when the secondary part has a C or U profile.
Shear plate simple (146)	You can now define the size of the gap between the main part web and the stiffener on the **Stiffeners** tab. 
Base plate (1004)	On the **Parameters** tab, you can now define that two grout holes are created in the base plate.
Base plate (1004) **Stiffened base plate (1014)**	You can now define the bolt cut length on the **Bolts** tab.

Component	Description
Web stiffened base plate (1016) **Base plate (1042)** **U.S. Base plate (1047)** **Circular base plates (1052)** **Base plate (1053)** **Box column base plate (1066)** **Tapered column base plate (1068)**	
Stiffened base plate (1014)	You can now define the material of extra profiles on the **Extra plates** tab.
Stiffened base plate (1014) **Base plate (1042)** **U.S. Base plate (1047)**	• You can now select to create two nuts at the top of the anchor rods using the option on the **Anchor rods** tab.  • You can now select to create mounting grooves in the base plate using the options on the **Parts** tab.
Base plate (1004) **Stiffened base plate (1014)** **Web stiffened base plate (1016)** **Base plate (1042)** **U.S. Base plate (1047)** **Circular base plate (1052)** **Tapered column base plate (1068)**	You can now weld plate washers to the base plate using the option on the **Anchor rods** tab. 
Web stiffened base plate (1016) **Stiffened shear plate (17)**	The default width of stiffeners is now calculated using the XS_STANDARD_STIFFENER_WIDTH_TOLERANCE advanced option.

Component	Description
Beam with stiffeners (129) **Column with shear plate (131)** **Bolted moment connection (134)** **Beam to beam stub (135)** **Clip angle (141)** **Bent plate (151)** **Moment connection (181)** **Column with stiffeners W (182)** **Column with stiffeners (186)** **Column with stiffeners S (187)**	
Web stiffened base plate (1016)	You can now define the gap between the upper horizontal stiffener and the main part flange. 
U.S. Base plate (1047)	• You can now select to create plate washers below the base plate on the **Anchor rods** tab. • You can now define the weld between the key profile and the base/leveling plate using weld number 5.
Circular base plate (1052)	• You can now define the finish property for all parts. • You can now set the position of the grout to above or below on the **Anchor rods** tab.

2 Tekla Structures 2020 administrator's release notes

Upgrade guide from Tekla Structures 2019i to Tekla Structures 2020

Administrator's release notes are intended to provide advanced users with instructions on how to apply the additional customizations available in a new Tekla Structures version.

2.1 Administrator's release notes: General settings

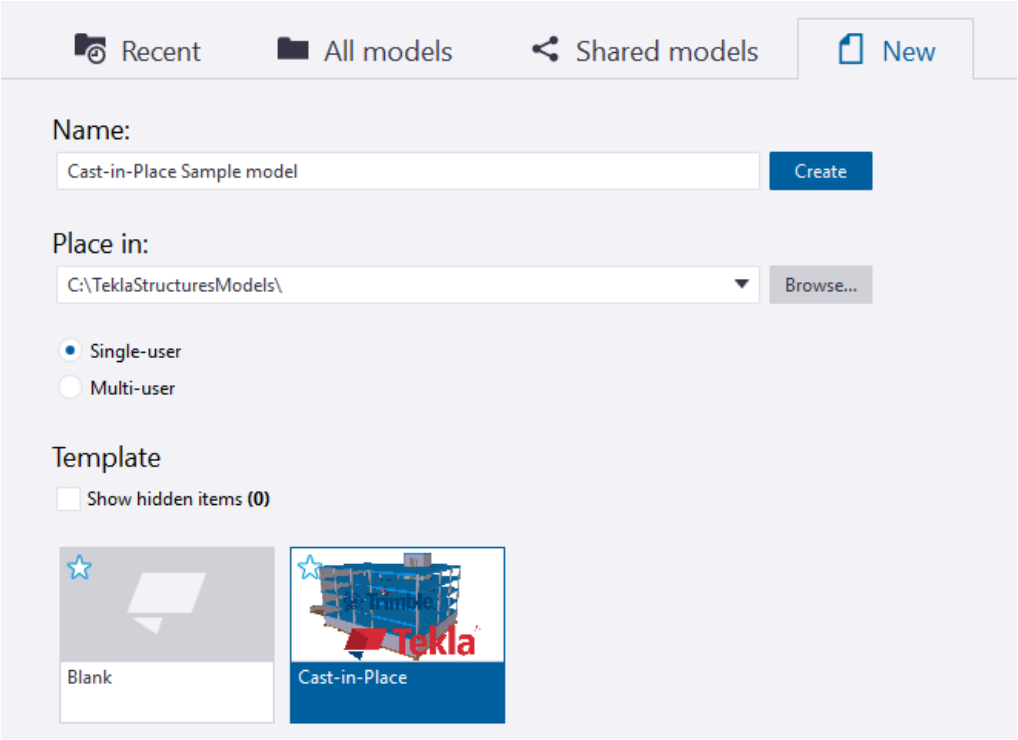
General customization settings apply to all user groups. Use these settings together with your own user group settings.

Administrator's release notes: Model templates in version update

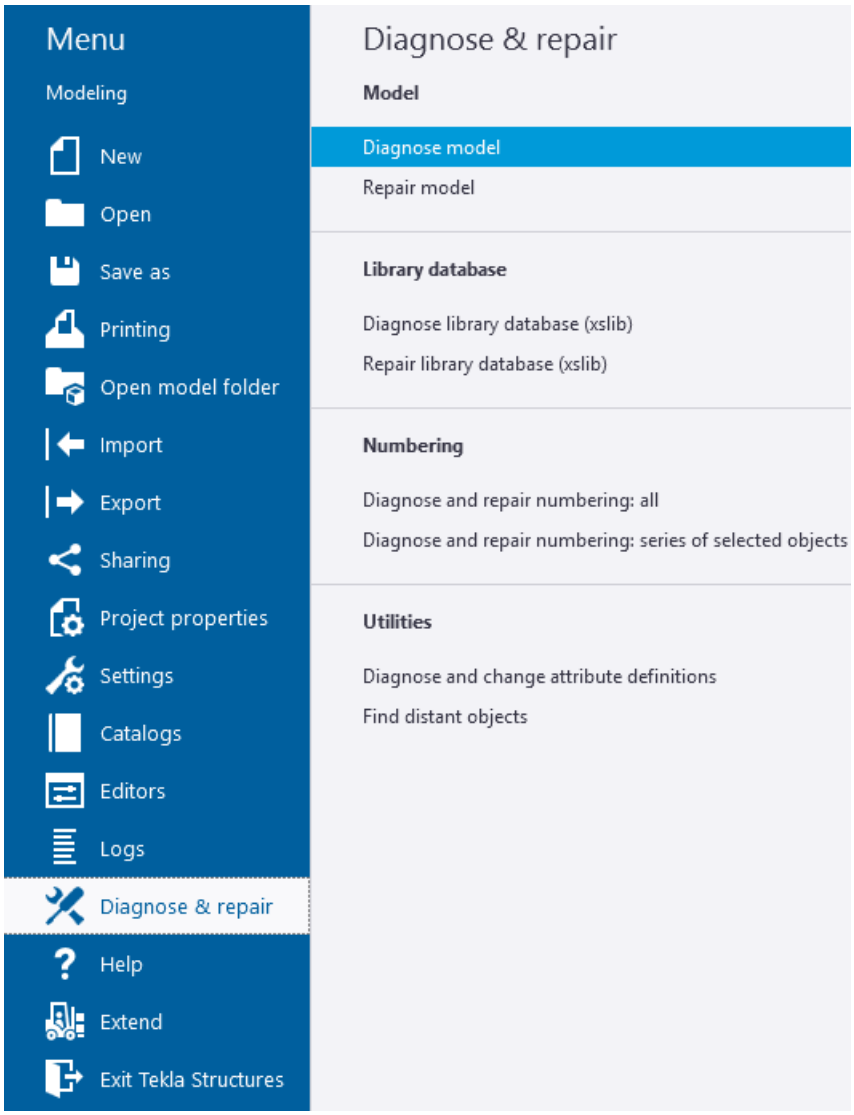
Update model templates

If you have sketched profiles or custom components that use sketched profiles, download the Sketch solver tool from Tekla Warehouse and install it on your computer before updating model templates.

1. Open Tekla Structures 2020.
2. Create a new model using an existing model template.
3. Give the model the same name as in the previous Tekla Structures version.

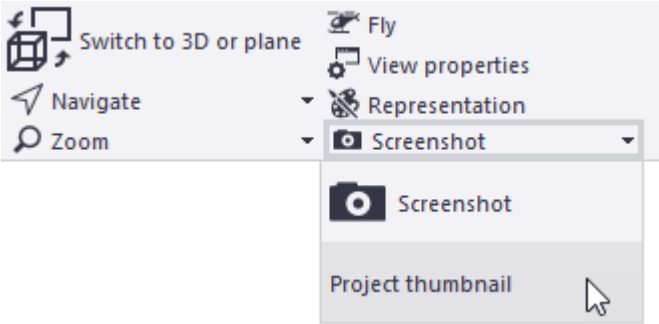


4. Open a 3D view.
5. Diagnose and repair the model.



6. Create a project thumbnail, or add a custom image named `thumbnail.png` in the model folder.

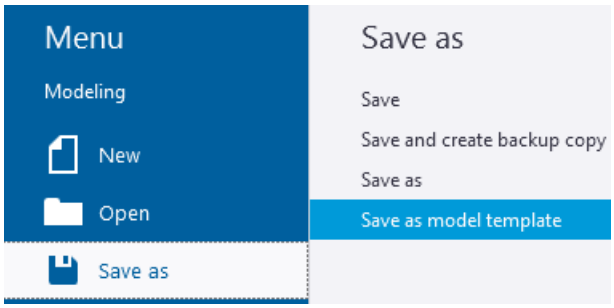
   The preferred size of the image is `120 x 74` pixels.



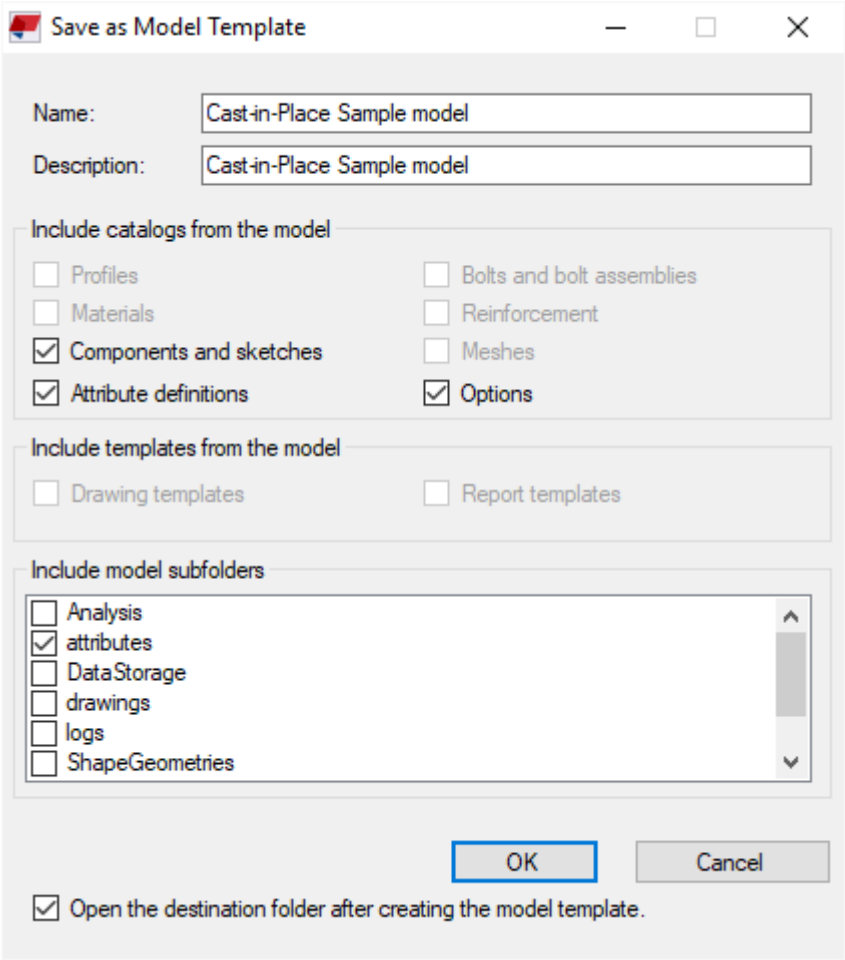
7. Save the model.

