

Autodesk Revit Guidance Tekla Structural Designer Integrator

Guidance Notes

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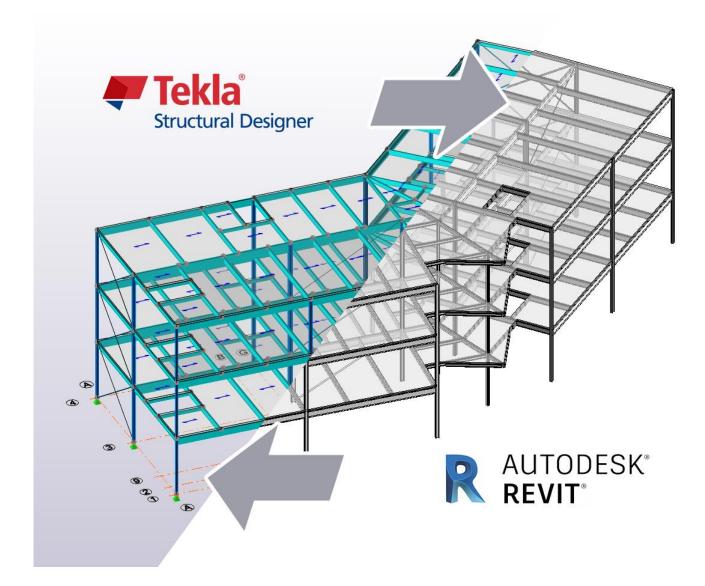
1 Introduction

These guidance notes have been developed to give practical advice to users of Autodesk Revit wishing to integrate models between Autodesk Revit and our own Tekla Structural Designer software.

These notes are not intended to replace our existing **Guidance Documentation** notes, which are installed as part of the Tekla Structural Designer Integrator for Autodesk Revit application, and users are strongly recommended to read these notes in addition to this document.

This document largely deals with the subjects of model connectivity and object mapping as these are the most important considerations when building models within Autodesk Revit. Several sections relating to important information and advanced subjects are also contained.

It may be noted that several appendices deal with the setting up of Revit tags and schedules. These are included for information use only and may be omitted if users own templates contains alternative information.



2 Important Information

2.1 The Use and Importance of GUID references

The integration between Tekla Structural Designer and Autodesk Revit software is enabled by the use of GUID (Global Unique IDentifiers) references.

A GUID is a unique number that can be used as an identifier but should not be able to be replicated - with randomly generated GUIDs you should only be duplicating references once every 10-30 trillion GUIDs.

GUID references themselves are a 32 digit hexadecimal reference and are created by a complex algorithm, with the references written as part of a members properties within the CXL file. We track members based on the GUID reference rather than member size, position, Revit element ID or any other method.

The GUID reference itself is automatically created by Tekla Structural Designer when an object is first inserted into the model. This happens 'behind the scenes' of the program interface and the user is never directly aware of the references.

```
</Member Actilutes/
</Member>
</member MemberId="9c6bb2ec-1fb0-46f0-973d-e6328bd15783">
</momented actilutes/
</momented/
</momented/
</momented/
</momented/
</momented/
</momented/
</momented/
</momented/>
```

Please note however, that Revit by default does not use GUID references. Revit instead uses Element ID references, which can be easily duplicated within differing models.

To avoid any sort of duplication issues, the integration process will assign GUID references to all object instances when models are either imported into Revit or exported from Revit.

Please note that these references will be lost on exiting from Revit unless the model is saved first. It is therefore vital that the Revit model is saved after performing an export to Tekla Structural Designer.

Failure to save will lose the GUID references on exiting the program and remove the ability to communicate any model changes with Tekla Structural Designer.

2.2 API - Application Program Interface

An API (Application Program Interface) controls the transfer between Tekla Structural Designer and Autodesk Revit. The API is a separate program that sits inside the Tekla Structural Designer Integrator for Autodesk Revit application, and is provided by Autodesk for the Trimble Solutions product development team to use.

The API is the governing factor between the two items of software and controls which object can be passed to and from the software packages. It can also limit what sort of change control can be performed with each category.

• For example, Floor category instances can be created or deleted using the API, but they cannot be updated in boundary shape. Therefore, if a floor instance changes boundary shape, the integrator is forced to delete the existing floor instance and create a new instance in its place.