   If you do not do this, a message may appear warning about the model being created with a previous version.

8. Save the model as a model template.



9. Include the needed catalog files and subfolders from the model folder, and click **OK**.



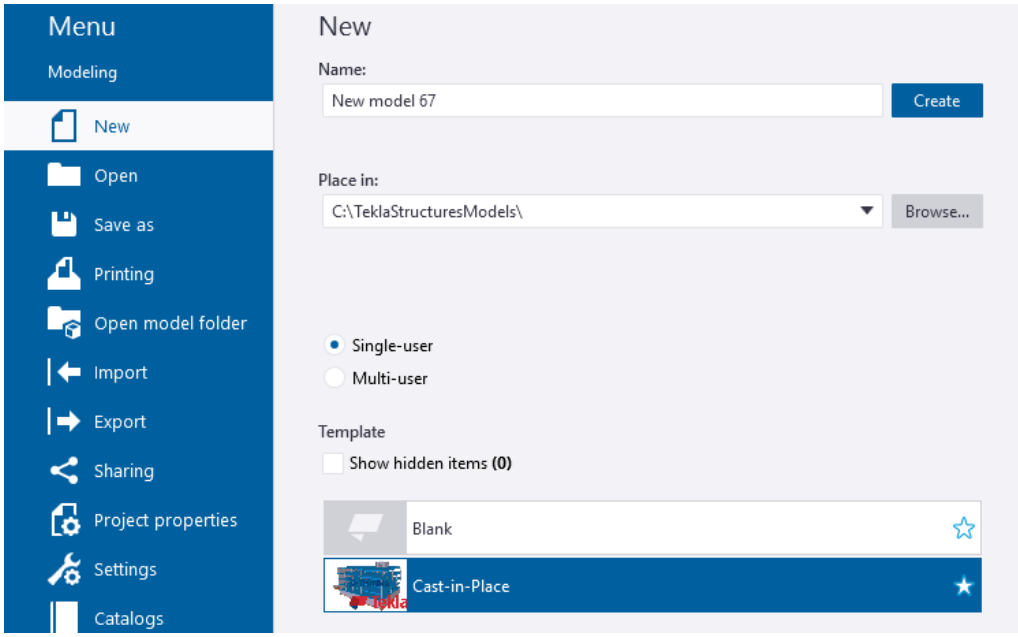
10. Remove manually all `*.db` files (environment database, options databases) from the model folder.

The `*.bak`, `*.log` and `xs_user` files are automatically removed from the model folder.

The `.idrm` files (`db.idrm` and `xslib.idrm`) should be kept as they are part of the model.

The model template is saved in a location pointed by `XS_MODEL_TEMPLATE_DIRECTORY`.

You now have a sample image for your model template. The **Applications & components** catalog is now also in order and easy to use.



Administrator's release notes: Applications & components catalog maintenance

Keep the **Applications & components** catalog in shape and usable. For more information about the **Applications & components** catalog, see .

Set `XS_COMPONENT_CATALOG_ALLOW_SYSTEM_EDIT` to `TRUE` to be able to edit the **Applications & components** catalog definition files that are located in the `XS_SYSTEM` folders.

Check and fix the following:

1. Add the items to groups

Check **Ungrouped items** and add the items to the appropriate group.

2. Check the logs for errors

The **Applications & components** catalog shows the message log button in the lower-right corner of the catalog if there are errors or warnings in the catalog definition files, for example.

If there are references to missing plug-ins, go to the referred `ComponentCatalog.xml` and remove the references manually:

```
<ComponentCatalogItemPlaceholder>
  <ItemIdString>CatalogMacroModelingItem?CreateSurfaceView?GLOBAL</ItemIdString>
</ComponentCatalogItemPlaceholder>
<ComponentCatalogItemPlaceholder>
  <ItemIdString>CatalogPluginComponentItem?CopyModelDirectoryPlugin</ItemIdString>
</ComponentCatalogItemPlaceholder>
<ComponentCatalogItemPlaceholder>
  <ItemIdString>CatalogMacroModelingItem?CloseViewsExceptSelected?GLOBAL</ItemIdString>
</ComponentCatalogItemPlaceholder>
<ComponentCatalogItemPlaceholder>
  <ItemIdString>CatalogMacroModelingItem?CloseTemporaryViews?GLOBAL</ItemIdString>
```

Delete selected lines for each missing plugin

Test thoroughly that these changes do not create any further errors, or change the structure of your **Applications & components** catalog. Check at least the **Ungrouped items** and **Legacy catalog** groups.

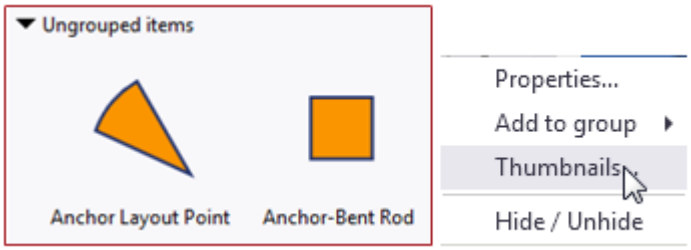
As in the example above, there may be errors for:

- `CatalogPluginComponentItem?CopyModelDirectoryPlugin`
- `CatalogPluginComponentItem?SaveAsModelTemplatePlugin`

3. Hide all non-related applications and components from roles

1. In the **Ungrouped items** catalog, select the **Show hidden items** check box at the bottom.
2. Right-click an application or a component and select **Hide / Unhide**.

4. Create custom thumbnails



Publish a component in the Applications & components catalog

You may need to use the same component with different settings in different cases. To easily use the component, you can define the settings for each case and publish the component in the catalog. This feature can be useful for some roles.

Administrator's release notes: Check changes in the Tekla Structures ribbon

You can customize the ribbon according your own needs. If the ribbon has been customized, additions in the new Tekla Structures version are not visible. It is always good to check the changes and add them to your own customized ribbon.

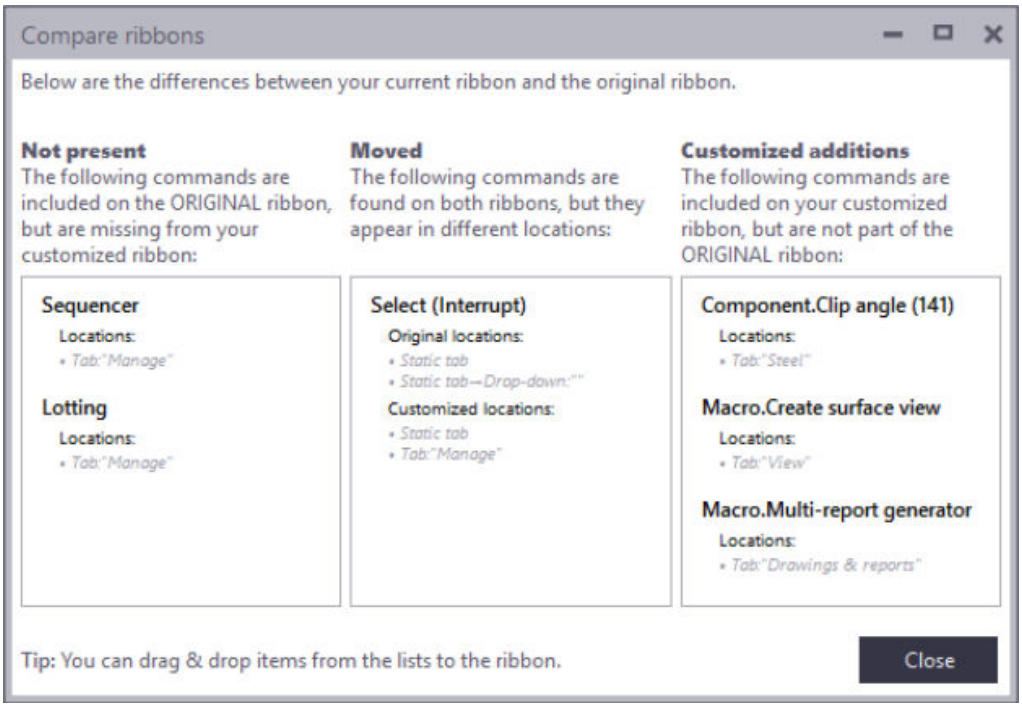
For more information see the instruction in .

Checking the changes

You can compare the original ribbon with the changes you have made. You can check what has been added and removed, and what has been moved to different tabs.

1. Save the customized ribbon, if you have not already done so.
2. Click the **Compare** button.
3. In the **Compare ribbons** dialog box, check the changes you have made.

   For example:



- **Not present** : These commands have been removed.
- **Moved**: These commands have been moved to a new place.
- **Customized additions**: These commands have been added.

NOTE **Original ribbon** refers to the ribbon file that came with the Tekla Structures installation for your current configuration.

4. If you have removed a command that you would like to get back, drag it from the **Compare ribbons** dialog box to the ribbon.
5. When you have finished, click **Close**.

Administrator's release notes: Property pane updates

You can define your own property pane values (for example, UDAs) in the `PropertyTemplates.xml` file which can be located in the `\<user>\AppData`, environment, company, or project folder.

The new Tekla Structures version can have new object types or properties. If you are using your own `PropertyTemplates.xml` file, the new object types or properties are not visible. You need to manually update your own `PropertyTemplates.xml` file. For information on how to customize the property pane, see .

There are typically three different cases:

- **New object types**

  These are automatically available in your property pane from the Default settings. It is good to check these but no action is needed if you do not have your own UDAs for this object type.
- **Changed object types or properties**

  You may need to delete and add new properties or groups.
- **Removed properties**

  These do not cause any functional problems but it is good to delete non-existing properties or empty groups from the settings files.

To do

Changed properties

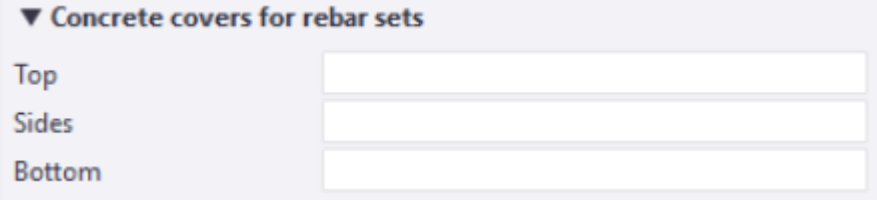
Delete the top, side and bottom properties from the concrete covers for rebar set groups. Add the new property. Repeat this to all object types.

Object types:

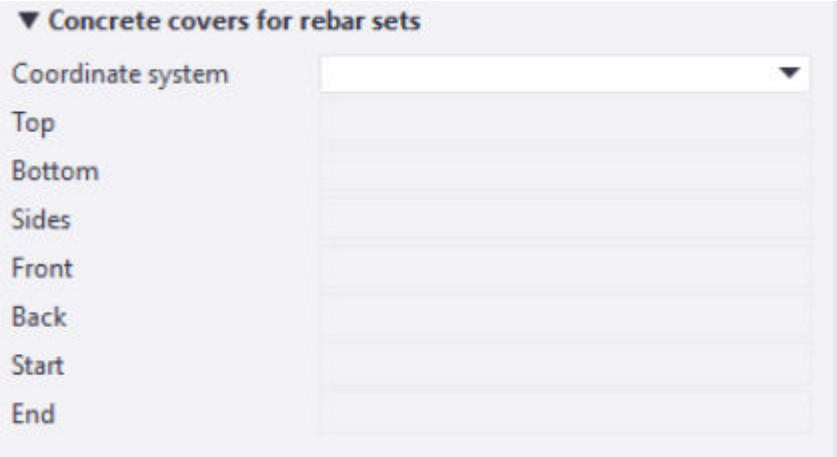
- Concrete column
- Concrete beam
- Concrete spiral beam
- Concrete panel
- Concrete slab
- Pad footing
- Strip footing
- Lofted slab

- Concrete item

Old:



New:



Removed property

Delete the property and the whole position group if it is empty.

Object types:

- Lofted slab
- Lofted plate

Administrator's release notes: Drawing layout editing updates

The drawing **Layout editor** has a number of useful improvements that aim to make the layout editing workflow easier.

You can now customize drawing layouts easily in a separate layout editing mode that shows all changes you make in real time.

The following improvements are available for layouts in **Drawing layout editor**:

- Customization of drawing sizes to be used with the **Specified size** and **Autosize** options in drawing properties.
- Control over margin and space properties for drawing views.
- Control over drawing frame margins and colors.
- Possibility to associate drawing layouts with certain drawing types (M/GA/A/C/W).

Country-specific environments need to be reviewed and localized according to your company's needs.

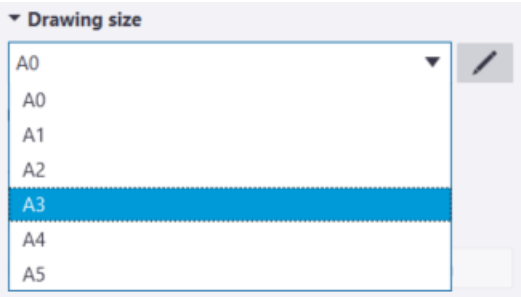
Files to update or localize

- Drawing layout (`.lay`) files
- Drawing properties (`.wd` / `.ad`/ `.cud`/ `.md`/ `.gd`)
- Common frames and foldmark settings (`standard.fms`)
- Printing-related settings (`DrawingsSizes.dat`, `PaperSizesForDrawings.dat`)

Updates in drawing sizes

Adding new drawing sizes for drawing layouts

Each drawing layout has to contain list of drawing sizes with customized table sets, frame properties, margins, and spaces. To smoothly use drawing layouts, ensure that each drawing layout has the necessary drawing sizes. You can see the existing drawing sizes in the **Drawing size** list in the **Layout editor** side pane.



The **Drawing size** list is populated with the sizes defined in the `PaperSizesForDrawings.dat` file. The can be located in:

- For the **USA** environment: `..\ProgramData\Tekla Structures\<version>\environments\USA\common\General\DrawingSettings`

- For all other environments: `..\ProgramData\Tekla Structures\<version>\environments\<environment>\...\ DrawingSettings\`

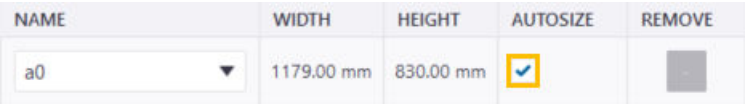
NOTE Tekla Structures printing uses the drawing sizes defined in `PaperSizesForDrawings.dat` file, and adds the external and internal margins set in the file. So, to make drawing sizes created in **Layout editor** equal to paper sizes in printing, you need to set the external and internal margins for printing to 0 in the `DrawingSizes.dat` file.

For more information on how to add, edit, or remove drawing sizes for a layout, see .

Updated drawing size definition options: Fixed size and Autosize

- To add and edit drawing sizes, in the **Layout editor** side pane, click the **Edit** button on the right side of the **Drawing size** list.

When you are adding drawing sizes in the **Drawing size settings** dialog box, you can select if Tekla Structures should use the drawing sizes for automatically selecting suitable drawing sizes for drawings. If you select the **Autosize** check box, Tekla Structures automatically uses the smallest possible drawing size that fits all content in the drawing layout.



You also need to set the size definition mode that is used for the drawing layout in drawing layout properties. The options are:

- **Specified size**: Tekla Structures only uses the size that you select in the **Drawing size** list below. It does not matter whether the **Autosize** check box has been selected for the drawing size in the **Drawing size settings** dialog box or not.
- **Autosize**: Tekla Structures automatically uses the smallest possible drawing size among the drawing sizes for which you have selected the **Autosize** check box in the **Drawing size settings** dialog box.

Renaming automatically generated drawing sizes

In previous Tekla Structures versions, table sets were associated to drawing sizes when the **Fixed sizes** or **Calculated sizes** option was selected on the . However, if you selected the **Specified size** option, the table sets were not associated to any drawing size.

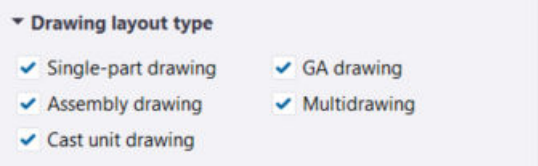
Now, when you open a layout file (`.lay`) with unassociated table sets that were created in a previous version of Tekla Structures, Tekla Structures

generates a drawing size to every table set automatically. The files are named with the format `###_[TABLE LAYOUT NAME]`.

All drawing sizes that have been generated using the old settings need to be saved with new, more appropriate names. For example, `###_Assembly_revision` could be renamed as `A1 Assembly_revision`.

Drawing layout types

If necessary, you can select which drawing types can use a particular drawing layout. In the **Drawing layout type** list in the **Layout editor** side pane, select the drawing types for which the current drawing layout can be used.



The drawing layout is only available in the drawing properties dialog boxes of the drawing types that have been selected in the **Drawing layout type** list.

Updates in margins, spaces, and frames

Drawing layout margins and spaces have been moved from Tekla Structures printing to **Layout editor**.

- To adjust the margins and spaces, in the **Layout editor** side pane, click the **Edit** button on the right side of the **Drawing size** list.

Note that the `standard.fms` file contains the global frame properties. If you do not define the frames, margins, and spaces individually for a drawing layout in the **Drawing size settings** dialog box, the properties in the `standard.fms` file are used.

Updates in tables

The new **Layout editor** does not require making changes to individual tables.

Note that the **Tables in use** list in **Layout editor** can contain table names that have been removed from the folder where the tables were stored. You need to delete these tables from the **Tables in use** list manually.

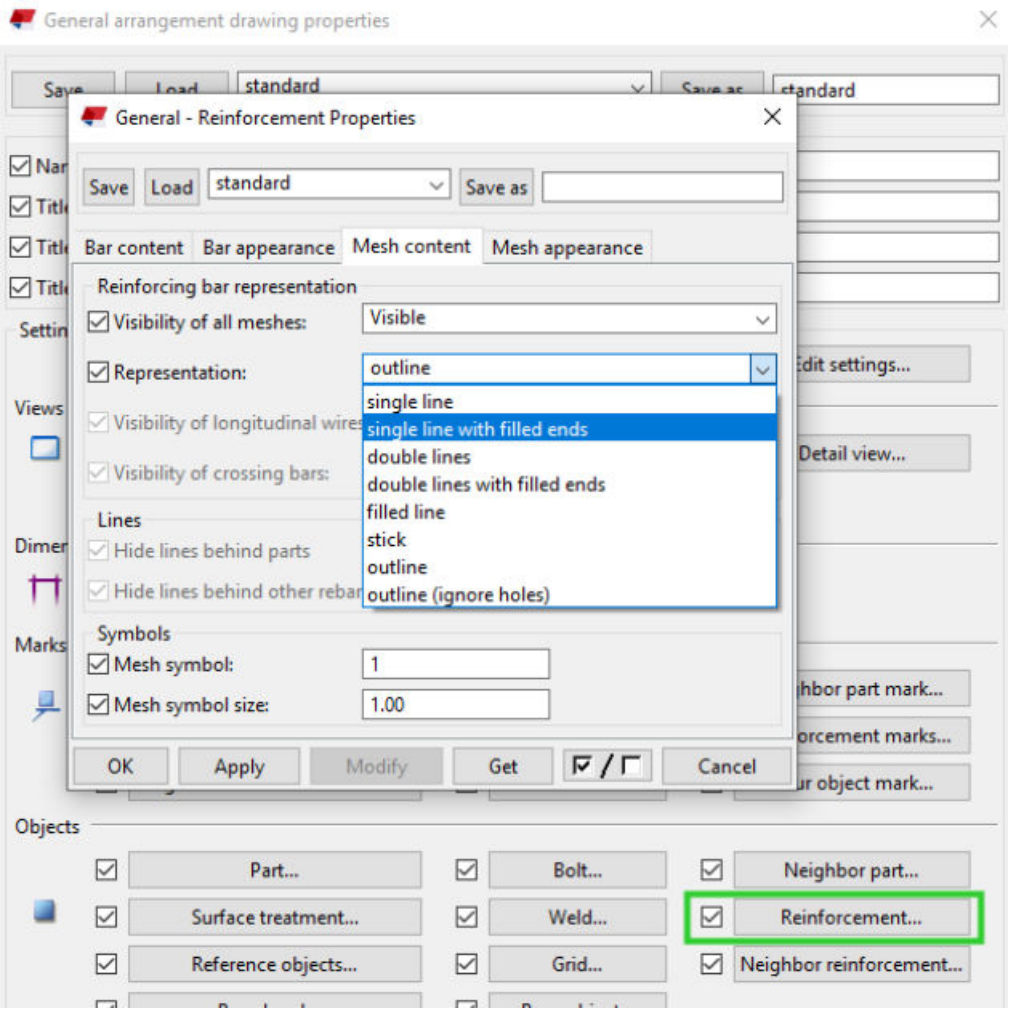
Administrator's release notes: Macro support for Document manager

Existing macros now start using the current macro runtimes which support WPF dialogs such as **Document manager** in Tekla Structures. This applies to Tekla Structures 2020 and later versions only.

Administrator's release notes: Miscellaneous drawing updates

Single filled ends for meshes

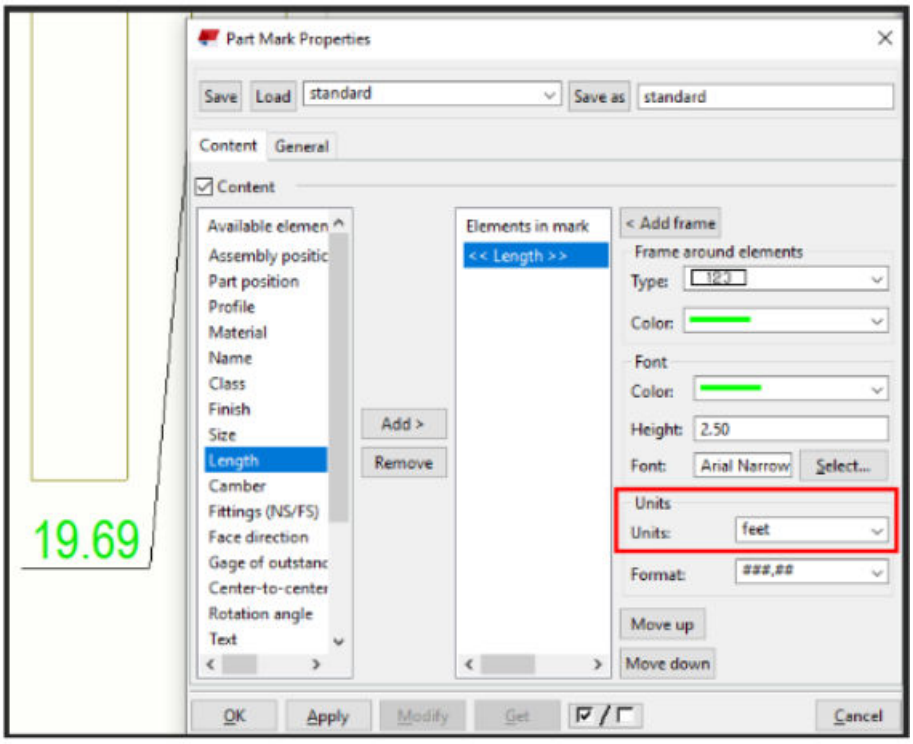
There is now an option in mesh representation for single lines with filled ends. Previously, this has been available for single bars, but was not available in the mesh representation.

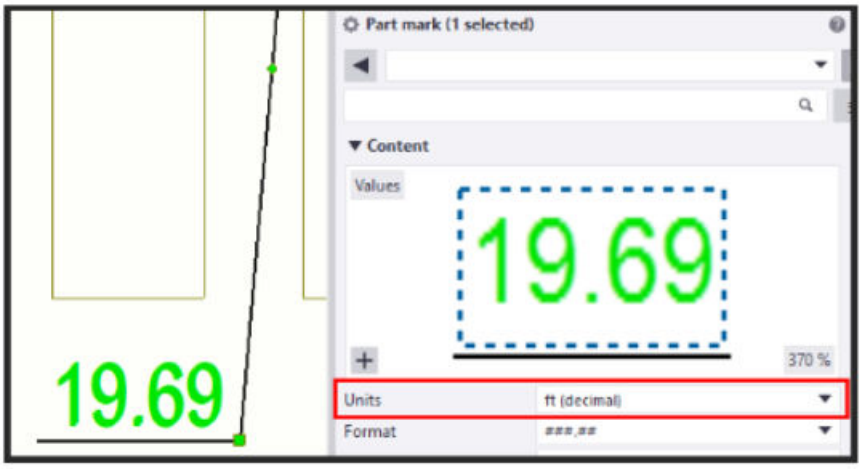


Update the standard file if you want to use the new representation (`*.gdr`).