2.3 Parameters Transferred

Tekla Structural Designer will transfer the following parameters into Revit:-

	Analysis Resu	It Parameters
Parameter Name	Description	Notes
Result_AxialMax	Maximum Axial Force	Applicable to Structural Framing Bracing members only when analysis results imported
Result_ColMajorMomentMax	Maximum Moment in Major Axis	Populated by Steel Structural Column Members when analysis results imported
Result_ColMajorMomentMin	Minimum Moment in Major Axis	Populated by Steel Structural Column Members when analysis results imported
Result_ColMajorShearMax	Maximum Shear in Major Axis	Populated by Steel Structural Column Members when analysis results imported
Result_ColMajorShearMin	Minimum Shear in Major Axis	Populated by Steel Structural Column Members when analysis results imported
Result_ColMinorMomentMax	Maximum Moment in Minor Axis	Populated by Steel Structural Column Members when analysis results imported
Result_ColMinorMomentMin	Minimum Moment in Minor Axis	Populated by Steel Structural Column Members when analysis results imported
Result_ColMinorShearMax	Maximum Shear in Minor Axis	Populated by Steel Structural Column Members when analysis results imported
Result_ColMinorShearMin	Minimum Shear in Minor Axis	Populated by Steel Structural Column Members when analysis results imported
Result_ColVShearMax	Maximum Vertical Shear	Populated by Steel Structural Column Members when analysis results imported
Result_ColVShearMin	Minimum Vertical Shear	Populated by Steel Structural Column Members when analysis results imported
Result_EndAxialMax	Maximum Positive Axial on Beam End	Populated by Steel Structural Framing Beam members without pinned ends when analysis results imported
Result_EndAxialMaxNeg	Maximum Negative Axial on Beam End	Populated by Steel Structural Framing Beam members without pinned ends when analysis results imported
Result_EndMomentMax	Maximum Positive Moment on Beam End	Populated by Steel Structural Framing Beam members without pinned ends when analysis results imported
Result_EndMomentMaxNeg	Maximum Negative Moment on Beam End	Populated by Steel Structural Framing Beam members without pinned ends when analysis results imported
Result_EndVShearMax	Maximum Positive Shear on Beam End	Populated by Steel Structural Framing Beam members when analysis results imported
Result_EndVShearMaxNeg	Maximum Negative Shear on Beam End	Populated by Steel Structural Framing Beam members without pinned ends when analysis results imported

Result_StartAxialMax	Maximum Positive Axial on Beam Start	Populated by Steel Structural Framing Beam members without pinned ends when analysis results imported
Result_StartAxialMaxNeg	Maximum Negative Axial on Beam Start	Populated by Steel Structural Framing Beam members without pinned ends when analysis results imported
Result_StartMomentMax	Maximum Positive Moment on Beam Start	Populated by Steel Structural Framing Beam members without pinned ends when analysis results imported
Result_StartMomentMaxNeg	Maximum Negative Moment on Beam Start	Populated by Steel Structural Framing Beam members without pinned ends when analysis results imported
Result_StartVShearMax	Maximum Positive Shear on Beam Start	Populated by Steel Structural Framing Beam members when analysis results imported
Result_StartVShearMaxNeg	Maximum Negative Shear on Beam Start	Populated by Steel Structural Framing Beam members without pinned ends when analysis results imported

Reinforced Concrete Specific Parameters			
Parameter Name	Description	Notes	
TSDI_RC_Bars	Designed rebar requirement in column	Populated by Concrete Structural Column objects	
TSDI_RC_Bottom	Designed rebar requirement in bottom of beam	Populated by Concrete Structural Framing objects only	
TSDI_RC_Cover	Designed rebar cover requirement	Populated by Concrete Structural Column and Structural Framing objects	
TSDI_RC_Links	Designed rebar link requirement	Populated by Concrete Structural Column and Structural Framing objects - TSD English UK language	
TSDI_RC_Side	Designed rebar requirement in side of beam	Populated by Concrete Structural Framing objects only	
TSDI_RC_Span_Links	Designed rebar link requirement	Populated by Concrete Structural Framing objects only if option 'Separate Support and Span Regions' has been enabled	
TSDI_RC_Span_Stirrups	Designed rebar stirrup requirement	Populated by Concrete Structural Framing objects only if option 'Separate Support and Span Regions' has been enabled	
TSDI_RC_Stirrups	Designed rebar stirrup requirement	Populated by Concrete Structural Column and Structural Framing objects - TSD English US language	
TSDI_RC_Supp_Links	Designed rebar link requirement	Populated by Concrete Structural Framing objects only if option 'Separate Support and Span Regions' has been enabled.	
TSDI_RC_Supp_Region	Description of the Support Region extents	Populated by Concrete Structural Framing objects only if option 'Separate Support and Span Regions' has been enabled.	
TSDI_RC_Supp_Stirrups	Designed rebar stirrup requirement	Populated by Concrete Structural Framing objects only if option 'Separate Support and Span Regions' has been enabled.	
TSDI_RC_Top	Designed rebar requirement in top of beam	Populated by Concrete Structural Framing objects only	

General Parameters				
Parameter Name	Description	Notes		
TSDI_Alias	Alias information	Blank parameter left for users own use		
TSDI_Concrete_Fill	Is the member concrete filled?	Populated when concrete filled hollow section columns are integrated - Yes/No answer		
TSDI_Design_Grp	Design Group assigned in TSD	Populated by all objects when used in TSD		
TSDI_Detail_Grp	Detail Group assigned in TSD	Populated by Concrete Structural Framing and Structural Column members		
TSDI_Dim	Steel decking profile gauge	Populated by Floor objects only		
TSDI_EndConn	Connection type on end of member	Populated by Structural Framing and Structural Column members		
TSDI_Fibre_Reinf	Fibre reinforcement details	Populated by Floor objects only		
TSDI_Integration_Status	Integration Status of Object	Populated by all objects - New / Updated / Unchanged settings available		
TSDI_Manufacturer	Steel decking manufacturer	Populated by Floor objects only		
TSDI_Matl	Material grade assigned in TSD	Populated by all objects		
TSDI_Not_Converted	Indicates any mapping problems	Populated by Structural Framing and Structural Column members		
TSDI_Note	Applicable notes	Populated if UDA for Note is used		
TSDI_Part_Mark	Part mark assigned in TSD	Populated by all objects		
TSDI_Reference	Steel decking profile name	Populated by Floor objects only		
TSDI_Size	Numerical decking data for US Slabs	Was populated by Floor objects only but is no longer used		
TSDI_StartConn	Connection type on start of member	Populated by Structural Framing and Structural Column members		
TSDI_Trans_Reinf	Transverse Reinforcement Requirements	Populated by compositely designed Structural Framing objects only		
TSDI_Type	Member, Slab or Wall Type in TSD	Populated by all objects		

13 (230)

3 Revit Connectivity and Integration with Tekla Structural Designer

The subject of model connectivity - or lack of it - is one of the major reasons for integration failure. Revit models **MUST** be analytically connected for a successful analysis and design of the structure to take place.