Part marks now support decimal feet

It is now possible to set (decimal) feet for part mark properties.





Update the standard file if you want to use feet with decimals (`*.pm`).

2.2 Administrator's release notes: Steel settings

The following customization settings only apply to the steel user group.

Administrator's release notes: Steel components (page 103)

Administrator's release notes: Steel components

There are several improvements in steel components in Tekla Structures 2020.

Update your standard files if you want to use the new options and features.

For more information about these improvements, see Improvements in components (page 77) in Tekla Structures 2020 release notes.

2.3 Administrator's release notes: Concrete settings

The following customization settings only apply to the concrete user group.

Administrator's release notes: Rebar set updates

Bar layer as a reportable property

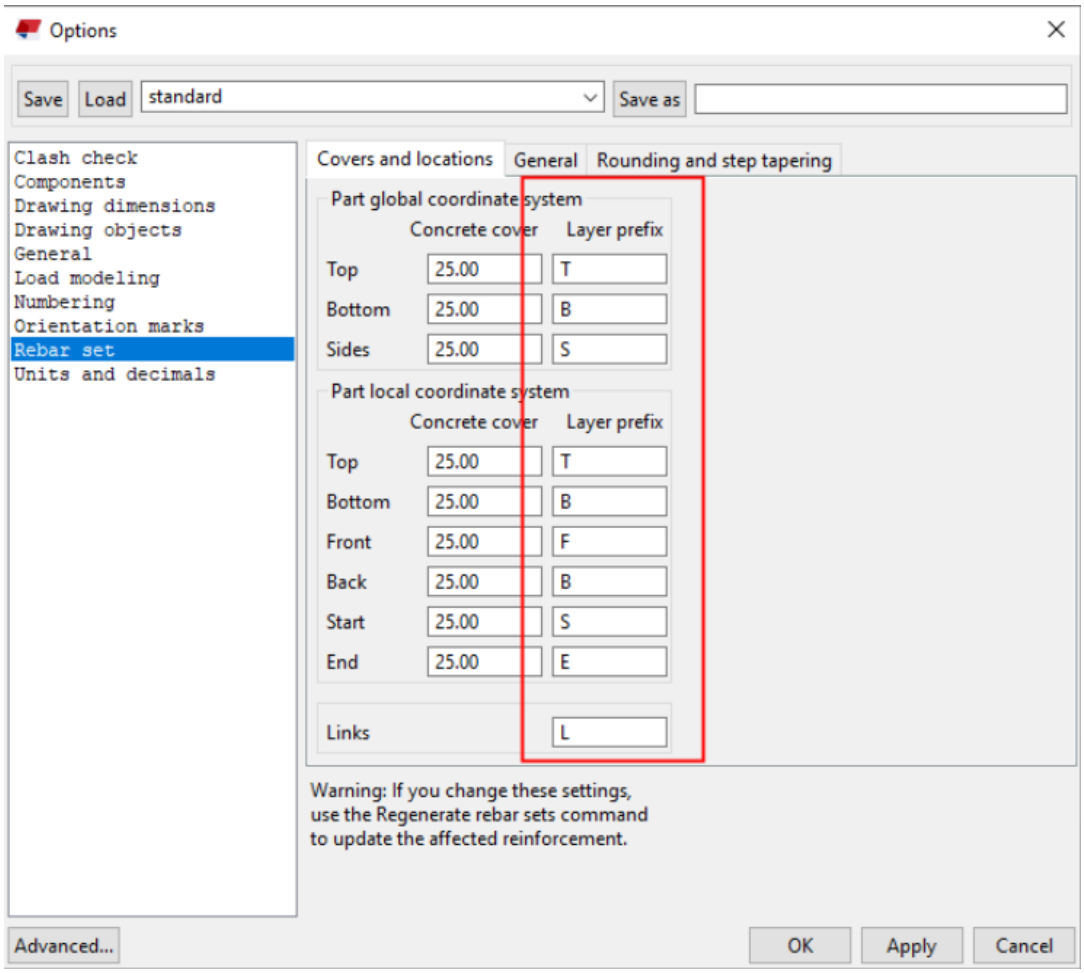
To do

Update your environment's **Options** dialog box standard file (`standard.opt`) as follows:

1. Open Tekla Structures.
2. Open a model.
3. Open the **Options** dialog box and go to the **Rebar set** settings.
4. On the **Covers and locations** tab, enter suitable standard values in the **Layer prefix** boxes, and save the values.

5. Search or browse for the updated `standard.opt` file under `\<model folder>\attributes`.
6. Copy this file to your environment.

   (In the Default environment, the file is located in `\Environments\default\General\Shared\ModelingSettings`.)



Note that if you want to edit the default concrete covers (in both part global and part local coordinate systems) you can update them at the same time.

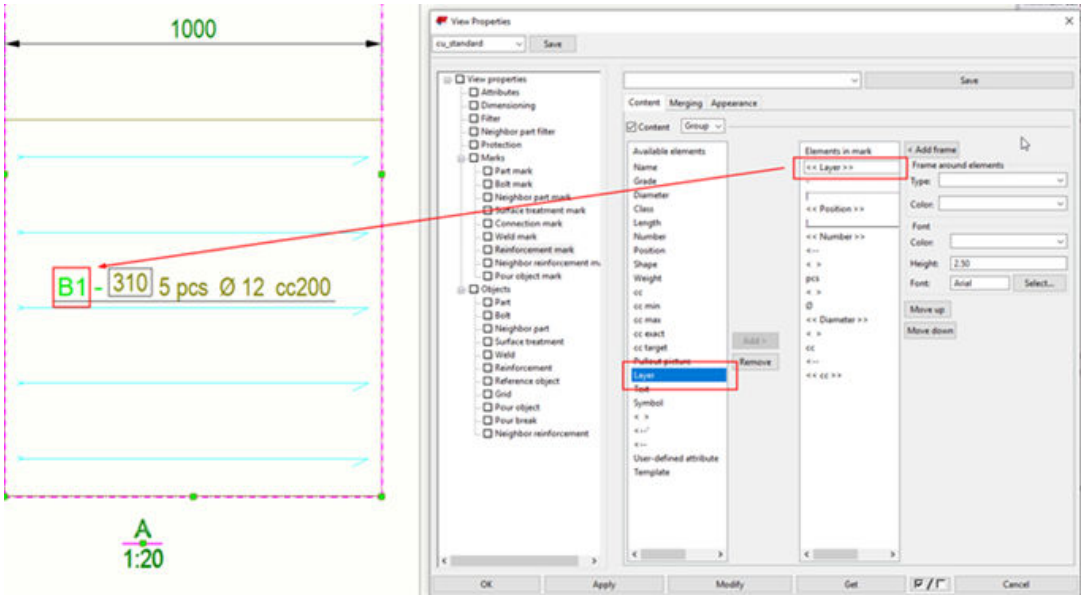
Modify how LAYER is constructed (optional)

If you want to modify how the `LAYER` attribute is constructed, you can edit it by configuring the `XS_REBARSET_REBAR_LAYER_FORMAT_STRING` advanced option.

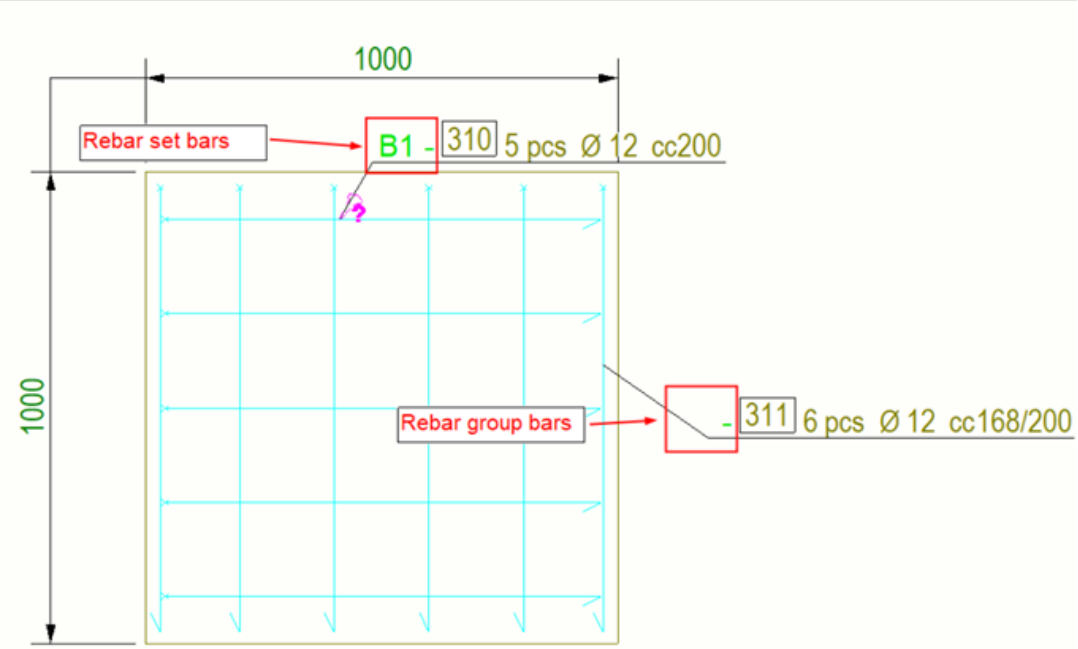
By default, the value is `%LAYER_PREFIX%%LAYER_NUMBER%`. This means that, for example, the outermost layer bars at the top face of the concrete get the `LAYER` value `T1` (if you have defined the top layer prefix to be **T** as in the image above).

Drawings standard file updates

If you want to use `LAYER` in drawings, update your reinforcement mark properties in your standard files to include this new property.



Note that this new property only works with rebar sets:



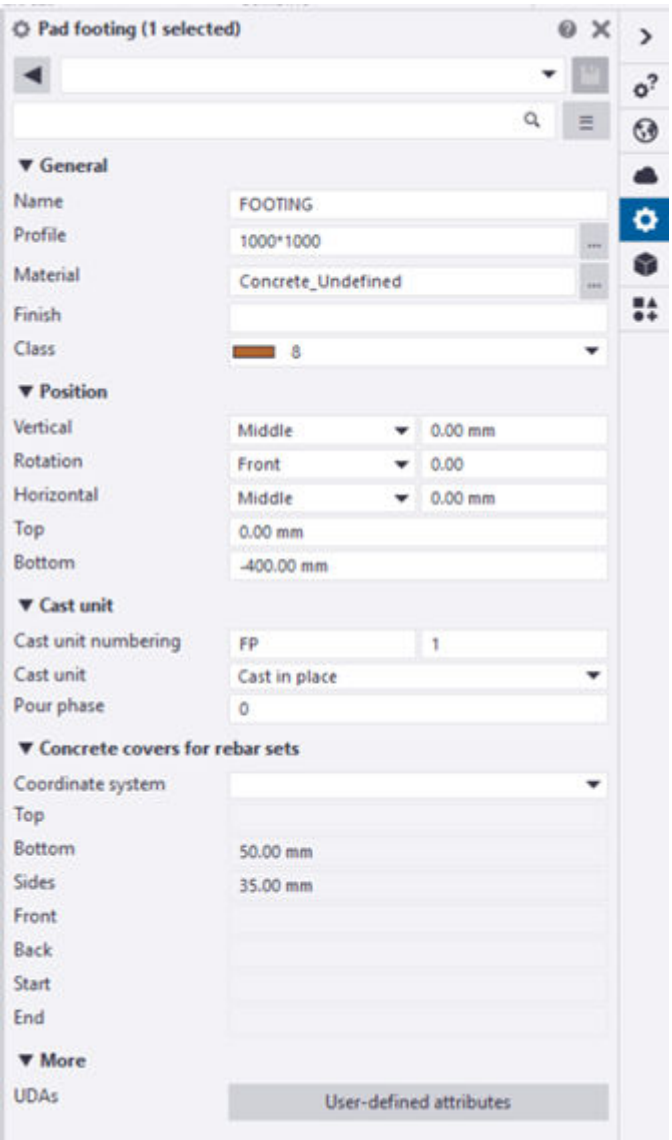
Report templates update (optional)

If you want to use the new `LAYER` property in your report templates, update them as well.