Please note that the export from the Revit platform uses the analytical wire location for positions of all elements transferred into Tekla Structural Designer.

The default analysis wire position can be controlled through the analytical alignment settings and this will be discussed in a later section.

3.1 Validation inside Tekla Structural Designer

For import processes into Tekla Structural Designer, it is important to validate the model as soon as the import has been completed. Validation can also be used to remove potential problems from integration.

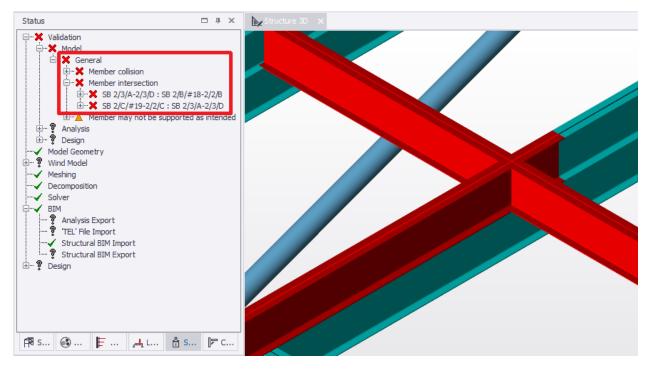
			<u>^ ()</u> (Ð
Column	Roof Panel Wall Panel	Support Element Measure	on Validate	
Cold Formed	Panels 🗔	Miscellaneous	Wall	

The purpose of validation is to trap errors within the Tekla Structural Designer model that will cause the Solver to fail. Examples of validation errors include **Unsupported Elements** and **Element Collision**.

Status - # X -X Validation X Model . General Member collision Member intersec Member may not be supported as intende A SB 2/4/#15-2/4/#16 A SB 2/A/#17-2/3/A A SB 2/D/#20-2/3/D A SBR /%1-/%2 SBR /%3-/%4 ± ? Analysi ± ? Design Model Geometry • Wind Model Meshina Decomposition Solver BIM 1 Analysis Export TEL' File Import Structural BIM Import ? Structural BIM Export 🗄 🖗 🖗 Design 🛱 S... 🚯 ... ╞ ... 🞿 L... 📩 S... 🖻 C...

Example of a validation warning regarding unsupported members

Example of a validation error regarding element collision.

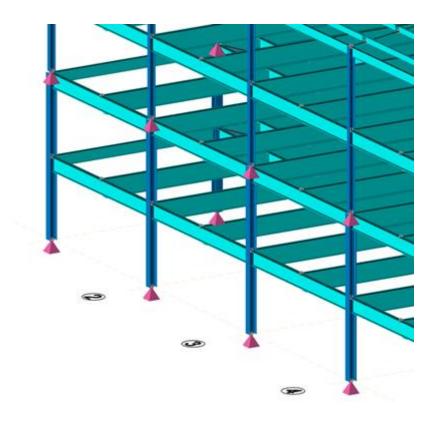


Within Tekla Structural Designer, you are able to double click on the error messages in the status tree and find that the program will zoom and highlight the affected elements.

3.2 Additional visual checks within Tekla Structural Designer

When importing a model into Tekla Structural Designer, please note that pinned supports will be generated under all columns where no supporting member can be detected.

Check the imported model for any support elements located at unexpected positions (e.g. in the following image additional supports are located at splice positions). This is usually an indication of an underlying connectivity issue.



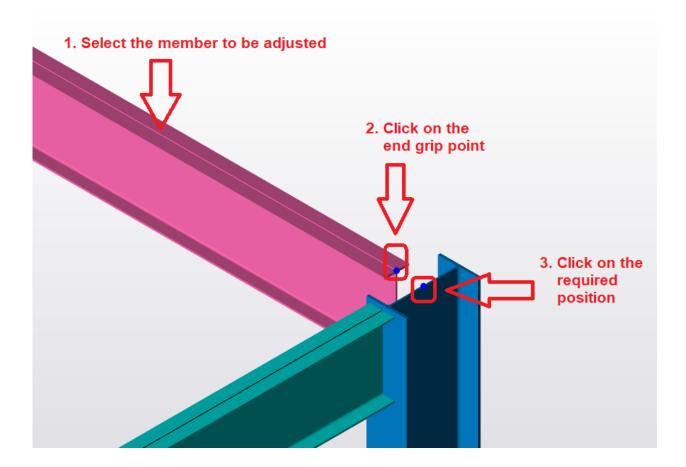
3.3 Correcting models inside Tekla Structural Designer

It is possible to correct validation and connectivity issues within Tekla Structural Designer. However, please note that Revit contains tools that allow models to be corrected more quickly than Tekla Structural Designer.

Editing should ideally be performed in the Revit software as the BIM model should be considered as the 'master' model concerning dimensional accuracy and set out locations.

As a quick rule of thumb, we would say that if a model contains more than a dozen connectivity issues then it is faster to correct the model inside Revit and re-export.

Connectivity issues in Tekla Structural Designer can be adjusted in the Structural View by selecting the object (member), clicking the end node and then clicking on the correct location.