Part local coordinate system based concrete covers

To do

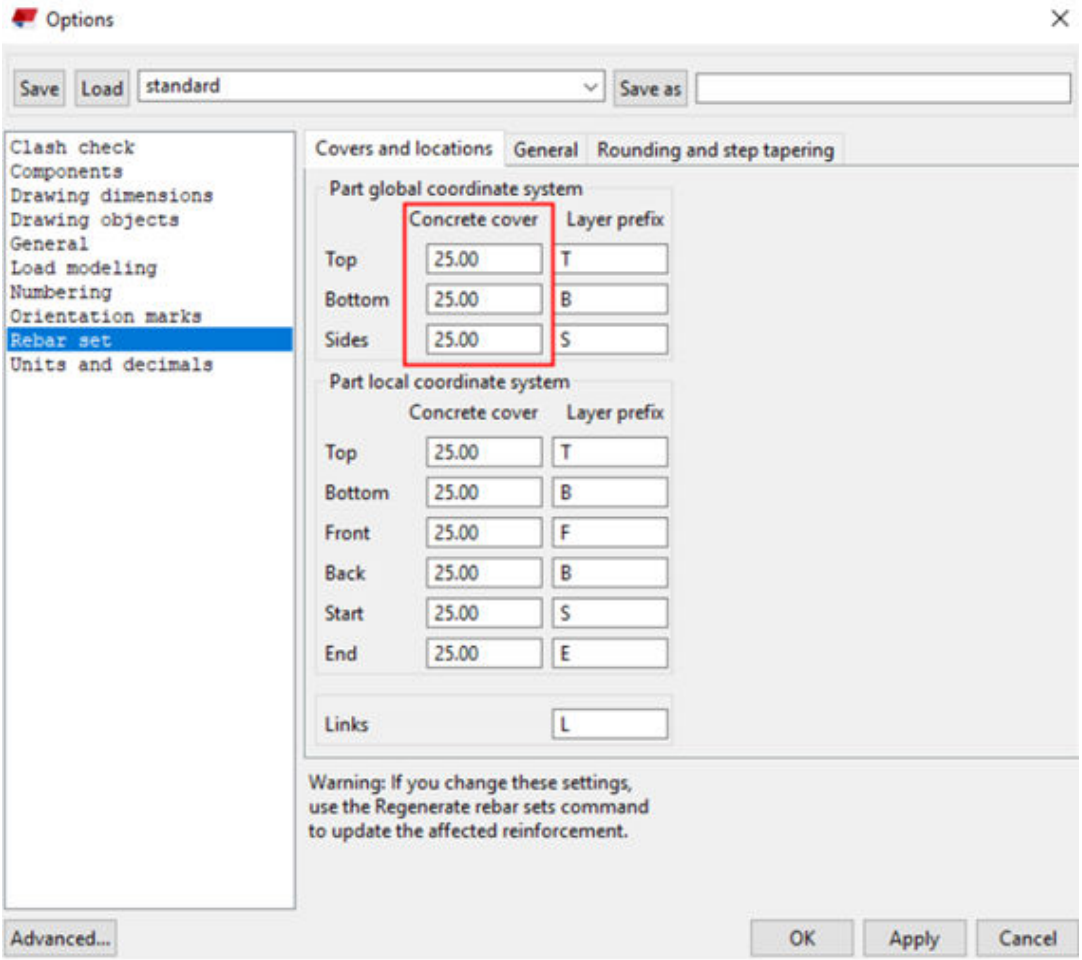
Concrete object types standard file updates (optional)



If you want the concrete covers of the concrete object types to be something else than the global coordinate system default values defined in the **Options** dialog box (see the image below), update the standard files of the concrete objects as follows:

1. Open Tekla Structures.
2. Open a model.
3. Create all different concrete objects and modify the concrete cover settings in the property pane if needed, and save the settings as a standard file.

4. Search or browse for the updated standard files under `\<model folder>\attributes`.
5. Copy these files to your environment.

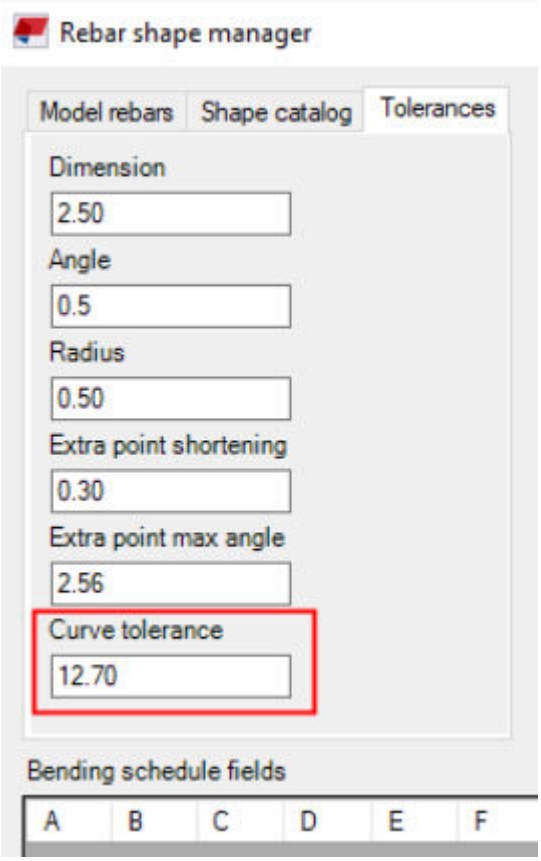


Administrator's release notes: Rebar shape manager

Update your rebar shape definitions

1. Open Tekla Structures.
2. Open a model.
3. Create the shapes (with arcs) that you would like to have support for in your environment.
4. Click **File** --> **Editors** --> **Rebar shape manager** to open **Rebar shape manager** and check that the bars are recognized as you wish.

5. Edit the curve tolerance values if needed:



6. In the model, select the bars that you would like to add. Click **Get selected** and edit the bending schedule field definitions and bending shape rules.
7. Enter a new shape code for the newly added bars which have arcs in them. Click **Add** to add this new shape to the shape definitions.
8. Save the `rebarshaperules.xml` file.
9. Upload the file to your environment.

Turning off the functionality

If you do not need this functionality, you can turn it off by changing the value of the `XS_REBAR_COMBINE_BENDINGS_IN_EVALUATOR` advanced option to `FALSE`.

Starting from Tekla Structures 2019i the advanced option is by default set to `TRUE`.

However, in Tekla Structures 2019i (and in earlier versions), the functionality does not combine multiple small bends to arcs, but instead combines multiple small bends to a single bend with a large bending radius.

Administrator's release notes: Rebar catalog configuration

To do

The settings files that can be searched from the environment are:

- `rebar_catalog.settings.user.default` (starring)
- `rebar_catalog.settings` (tags)

Tekla Structures saves the settings files to the model folder as `rebar_catalog.settings.user.<xxxxxx>` and `rebar_catalog.settings`. Rename `rebar_catalog.settings.user.<xxxxxx>` as `rebar_catalog.settings.user.default`, and copy both files to the wanted folder in the environment.

The search order for the settings files is: model folder, project folder (`XS_PROJECT`), firm folder (`XS_FIRM`), and system folder (`XS_SYSTEM`).

It is useful to configure this on the project or company level.

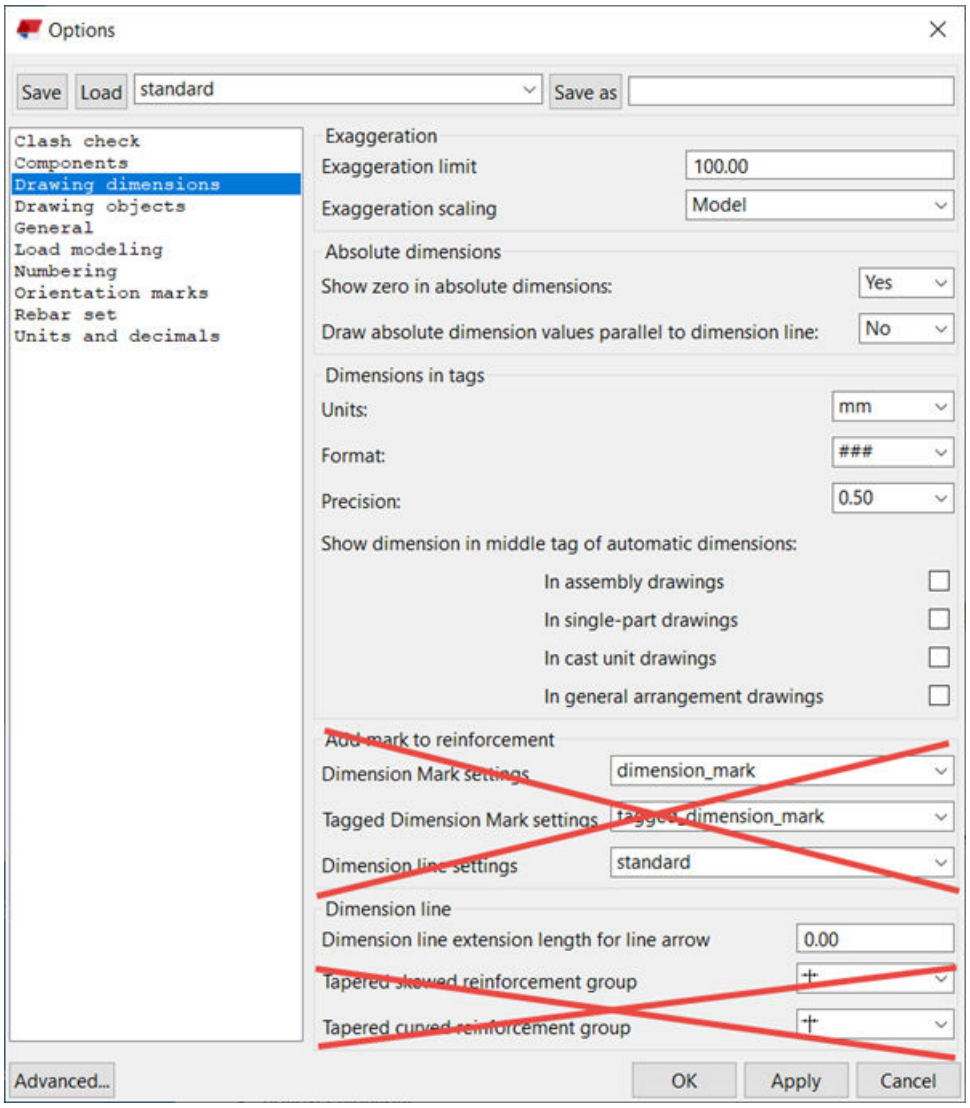
Administrator's release notes: Rebar dimension marks

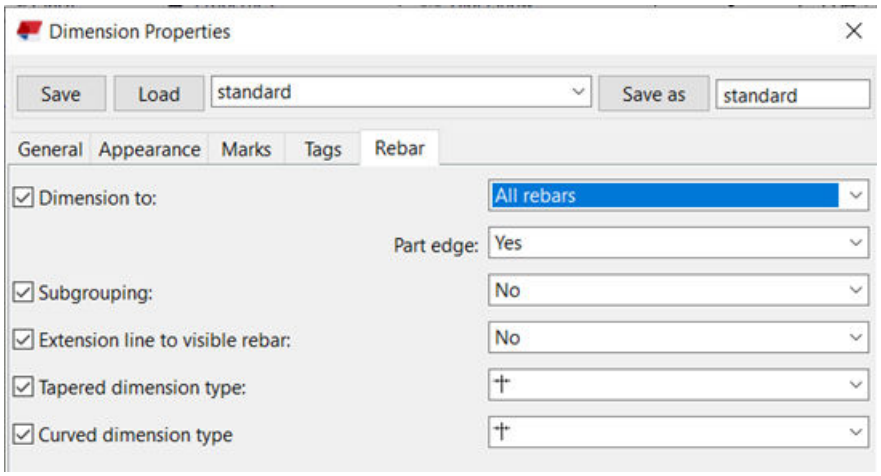
Changes

You can now control the rebar dimension mark style with the settings defined on the **Rebar** tab in the **Dimension Properties** dialog box.

Previously, the files controlling the rebar dimension mark settings were defined in the **Options** dialog box in the **Drawing dimensions** settings. The options defining the settings files have now been removed from the **Options** dialog box.

Furthermore, the dimension line settings **Tapered skewed reinforcing group** and **Tapered curved reinforcing group** have been moved to the **Dimension Properties** dialog box.