3.4 Creating analytically connected models within Revit

It is important to understand that there are a number of locations that can be used for the position of the analysis wire, and that the location can be defined at both the start and end of the member.

The analytical settings of an object can be accessed by altering the Properties Filter to use the Analytical Model settings. The Analytical Alignment settings should now be visible.

Properties	×
Proper	ties Filter
Analytical Beams (1)	✓ 🔂 Edit Type
Analytical Model	*
Analyze As	Gravity
Analytical Links	From Column
Analytical Properties	*
Family Type	W Shapes : W14X30
Physical Material Asset	Steel ASTM A992-50
Length	20' 0"
Cross-Section Rotation	0.00°
Analytical Alignment	*
Start Alignment Method	Auto-Detect
Start y Projection	Location Line
Start z Projection	Location Line
End Alignment Method	Auto-Detect
End y Projection	Location Line
End z Projection	Location Line
Neleases / Wember Forces	*
Start Release	Fixed
Start Fy	

The analytical alignment can be set to follow:

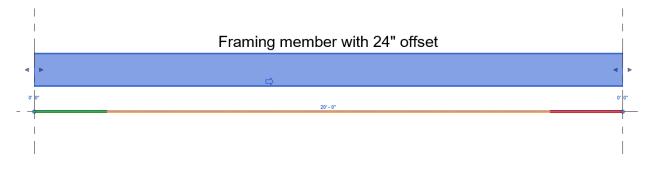
3.4.1 Auto-Detect

This should use the location line as a default but care should be taken as Revit can detect adjacent objects and move, lengthen or shorten the analysis wire to suit.

The Auto-Detect option is the default option set when generating Structural Framing members. We would recommend that users review the analysis wire location for all members using Auto-Detect settings and correct where necessary.

3.4.2 Location line

The analysis wire will follow the positions selected for the start and end points. In the example below, the beam has been defined between the grid/level intersections and so the analysis wire follows these points - regardless of the location of the physical object.



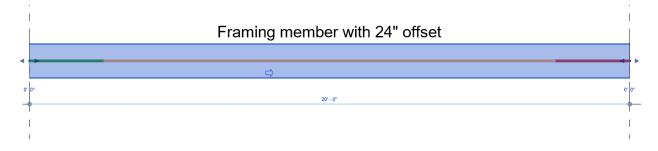
3.4.3 Top of Element

The analysis wire follows the top of the physical location, regardless of the positions selected when defining the object.

	Framing member with 24" offset		l
٩	▶	٩	•
0'	or 20'- 0"	0' (o"
		I 	

3.4.4 Center of Element

The analysis wire follows the center of the physical location, regardless of the positions selected when defining the object.



3.4.5 Bottom of Element

The analysis wire follows the bottom of the physical location, regardless of the positions selected when defining the object.

	Framing member with 24" offset		
٩	▶	•	•
o' 	or20' - 0"	0' 0	-
		I I	

3.4.6 Additional locations

The analysis wire can also be set to follow predefined gridlines, levels or workplanes.

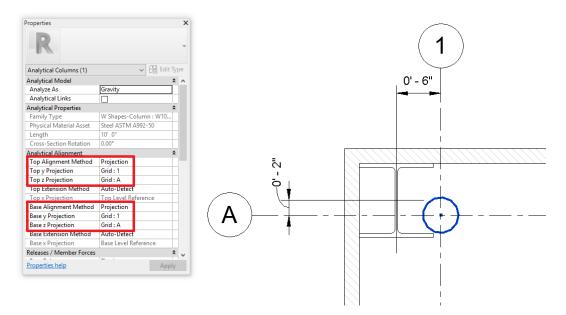
	Example Ref Plane
Framing member with 24" offset	
Example Ref Plans	- +

3.4.7 Adjusting the analysis wire location for Structural Columns

Horizontal locations

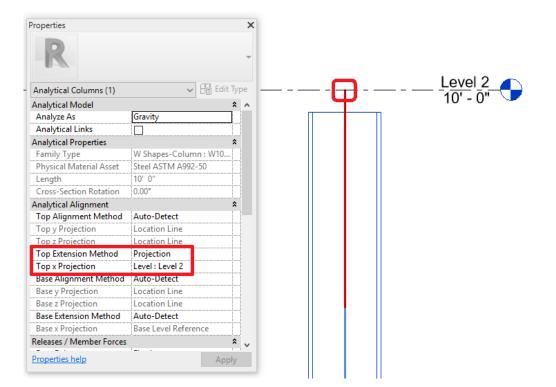
We would recommend that Structural Column instances be moved into the correct physical location in plan views. The analysis wire can then be adjusted to a suitable position (such as a grid intersection position).

The settings at both the top and bottom of the instance should be identical to avoid generating a sloping analysis wire.



Vertical locations

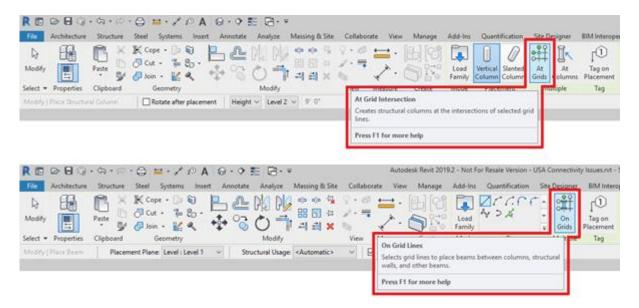
In a similar fashion, both the top and bottom locations of Structural Column analysis wires can be stipulated. Locations can include specific levels or the top and bottom of the physical representation.