Changes are done in Default environment:

- `dimension_mark.dim` has been renamed to `rebar_dimension_mark.dim`
- `tagged_dimension_mark.dim` has been renamed to `rebar_tagged_dimension_mark.dim`
- `rebar_dimension_line.dim` has been created

Note that each environment might have customized the settings files so each environment's files have to be edited by the localizers i.e. you cannot just necessarily copy from Default.

Usage

For more information about creating the rebar dimension marks, see Other drawing improvements (page 45) and Add dimensions to rebars.

To do

Check the settings in the **Options** dialog box in each environment in an older Tekla Structures version to find the default setting files that need attention:

Note that if a settings file is a general one rather than rebar specific, use a renamed copy rather than changing the original file (as we did in the above with the `standard` file, which we copied and renamed to `rebar_dimension_line.dim`).

Also check that the three files have a consistent look, meaning for example font, font size, and arrow size. Adjust as necessary.

Update the following files or their equivalents (depending on environment file naming and translation naming):

`rebar_dimension_mark.dim`

`dimension_mark.dim` renamed to `rebar_dimension_mark.dim` (for old **Dimension Mark** command style) - but naming to follow the specific environment's conventions:

Dimension to: **All rebars**

Subgrouping: **Yes**

Extension line to visible rebar: **No**

Combine equal dimensions: **3*60=180**

Minimum to combine: **1**

Set **Prefix** in **Dimension mark contents**.

Set **Visibility of numeric value** to **Hidden** in **Dimension mark contents**.

`rebar_tagged_dimension_mark.dim`

`tagged_dimension_mark.dim` renamed to `rebar_tagged_dimension_mark.dim` (for old **Tagged Dimension Mark** style) - but naming to follow the specific environment's conventions:

Dimension to: **All rebars**

Subgrouping: **Yes**

Extension line to visible rebar: **No**

Combine equal dimensions: **3*60=180**

Minimum to combine: **1**

Set the appropriate tag contents.

`rebar_dimension_line.dim`

Also create:

`rebar_dimension_line.dim` to meet old **Create dimension line** behaviour - but naming to follow the specific environment's conventions:

Dimension to: **Start and end rebars**

Subgrouping: **No**

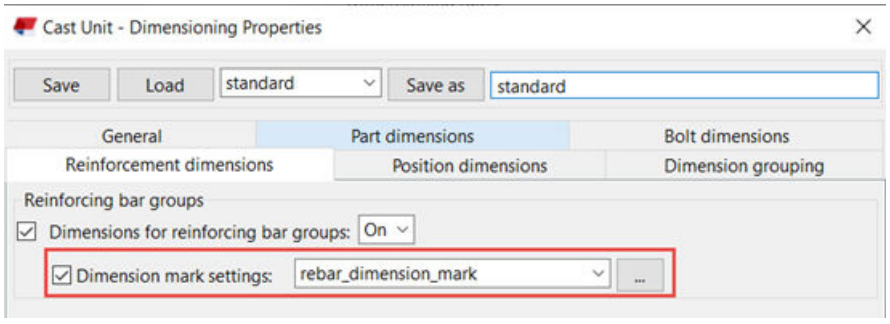
Extension line to visible rebar: **Yes**

Combine equal dimensions: **Off**

Update all *.cudcd settings files (Cast unit - Integrated dimensioning):

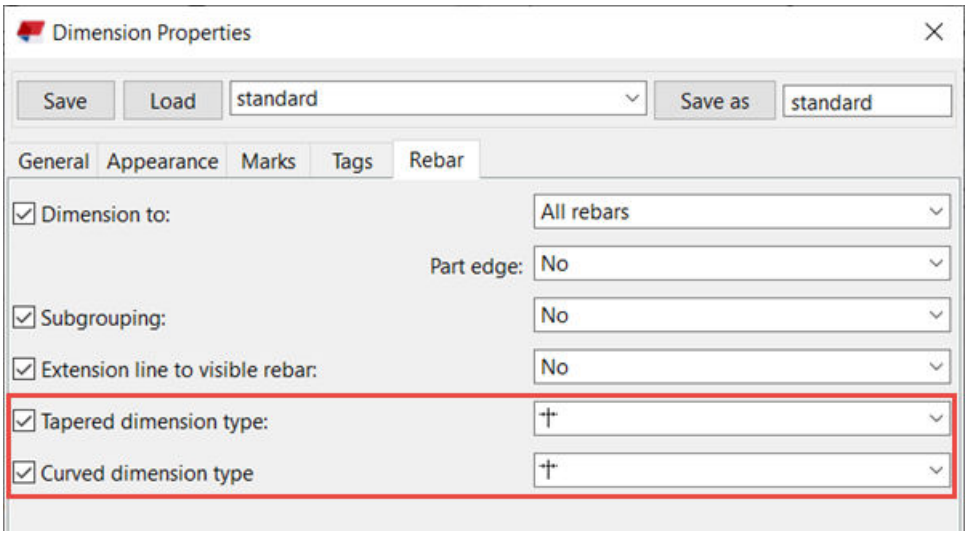
- Remove the following lines:
  - RebarDimensionTagMarkLocation
  - RebarDimTagMarkLocation_en
  - RebarDimensionMark.*
  - RebarDimensionMark_en
- Add the following lines:
  - RebarDimensionMarkSettings "rebar_dimension_mark"

    Where the value is set to an appropriate and accessible (for that environment and *.cudcd) dimension settings file i.e. "rebar_dimension_mark" in the above line is just an example but may not be appropriate.
  - RebarDimensionMarkSettings_en 1
- Updated dialog:



Update all *.opt settings files and applicable *.dim settings files for the tapered skewed and curved model options changes:

- Ideally remove the following properties from all *.opt settings files where they exist (note that if they exist they will just be ignored in the new version of Tekla Structures):
  - `dia_option_settings.TaperedSkewedReinforcementGroup`
  - `dia_option_settings.TaperedCurvedReinforcementGroup`
- If any *.opt settings file had either of the above two properties set to 2 i.e. not straight setting but tapered or curved setting then you might wish to set the equivalent in the rebar specific *.dim settings files.
  - For the above *.opt settings file properties; 1 = straight and 2 = tapered/curved.
  - In the *.dim settings file the new properties are called TaperedSkewedReinforcementGroup and TaperedCurvedReinforcementGroup and for these 0 = straight and 1 = tapered/curved (which is different to the *.opt properties).
- Updated dialog:



Note the following:

- You cannot change the following properties when editing an existing rebar dimension mark (they are only available for creation):

  Dimension to

  Part edge

  Tapered dimension type

  Curved dimension type
- **Dimension to part edge** is only supported for **Dimension to** = **All rebars** (an old limitation that we could look to resolve in the future).

- The drawing property pane has been disabled by Aurora so you no longer need to use `XS_DISABLE_DRAWING_PROPERTY_PANE`.
- When a rebar dimension mark has been created with closing dimensions (**Dimension to part edge** has been selected), editing it and then changing other editable **Rebar** tab properties (e.g. **Extension line to visible rebar**) does not update the rebar dimension instance. This is under investigation.

Check if any *.cs macro files reference any of the following old parameters "TaggedRebarDimMark", "RebarDimLine" or "RebarDimMark" eg in lines of the following form:

akit.Callback("acmd_create_marks_selected", "RebarDimLine", "View_10 window_1");

Replace the old parameter with "RebarNewDimMark" e.g. to give:

akit.Callback("acmd_create_marks_selected", "RebarNewDimMark", "View_10 window_1");

Note that the user workflow has now changed and the user needs to load and apply the desired dimension settings file prior to running any macros of this form.

If XS_REBAR_DIMENSION_MARK_MANUAL_CLOSE_TO_GEOMETRY was set to TRUE then you might wish to set Part edge to Yes for appropriate *.dim settings files.

image

The functionality is `XS_REBAR_DIMENSION_MARK_MANUAL_CLOSE_TO_GEOMETRY`, its just that we now expose it via the dimension properties dialog box and not an advanced option. Note that it is only supported if **Dimension to** is set to **All rebars**. Some slight localisation might be needed to certain *.dim files if an environments use `XS_REBAR_DIMENSION_MARK_MANUAL_CLOSE_TO_GEOMETRY` is set to `TRUE`

Additional

List of `*.opt` files which have DimensionMarkSettings configured

List of `*.cudcd` files

Administrator's release notes: Miscellaneous concrete updates

Reports listing subassemblies of concrete

There is a new content type for reporting: `HIERARCHIC_CAST_UNIT`.

The content type `CAST_UNIT` is flat, contrary to the steel `ASSEMBLY`. The new content type, `HIERARCHIC_CAST_UNIT`, supports hierarchy with the same

logic as `ASSEMBLY`. It enables reports that list the hierarchic content of cast units with multiple levels of subassemblies, for example, double walls. The existing `CAST_UNIT` has not been changed.

To do

If your environment has cast unit reports, we recommend that you consider updating the cast unit inquiry to show the whole content of the cast unit.

If you have double walls or sandwich walls (multi-level cast units), it is good to have:

- New separate BOM list for double walls
- New separate BOM list template for double walls in cast unit drawings
- New separate quantity BOM list template for double walls in cast unit drawings

This works in the same way as assemblies. Use the **Add as sub-assembly** command to add sub-cast units. Reports require filtering by using `ASSEMBLY.HIERARCHY_LEVEL` = 0 / 1' on the top level cast unit or combined on the top row.

Example files can be found in `Environments\default\Concrete\Precast\Detailing\ReportsAndTemplates`.

- `Cast_Unit_Double_Wall_Bill_of_Material.rpt`
- `CU_DW_BOM.tpl`

Administrator's release notes: Updates in tools for automated precast fabrication

Export Unitechnik (79), **Export EliPlan file**, **BVBS Export** and **HMS Export** contain several improvements.

For more information about the improvements, see Updates in tools for automated precast fabrication (page 60) in Tekla Structures 2020 release notes.

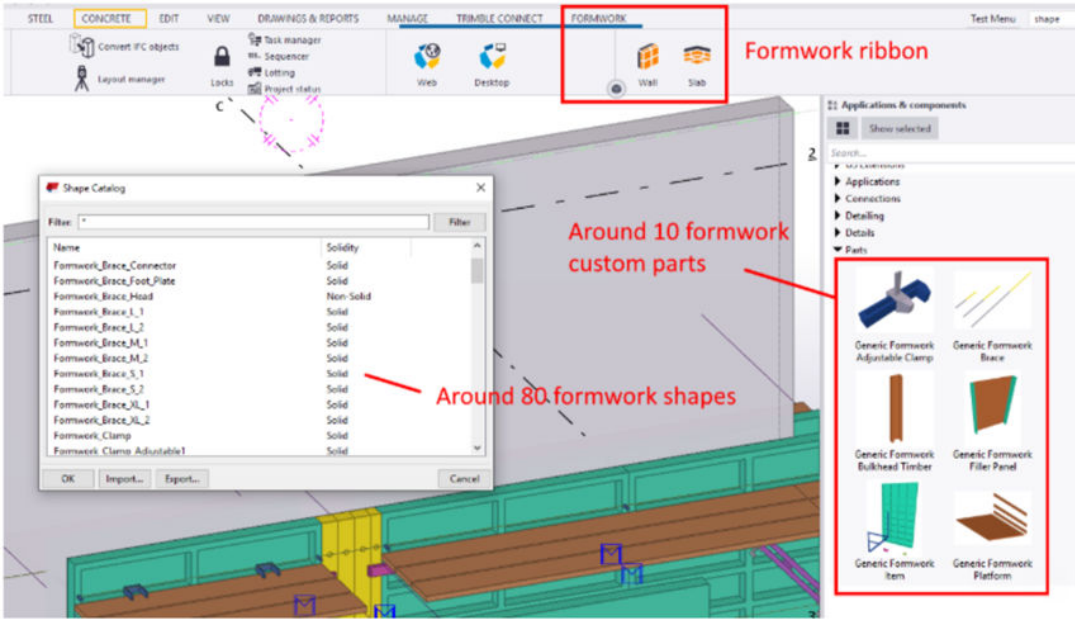
Administrator's release notes: Formwork placing tools

Formwork placing tools are now included in Tekla Structures 2020 installation.