3.5 Building Connected Models

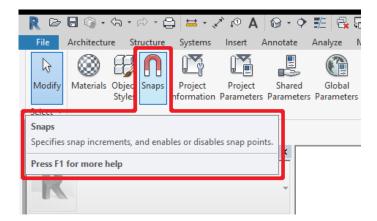
Using the **At Grids** (Structural Columns) and **On Grids** options when initially creating Revit models will help generate correctly connected analytical models. We would recommend the use of Location Line analytical settings when using these commands.

Please note that **At Grid Intersection** is an option relating to the placement of Structural Columns, **On Grid Lines** is an option relating to the placement of Structural Framing objects.



3.6 Snaps

The use of snap shortcuts are also useful tools to generate connected models.



Popular snaps to use when initially constructing the Revit model are: Recommended Snaps are-

- **SE** : Snap to Endpoint
- SM : Snap to Midpoint
- SI: Snap to intersection

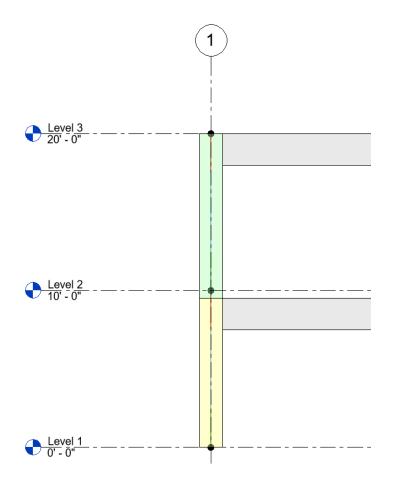
3.7 Generating Concrete models inside Autodesk Revit

3.7.1 Guidance for Concrete Columns

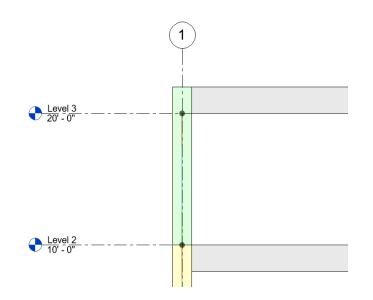
Within the Autodesk Revit software, concrete columns can be modelled either from level to level or for the full height of the structure.

Where slabs are required at slightly different heights in different wings of a building, it may simplify the model to use fewer levels in Revit and use vertical offsets to obtain the correct physical locations of the columns.

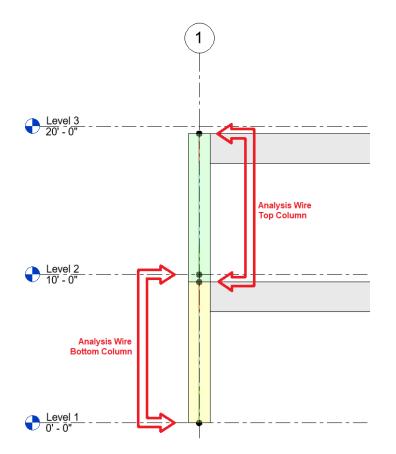
However, if the physical length of the column is shorter than the analytical length, then the design may be conservative. (See lower column)



If the physical length of the column is longer than the analytical length, then the design may be unconservative.



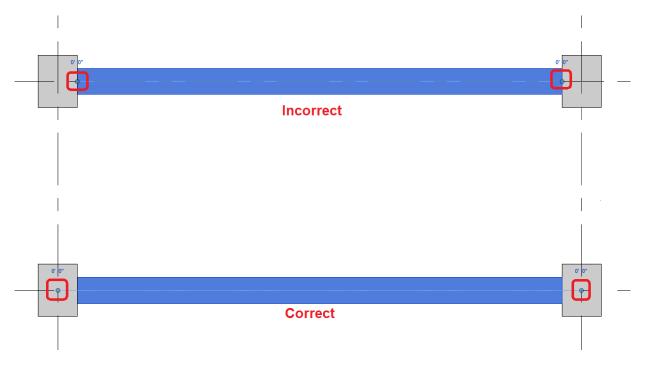
It is also possible to create columns where the analysis wires overlap if the wrong settings are used in Revit



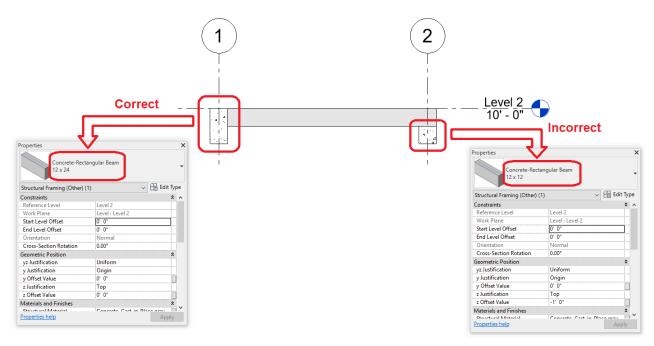
The analytical links option does not have any effect on Tekla Structural Designer integration. Rigid link elements to provide the necessary support are automatically generated on import from any concrete column members.

3.7.2 Guidance for Concrete Beams

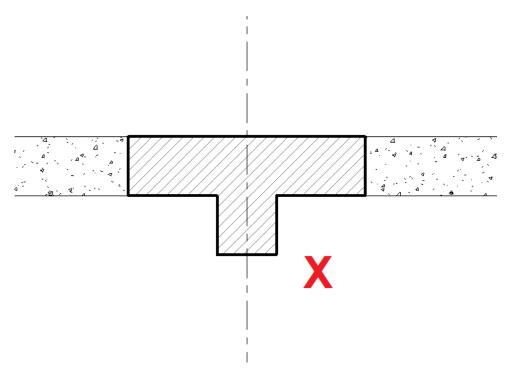
Beams should generally be created in Revit from reference point to reference point with levels used for analytical wire locations.