The following are now available in Tekla Structures:

- Formwork tab on the ribbon
- Formwork custom parts in the **Applications & components** catalog
- Formwork shapes in the shape catalog

- Extra files in the environments



The formwork placing tools are available in the **Concrete Contractor**, **General Contractor** and **Rebar Detailer** roles in the Default environment. This means adding files for the new ribbon tab and files:

- Shape folders

  `C:\ProgramData\Trimble\Tekla Structures\2020.0\Environments\common\system\CIP\Formwork\profil`

- Custom part component `.uels`

  `C:\ProgramData\Trimble\Tekla Structures\2020.0\Environments\common\components_sketches\concrete\Formwork`

- Attribute files, configuration files

  `C:\ProgramData\Trimble\Tekla Structures\2020.0\Environments\common\system\CIP\Formwork`

- Ribbon file

  `C:\ProgramData\Trimble\Tekla Structures\2020.0\Environments\common\system\CIP\Formwork\Ribbons`

To do

If you want to configure this in some of your roles, add the following:

`XS_SYSTEM` path - `%XSDATADIR%\environments\common\system\CIP\Formwork`

`XS_UEL_IMPORT_FOLDER` path - `%XSDATADIR%\environments\common\components_sketches\concrete\Formwork`

Administrator's release notes: Concrete components

There are several improvements in concrete components in Tekla Structures 2020.

Update your standard files if you want to take the new options and features into use.

Note the following changes in **Floor layout**:

Add the default values to the appropriate attribute files for:

- Property strip (new standard file)
- Embedded CIP filler
- Automatic cuts around objects
- Allowed widths for holes
- Steel sheet cladding (start and end gaps, negative gap values)
- Optimized slab width
- Maximum slab length (recommended to keep empty or have a large number). Customize the `FloorLayout.ini` file to contain profile specific length limits.

For more information about these improvements, see Improvements in components (page 77) in Tekla Structures 2020 release notes.

3 Localization release notes

Environment-specific Tekla Structures localization release notes introduce new and changed features in the new Tekla Structures version from the localization point of view. It lists the features that have been localized in your environment and also helps you in your own customization tasks. The localization release notes are supplied by the localization teams at your local area and reseller offices.

4 Tekla Structures 2020 hardware recommendations

Operating system requirements

Tekla Structures 2020 runs on the following operating systems:

- 64-bit Windows 10
- 64-bit Windows 8.1

Other operating systems are not supported.

Tekla Structures can be used with application and desktop virtualization. For more information, see .

Recommended hardware for Tekla Structures workstations

The table below presents two different hardware configurations. The recommendations are mainly for desktop computers, but the same guidelines can also be applied when purchasing laptops. These hardware recommendations are based on proven set-ups that are used in testing Tekla Structures. Other set-ups can be used if they are more optimal for your intended use.

Before purchasing a large number of computers for your Tekla Structures users, test and verify the set-up first with one or two computers.

NOTE Tekla Structures does not support Itanium processors.

	Recommendation	Best performance
Operating system	Windows 10 (64-bit)	Windows 10 (64 bit)
Memory	16+ GB	32+ GB
Hard disk	240-480 GB, SSD	1 TB, SSD
Processor	Intel® Core™ i5 CPU 2+ GHz	Intel® Core™ i7 CPU 3+ GHz

	Recommendation	Best performance
Graphics card*	Two monitor support e.g. NVIDIA GeForce RTX 2060/2070	Two monitor support e.g. NVIDIA GeForce RTX 2080/2080 Ti or newer
Monitor(s)	Two 27” 1920x1200 each	30” 2560x1600 or two 27” 2560x1440
Mouse**	3-button wheel mouse, optical	3-button wheel mouse, cordless & optical + 3Dconnexion SpacePilot
Backup equipment	External hard drive	External hard drive with scheduled backups
Network adapter (multi-user funct.)	100 Mbit/s IPv4 or IPv6	1 Gbit/s IPv4 or IPv6

**Tekla Structures rendering can use DirectX or OpenGL technology. The DirectX rendering mode is better optimized for modern graphics cards, and you should prioritize DirectX performance when deciding on a graphics card. We do not have resources to test all cards on the market, so we have chosen cards based on the NVIDIA graphics processor to be our test platform.*

***A 3-button wheel mouse is required in all cases (to be able to finish some commands, and to zoom, pan, and rotate). Tekla Structures also supports the following 3D mice provided by 3Dconnexion: SpaceNavigator, SpaceExplorer, SpacePilot and SpacePilot Pro to be used in tandem with a regular mouse to enhance zooming, panning and rotating. To use a 3D mouse, dowload the install files and instructions on how to use them from Tekla Warehouse: 3Dconnexion Device Installer.*

Graphics card configuration

Make sure that your graphics card is set up to use a high performance profile with Tekla Structures. You can check and assign the profile in the configuration tool provided by the graphics card manufacturer, or in Windows settings in recent Windows versions. This is especially important on laptop computers, which may be configured to emphasize power saving. Many systems default Tekla Structures to use a less powerful integrated graphics processor instead of the more powerful dedicated graphics card unless you change the setting.

In addition to the main Tekla Structures software, other software components also affect how the 3D models are drawn on your computer:

- Your computer uses the standard drivers provided by the graphics card manufacturer also when drawing the 3D view in Tekla Structures. We recommend that you regulary check for updates to the graphics drivers from the manufacturer's website.

  Before updrading the drivers on a large number of computers, test the driver version first to make sure the update does not introduce problems in the 3D views in Tekla Structures.

- Tekla Structures includes two alternative rendering engines: one based on OpenGL and one based on DirectX. Microsoft Windows includes support for both technologies.

Further tools to help you choose Tekla Structures workstation hardware

Join the discussion at Tekla Discussion Forum > Tekla Structures Forums > Hardware & operating system to exchange experiences with other users.

We also provide an application called Steelmark for testing and evaluating graphics cards for use with the Tekla Structures OpenGL rendering engine. Download it from Tekla Warehouse. This application does not measure performance of the DirectX rendering engine.

Requirements for connecting to Tekla Online services

Tekla Online services complement the Tekla software products with comprehensive learning and support resources, software installation package downloads, cloud-based sharing, and various add-on tools that enhance your use of the software.

To ensure full access, follow the requirements for connecting to Tekla Online services.

Tekla License Server

Tekla License Server is required for on-premises licensing, which is the only supported licensing method for most Tekla Structures configurations.

- We recommend that you upgrade to the latest available license server version. You can always install the license server on any computer that meets the Tekla Structures hardware recommendations.
- If the license server is installed on a different computer, there are additional considerations for the hardware and operating system. See the separate Tekla License Server 2020 hardware recommendations (page 123).
- If you use different versions of Tekla Structures, check the license server compatibility before you updgrade your license server.

Tekla Structures multi-user server

If you use the Tekla Structures multi-user server, we recommend that you always install the latest available version. At the time of writing, this is version 2.5.0.

For more information, see Tekla Structures multi-user server 2.5.0 hardware recommendations (page 126).

Printers

Tekla Structures uses the standard Windows printer drivers provided by the manufacturer of the printer. You can install the most recent driver from the manufacturer's website.

Additional necessary software components

Tekla Structures needs the following redistributable packages that are automatically installed during the Tekla Structures software installation if they, or newer versions of the packages, do not exist on your computer:

- Microsoft .NET Framework 4.7.2
- Microsoft Visual C++ 2010 Redistributable (x64) 10.0.40219
- Microsoft Visual C++ 2010 Redistributable (x86) 10.0.40219
- Microsoft Visual C++ 2013 Redistributable (x64) 12.0.40649
- Microsoft Visual C++ 2013 Redistributable (x86) 12.0.40649
- Microsoft Visual C++ 2015 Redistributable (x64) 14.0.23026
- Microsoft Visual C++ 2015 Redistributable (x86) 14.0.23026

If your organization installs Tekla Structures centrally using .msi packages, it may be necessary to download the required .NET Framework and Microsoft Visual C++ Redistributable components from Microsoft's web site and install them separately.

5 Tekla License Server 2020 hardware recommendations

We recommend that you upgrade your license server to the newest available version. Each license server version is compatible with several versions of Tekla Structures. See the table at the bottom of this page for information on which License Server versions are compatible with previous Tekla Structures versions.

Operating system

The FlexNet licensing system for Tekla Structures runs on the following operating systems:

- Microsoft Windows 10
- Microsoft Windows Server 2016
- Microsoft Windows Server 2019

Both 32-bit and 64-bit operating systems are supported.

It is a best practice to install Tekla License Server on a server-based OS. If there is no local area network in your company, you can install the license server on each computer that Tekla Structures is running on, and activate one license on each computer.

License server hardware

The server that is used as Tekla License Server does not have to be very efficient or have maximum performance. Reliability of the server and the network connection are much more important.

You cannot run Tekla Structures without access to a license. To minimize the risk of disrupting the work of your users, we recommend that you run any license server used by multiple users on proper server hardware and server operating system. Servers are designed to operate properly for a longer time period without rebooting as often as normal workstations.

Virtualization platforms

The supported virtual machine platforms for Tekla License Server are:

- Citrix XenServer 7.6
- Microsoft Windows 10 Hyper-V
- Microsoft Windows Server 2016 Hyper-V
- Microsoft Windows Server 2019 Hyper-V
- Oracle VirtualBox 5.2.18
- Parallels Desktop 14.1.0 for MAC 10.14
- QEMU-KVM (Host OS: CentOS 7.5)
  - Hypervisor: qemu-kvm-ev-2.10.0
  - Hypervisor Services: libvirt-daemon-kvm-3.9.0-14
  - Virtual Machine Manager: vmm v1.4.3
- VMware ESXi 6.5 and 6.7
- VMware Workstation 14.1.1

Linux or Unix based servers are not supported. Cloud environments are not supported.

Backups

Keep your licenses safe. Make sure to store the license entitlement file(s) sent to you over email. Back up your activated licenses to a separate backup location. If the activated licenses are deleted or if the license server computer suffers a hardware failure, you will need the backups to recover your licenses.

If activated licnenses are lost and no backups are available, replacement licenses can be ordered according to the terms set out in the end-user license agreement.

Internet connection

You need to have an Internet connection in order to activate, deactivate or repair your licenses. License activation, deactivation and repairing are the only cases when your license server contacts Trimble's activation server, and an Internet connection on your license server is needed.

The license server can be used in networks that use IPv4, IPv6, or both the IPv4 and IPv6 protocols.

Direct communication from the server computer to the Internet needs to be allowed while the license server at your company contacts the activation server at Trimble. The activation communication is done using SOAP (Simple Object Access Protocol) over HTTPS on TCP port 443. Your firewall should not block any incoming or outgoing information during the activation. To allow the activation communication, use the activation server address in your firewall settings: https://activate.tekla.com:443/flexnet/services/ActivationService?wsdl

Other infrastructure

Tekla Structures needs to be able to contact the license server to reserve a license when it starts up. Your firewall (for example, Windows Firewall) must allow the communication between the server computer and the Tekla Structures computers. You need to allow the applications *tekla.exe* and *lmgrd.exe* to operate through the firewall. The applications are located in the *..\Tekla\License\Server* folder.

The MAC address of your network adapter should not be changed on any computer that is running the license server. In case you are using a virtual environment, ensure that you are using static MAC addressing instead of dynamic MAC addressing.

The computer running the license server should have a fixed IP address.

5.1 Which license server version to use

Check the table below to see which license server version to use with your current Tekla Structures version. Also check if you need to upgrade to a new service pack or progress release.

For information about updating the license server, see Update the Tekla license server (page 129).

Tekla Structures version	License Server 2016 SP1	License Server 2017 or later
2018 or later		✓
2017i - all versions		✓
2017 - all versions	✓	✓
2016i - all versions	✓	✓
2016 SP5/PR5 or later	✓	✓
2016 up to SP4/PR4	✓	Upgrade to 2016 SP5/PR5 or later
21.1 SR7 or later	✓	✓
21.1 up to SR6	✓	Upgrade to 21.1 SR7 or later
21.1 all PV versions	✓	✓
21.0 or earlier	✓	✓

For instructions on how to install the license server, see .

6 Tekla Structures multi-user server 2.5.0 hardware recommendations

The multi-user server allows users in the same local area network to work on different parts of the same model simultaneously. The model data is stored on a central server, so users need a fast and reliable network connection to the server to ensure good performance. If you have users in different locations, the cloud-based (separately licensed) Tekla Model Sharing features may be a better fit for you.

Operating system

Tekla Structures multi-user server 2.5.0 runs on the following operating systems:

- 64-bit Windows 8.1
- 64-bit Windows 10
- 64-bit Windows Server 2016

32-bit Windows is not supported.

Multi-user server hardware

The server that is used as the Tekla Structures multi-user server does not have to be very efficient or have maximum performance. You can run the Tekla Structures multi-user server on the same computer as, for example, Tekla License Server, as long as you have dedicated different TCP ports for each of the servers.

The multi-user server can be used in networks that use IPv4, IPv6, or both the IPv4 and IPv6 protocols.

Other infrastructure

Set up scheduled backups for the model data stored on your multi-user server and store the backups on a different computer.

The computers on the same multi-user network must have a unique IP address and identical Subnet masks.

The computer running the multi-user server should have a fixed IP address.

The Tekla Structures multi-user server runs as a service. This means that the Tekla Structures multi-user server always starts automatically when you start the computer, and is always available when the computer is running.

7 Upgrade Tekla Structures to a new version

You can have many Tekla Structures versions on your computer. When you install and start using a new version, you do not need to uninstall the older versions and you can keep using them. Service packs are cumulative updates, so they replace the previous service pack installation for the same Tekla Structures version.

NOTE We recommend that you complete any models you are already working on using your current version of Tekla Structures. Once you save a model in the new version, you cannot open it in the previous versions anymore.

You can download the installation packages from the Tekla Downloads service.

Complete the upgrade in this general order (follow the links in the text for detailed instructions):

1. Update the Tekla license server (page 129). The updated version replaces the existing version you have installed.
2. Renew your licenses as explained in Renew a Tekla license (page 130).

   The renewed licenses can be used with the version indicated on the license and any previous versions that are compatible with your installed license server version.
3. .

   You can have many Tekla Structures versions and environments on your computer. When you install and start using a new version, you do not need to uninstall the older versions.
4. Copy personal settings to a new Tekla Structures version (page 131).

   You can use the Migration Wizard (page 131) tool to copy some of the personal settings to the new version. You can skip the copying if you do not want to copy the settings, or if you want to copy the settings from some other Tekla Structures version than suggested in Migration Wizard.

5. Transfer customized information to a new Tekla Structures version (page 132).

   In the new Tekla Structures version, you can use the information you have customized in the previous version. We strongly recommend that you create project and firm folders, and store the files you customize in these folders. Tekla Structures does not replace the files in project and firm folders when you install a new version. If you do not use project and firm folders, you need to transfer the customized information to the new version manually.

7.1 Update the Tekla license server

We recommend that you have the newest version of Tekla license server software installed on the Tekla license server. New versions of Tekla Structures do not always work at all with older license server versions.

You can use older versions of Tekla Structures with a newer version of the license server. In some older Tekla Structures versions, this requires that you have installed recent enough updates; for more information about the compatibility between Tekla Structures versions and Tekla license server versions, see Hardware recommendations for Tekla 2020 license server (page 123).

To update the Tekla license server:

1. Save the model that you are working with and close Tekla Structures before the server update.
2. Go to **Tekla Licensing** --> **LMTOOLS** through the **Start** menu or **Start screen**, depending on your Windows operating system.
3. On the **Stop/Start/Reread** tab, click **Stop Server** to stop the Tekla license server and any other licensing services.

   When you have completed installing the Tekla license server, you can restart the other licensing services.
4. Backup any files you have modified in the `C:\Tekla\License\Server` folder.

   You do not need to back up `tekla.lic` or `tekla.opt`, because the installer will not changes these files.
5. Download the latest version of the Tekla license server and the optional Tekla License Borrow Tool (if you use it) from Tekla Downloads.

6. Install the downloaded license server with administrator rights using the automatic installation for normal setup. Follow the instructions displayed on the screen.

   If the installation fails or the server does not start after installation, try reinstalling with the local firewall and antispyware/antivirus protection disabled.

7. If you use the Tekla License Borrow Tool, install the new version of the tool on workstations that need it.

7.2 Renew a Tekla license

License renewal means changing the details on an existing license, such as updating the highest allowed software version or extending the validity period of a temporary license. You deactivate the current license and then activate it again with a new license entitlement certificate that contains the updated information.

When you receive your renewed license, you must deactivate the existing license and then activate the new version of the license. Two versions of the same license cannot be active at the same time. License deactivation and activation is done on License server (which can also be the same computer on which Tekla Structures is installed) and requires an internet connection.

NOTE Before you deactivate licenses, ensure that the licenses are not in use or borrowed. To deactivate the licenses, users must return any borrowed licenses as explained in .

To renew a license:

1. Rename your previous entitlement certificate file in the license server installation folder (by default `C:\Tekla\License\Server`) from `EntitlementCertificate.html` to `EntitlementCertificate-OLD.html`.

2. Save the entitlement certificate file to the license server installation folder.

   The person in your organization who has made the license purchase, or someone named as the contact person, receives a new `EntitlementCertificate.html` entitlement certificate by e-mail as an attachment.

3. Go to **Tekla Licensing** --> **Tekla License Administration Tool** through the **Start** menu or **Start screen**, depending on your Windows operating system.

4. In the **Activated Licenses** area, select the **Deactivate** check box next to the license you want to deactivate.
5. Click the enabled **Deactivate** button.

   When deactivation is complete, the License administration tool shows a confirmation message.

   NOTE Do not use automatic notification if you are using some other FlexNet license and license server administration tool, such as FlexNet Manager. To notify the license server about license changes manually, see .

6. Make sure the automatic license server notification is enabled. Check the status on the **Notify Server** button in the toolbar and click the button if necessary.
7. Click **Open** and open the `EntitlementCertificate.html` file that contains the license. The license information is displayed in the **Entitled Licenses** area.

Entitled Licenses

Activate	Quantity	Order ID	Activation ID	Description	Configuration	Version	Type	Start Date	Expiration Date
	1	Tekla HQ	04C1-3F1E-5...	FUD-C	Full	20		1.5.2015	31.5.2015
	2	Tekla HQ	4B73-A2E9-...	STD-C	SteelDetailing	20		1.5.2015	31.5.2015

8. Click the **Activate** cell and select the number of licenses to activate.

Entitled Licenses

Activate	Quantity	Order ID	Activation ID	Description	Configuration	Version	Type	Start Date	Expiration Date
	1	Tekla HQ	04C1-3F1E-5...	FUD-C	Full	20		1.5.2015	31.5.2015
1	2	Tekla HQ	4B73-A2E9-...	STD-C	SteelDetailing	20		1.5.2015	31.5.2015

9. Click the **Activate** button.

   Your license server contacts the license activation server at Trimble Solutions.

The activated licenses are displayed in the **Activated Licenses** area.

We recommend that you back up the trusted storage (`..\ProgramData\FLEXnet\`) in a safe place away from the computer running the license server. Backups can help you restore your licenses on the same server if active licenses are accidentally erased.

7.3 Copy personal settings to a new Tekla Structures version

You can copy some personal settings from an older Tekla Structures version to a newer Tekla Structures version using the Migration Wizard tool. Migration

Wizard opens automatically when you start a new version of Tekla Structures for the first time.

Migration Wizard shows the version number from which the settings are copied and the version number to which the settings are copied. You can select which settings are copied.

1. Start the new Tekla Structures version.
2. In Migration Wizard, click **Next** to start copying the settings.
3. Select the settings you want to copy and click **Next**.
4. Check that you have selected the correct settings.
5. Click **Copy**.

NOTE If you want to copy the settings later, you can start Migration Wizard manually by double-clicking the `MigrationWizard.exe` in the `\Tekla Structures \<version>\nt\bin\applications\Tekla\Migrations` folder. You can select the version from which the settings are copied and the version to which the settings are copied.

See also

Upgrade Tekla Structures to a new version (page 128)

7.4 Transfer customized information to a new Tekla Structures version

You can transfer customized information from a previous Tekla Structures version to the new Tekla Structures version.

1. If you have used project and firm folders to store customized files in a model using a previous Tekla Structures version, go to **File menu** --> **Settings** --> **Advanced Options** and check that the `XS_FIRM`, `XS_PROJECT` and `XS_COMPANY_SETTINGS_DIRECTORY` advanced options point to the folders where the customized files are located.
2. If you have not used project and firm folders to store customized files, you need to transfer the customized files manually to the new Tekla Structures version to use the information.

   Many types of files can be copied using a local or private online Tekla Warehouse collection. See Tekla Warehouse instructions for more information.

   Check at least the following:

   - Advanced options
   - Files related to templates, reports and drawings

- Catalog files: profile catalog, material catalog, bolt catalog, bolt assembly catalog, rebar shape catalog
- Conversion files
- Extensions

  You need to re-install extensions for the new Tekla Structures version.
- NC export settings
- Printer catalog settings
- User-defined attributes
- Saved model object properties

You can copy some information automatically to the new version using the Migration Wizard (page 131) tool.

See also

Upgrade Tekla Structures to a new version (page 128)

8 Tekla Structures service packs

Tekla Structures service packs are Tekla Structures version updates.

Service pack software installation files are stand-alone installers that contain the full Tekla Structures version software. You do not need to separately install the related Tekla Structures version or a previous service pack. For example, you can install service pack 2 without installing service pack 1.

- Service packs can include new features, and improvements and fixes to existing features. We recommend that all users install the latest service pack.
- We recommend that you install the latest environments to ensure that the environments work correctly in the service pack. We recommend that you update all the environments that you are using.

You can find the service pack software and environment installation files in Tekla Downloads.

See also

Install a Tekla Structures service pack (page 134)

Install an earlier Tekla Structures service pack (page 136)

8.1 Install a Tekla Structures service pack

You can install a service pack to update a Tekla Structures version or a previous service pack. Service packs can contain new features, and improvements and fixes to existing features.

NOTE Service pack software installation files are stand-alone installers that contain the full Tekla Structures version software. You do not need to separately install the related Tekla Structures version or a previous service pack.

If you have the related Tekla Structures version or a previous service pack installed on your computer, you do not need to remove it before installing a new service pack.

NOTE You need to be logged in with administrator rights to install the Tekla Structures software on your computer.

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1. Install the Tekla Structures service pack software.
   a. Download the service pack software installation file from Tekla Downloads to your computer.
   b. Double-click the installation file to run the installation.
   c. Follow the steps in the installation wizard to complete the installation.

      Note that if you have the related Tekla Structures version or a previous service pack already installed, you cannot select the installation folder. The service pack will be installed to the same folder as the version that you are updating.

      If you do not have the related Tekla Structures version or a previous service pack installed, you can select the installation folder and the model folder.
2. Install the Tekla Structures environments.

   Note that the location of the environment installation folder depends on where you have installed the software. You cannot select the environment installation folder in the installation wizard.

   You do not need to remove any environments. Installing a newer version of an environment automatically upgrades the older version of that environment.

   a. Download the needed environment installation files from Tekla Downloads to your computer.
   b. Double-click the installation file to run the installation.
   c. Follow the steps in the installation wizard to complete the installation.

      You can select in the installation wizard that the environment setting files (`.tsep`) are installed when running the environment installation wizard.

      If you do not select to do this, the environment setting files are installed to the environment folder when you start Tekla Structures after the installation. Tekla Structures opens a dialog box that shows the installation progress.

See also

Tekla Structures service packs (page 134)

Tekla Downloads

8.2 Install an earlier Tekla Structures service pack

We recommend that you use the latest Tekla Structures service pack. In certain situations, you may need to take an earlier Tekla Structures service pack, or the related Tekla Structures version, into use even though you are already using a newer service pack.

1. Uninstall the Tekla Structures service pack software you are now using in Windows **Control Panel**.
2. Uninstall the related Tekla Structures environments in Windows **Control Panel**.
3. Install the Tekla Structures service pack software.
   a. Download the software installation file of the service pack from Tekla Downloads.
   b. Double-click the installation file to run the installation.
   c. Follow the steps in the installation wizard to complete the installation.

      You can select the installation folder and the model folder.
4. Install the Tekla Structures environments.

   The latest environments are in Tekla Downloads.
   a. Download the environment installation files related to the service pack that you have installed.
   b. Double-click the installation file to run the installation.
   c. Follow the steps in the installation wizard to complete the installation.

      You can select in the installation wizard that the environment setting files (`.tsep`) are installed when running the environment installation wizard.

      If you do not select to do this, the environment setting files are installed to the environment folder when you start Tekla Structures after the installation. Tekla Structures opens a dialog box that shows the installation progress.

See also

Tekla Structures service packs (page 134)

9 Disclaimer

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Portions of this software:

To see the third party open source software licenses, go to Tekla Structures, click **File menu** --> **Help** --> **About Tekla Structures** and then click the **3rd party licenses** option.

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