Beams need to be defined as the full depth of the beam section, not simply the depth remaining under the slab. This ensures that the correct depth will be used for the design of the beam and the correct rebar allocation will be assigned.



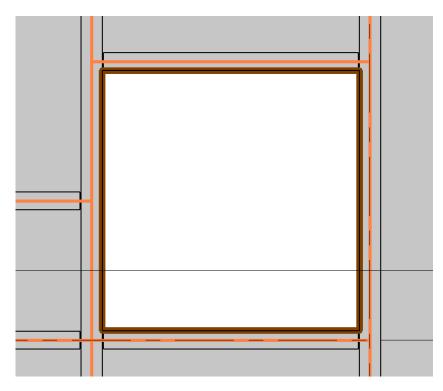
Beam flange widths can be determined automatically within Tekla Structural Designer so artificial beam flanges do not need to be modelled within Autodesk Revit. See the options held in the **Beam Properties** \rightarrow **Design Control** \rightarrow **Control Flanges** dialogs within Tekla Structural Designer after integration has taken place.



3.7.3 Specific rules for slab connectivity

Floor outlines

Please note that by default, floors modelled in Revit have the analysis wire positions modelled to the edges of the object.



Depending on the slab type used for design purposes within Tekla Structural Designer, this can lead to the slab being flagged as unsupported when the model is validated.

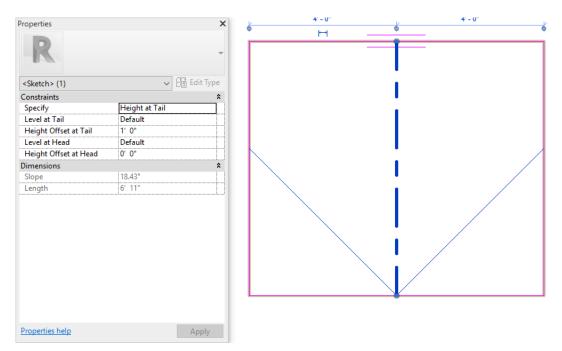
The slab wire can be adjusted to ensure connectivity by using the **Adjust Analytical Model** command (see later section).

An alternative is to deselect the **Enable Analytical Model** flag prior to integrating the model and building the slabs within Tekla Structural Designer. By also removing the slabs from the transfer back into Revit, you can then retain totally independent slab systems in both modelling systems.

When considering floor connectivity, we would recommend that the analysis extents of floor instances should intersect with supporting beam and wall lines as much as possible. (Exception being floors intended for flat slab analysis within Tekla Structural Designer).

Sloping slabs

Sloping slabs created in Revit (using the **Slope Arrow** option) will be transferred into Tekla Structural Designer.



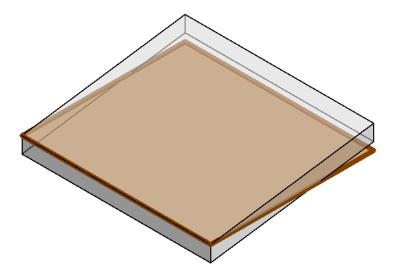
However, please note that it is not possible to return sloping slabs accurately from Tekla Structural Designer due to limitations within the Autodesk API.

If no existing Revit model exists

For first time import processes, no slab items will be created. The user will be informed of this within the log.

If merging results into an existing Revit model.

If the slab has not been adjusted in position, the slab will be physically updated to suit the
properties exported from Tekla Structural Designer.
The analysis wire will be reset to follow the horizontal plane and will no longer follow the slope of
the slab.



• If the slab has been adjusted in position, expanded or contracted in size, then no floor instance can be created within Revit. The existing floor will be deleted as part of the update process but no replacement floor instance will be created.

Floors and meshing

Floors should ideally be created so that a minimum of **2**" (or **50mm**) exists from the edge of any opening or from the outline of any column member to the edge of the slab.

These distances will ensure that the floor slab can be correctly meshed when the analysis stage is performed in Tekla Structural Designer.

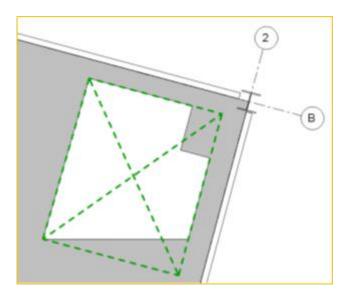
If these minimum distances cannot be met within the Revit software, either adjust the analytical model to suit or consider removing the floor instance from the integration process and instead have the engineer generate the slab within the Tekla Structural Designer software to meet their own requirements.

Floor Openings

Any opening with a polygonal shape or containing a curved edge will be simplified to a rectangular shape on import into Tekla Structural Designer.

The rectangular shape will be drawn to suit the horizontal and vertical extents of the opening plan requirements.

Please note that in some cases this may extend the hole past the outline of the slab and result in the opening becoming invalid.



3.8 Checking wireframe connectivity of a model within Revit

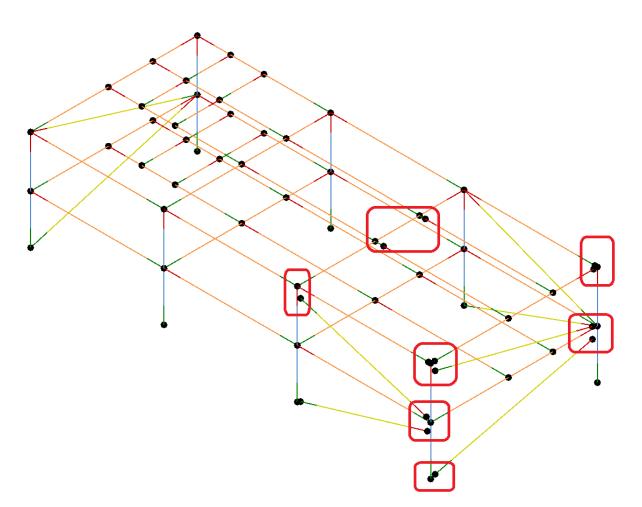
We would recommend creating a view within your Revit model or template specifically for analytical model connectivity. If your model is based off the standard Autodesk templates then the 3D View: **Analytical Model** can be used however we would also recommend enabling the option to view **Analytical Nodes** within the **Visibility/Graphics Overrides** command.

Visibility/Graphic Overrides for 3D View: An	alytical Model					×
Model Categories Annotation Categories A	nalytical Model Categories	Imported Categ	ories Filters			
Show analytical model categories in this v Filter list: <pre></pre>	iew		If a ca	tegory is unched	ed, it will not be vi	sible.
1/2-21-22 E -	Pr	ojection/Surface		11-10	Detailling	^
Visibility	Lines	Patterns	Transparency	Halftone	Detail Level	
🖅 🗹 Analytical Beams					By View	
🛓 🗹 Analytical Braces					By View	
🛓 🗹 Analytical Columns					By View	
🛓 🗹 Analytical Floors					By View	
🛓 🗹 Analytical Foundation Slabs					By View	
Analytical Isolated Foundations					By View	
Apalytical Links					By View	
- 🗹 Analytical Nodes	Override				By View	
🚊 💌 Analytical Pipe Connections					By View	
Analytical Spaces					By View	
🛓 🗆 Analytical Surfaces					By View	
Analytical Wall Foundations					By View	
🛓 🗹 Analytical Walls					By View	
Boundary Conditions					By View	
🗄 🗹 Structural Internal Loads					By View	
All None Categories that are not overridden are of according to Object Style settings.	Invert Expand drawn Object Styles					
			ОК	Cancel A	Apply He	lp

NB. To help with the clarity of the created view, we would recommend disabling the option **Show model** categories in this view (Model Categories tab). Disabling this option will remove all physical objects from the view and leave only analytical objects being visible.

Visibility/Graphic Overrides for 3D View:			
Model Categories Annotation Categories			
✓ Show model categories in this view			
<u>F</u> ilter list:	<show all=""> \sim</show>		

When using this view, you should be looking for areas where many nodes are located. These can be indications of a concentration of unconnected member ends.



3.8.1 Check Member Supports

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File	Architecture Structure Steel Systems Insert Annot	tate Analyze N
\ Modify	Boundary Loads Conditions Conditions	pports Consistency
Select	Analytical Model a Analytical M	lodel Tools 🛛 🛛
Propert e	Check Member Supports Verifies that structural elements such as beams, columns, walls, and slabs, are joined to supporting elements.	😚 3D Isometric V
N	Press F1 for more help	
		Γ

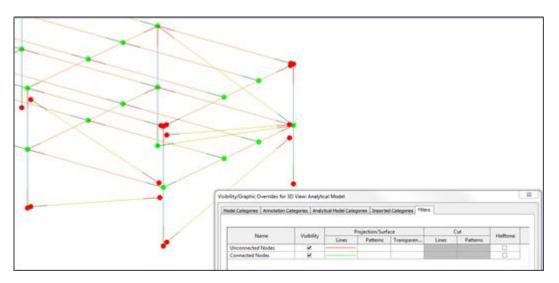
In addition to visual checks, Revit commands such as **Check Member Supports** (**Analyze** tab) command can also identify areas where no connectivity can be detected.

As mentioned in the tooltip, the command should identify all unsupported members and report any issues within the **Review Warnings** command (**Manage** tab).

Some customers may find the **Review Warnings** command rather cumbersome to navigate though and so we would recommend using the **Check Member Supports** command in conjunction with other methods of checking model connectivity.

3.8.2 Color coded nodal views

We would recommend the use of a color-coded filter based on nodal connectivity. This can then be combined with the Analytical Connectivity view (described earlier) to help identify problem areas within the model.



Creating a color coded view based on nodal connectivity

Depending on the Revit template that is used, filters relating to node connectivity may already exist. However, any predefined filters should be carefully checked to ensure that all available connectivity options are covered with both **Connected - Auto-Detect** and **Connected - Manual** status' being incorporated in filters

If the connectivity filters do not exist, please follow the steps below to generate a suitable filter.

With your Analytical Connectivity view active, access the **Visibility/Graphics Overrides** dialog by either clicking on the relevant **Edit** button within the view properties dialog or by using the **VG** or **VV** keyboard shortcuts.

Properties	×
3D View	
3D View: Analytical Connectivity	, v 🖓 🔂 Edit Type
Graphics	* ^
View Scale	1:50
Scale Value 1:	50
Detail Level	Medium
Parts Visibility	Show Original
Visibility/Graphics Overrides	Edit
Graphic Display Options	Eult
Discipline	Structural
Show Hidden Lines	By Discipline
Default Analysis Display Style	None
Sun Path	
Extents	\$
Crop View	
Crop Region Visible	
Annotation Crop	
Far Clip Active	
Far Clip Offset	304800.0
Scope Box	None
Section Box	
Properties help	Apply

			rojection/Surfa			ut	
Name	Visibility	Lines	Patterns	Transparen	Lines	Patterns	Halftone

Click on the Filter tab and then on the Add button to create a new filter.

When accessing the **Add Filters** dialog, click on **Edit/New** against the **Rule-based Filters** option to create a new filter.

Add Filters	×
Select one or more filters to insert.	
Rule-based Filters Selection Filters	Edit/New
OK Cancel	Help

Click on **New** to create a new filter and enter the name as being **Unconnected Analytical Nodes** with the filter option as being Define rules.

Click **OK** when this information has been entered.

Filters			×
Filters Rule-based Filters Selection Filters	Categories Select one or more categories to be included in the filter. Parameters common to these categories will be available for defining filter rules.	Filter Rules	~ Add Rule Add Set
	Filter Name ×		
	Define rules Select Use current selection		
	OK Cancel		
How do I create and use view filters?			OK Cancel Apply

Once the filter has been created, the Categories and Filter Rules windows should have become active allowing certain objects and parameters to be filtered.

Within the Categories window, tick the Analytical Nodes entry. Set the Filter Rules to be:-

- Object : **Connection Status**
- Action :
- Fouals
- Search Term : •

Un	connected	

Filters		×
Filters Rule-based Filters Unconnected Analytical Nodes Selection Filters	Categories Select one or more categories to be included in the filter. Parameters common to these categories will be available for defining filter rules. Filter list: <show all=""> Filter list: <show all=""> Inde un-checked categories Analytical Beams Analytical Braces Analytical Braces Analytical Broos Analytical Foundation Slabs Analytical Isolated Foundations Analytical Isolated Foundations Analytical Nodes</show></show>	Filter Rules AND (All rules must be true) Add Rule Add Set Connection Status equals Unconnected
*	Check All Check None	
How do I create and use view filters?		OK Cancel Apply

After the **Unconnected Analytical Nodes** filter has been correctly created, highlight the filter name and then use the **Duplicate** option to create two copies.

Filters			×
Filters	Categories Select one or more categories to be included in the filter. Parameters common to these categories will be available for defining filter rules. Filter list: <show all=""> Filter list: <show all=""> </show></show>	Filter Rules]
How do I c Duplicate ew filters?		OK Cancel Apply	

After creating the duplicate, you should have two filters.

Rename the newly created duplicate filter to be **Connected Analytical Nodes** and change the action for the Filter Rules from **equals** to **does not equal**.

Filters		×	(
Filters	Categories Select one or more categories to be included in the filter. Parameters common to these categories will be available for defining filter rules. Filter list: <show all=""> Filter list: <show all=""> </show></show>	Filter Rules AND (All rules must be true) Connection Status equals does not equal is greater than is greater than or equal to is less than is less than or equal to contains does not contain begins with does not begin with	
* [M	Check All Check None	ends with does not end with	
How do I create and use view filters?		OK Cancel Apply	:

Once the data for all both filters has been correctly created, click on the **OK** button to return to the **Add Filters** dialog.

Within the Add Filters dialog, select both filter names to include them into the view and click OK.

Add Filters	×
Select one or more filters to insert.	
Ref Local Structure Connected Analytical Nodes Unconnected Analytical Nodes Second Analytical Nodes	Edit/New
OK Cancel	Help

You should now have been returned to the main **Visibility/Graphics Overrides** dialog and should be able to see the filters that have been created.

Click to highlight the entry for **Unconnected Analytical Nodes** and then choose to **Override** the **Lines** applied to an object.

isibility/Graphic (Model Categories					Categories Filts	rs			
Houer Categories	Annotation cate	gones Anary	ucal model categ	jones imported	reategories				
Na	Name Visibility Projection/Surface						Cut	Halftone	
					Transparen	Lines	Patterns		
Unconnected	Analytical N alytical Nodes		Override	Override	Override				
	,			1	1				1
Add	Remove	U	p	Down					
All document	filters are defined	back							
modified here		anu	Edit/Nev	v					
					OK	Cano	el App	y He	ein

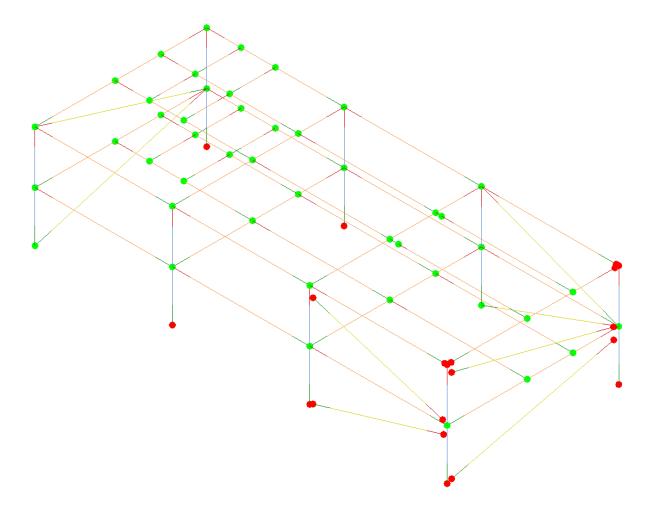
When editing the line graphic overrides, set the color to be **Red**. Click **OK** when done.

Line Graphics		×
Lines		
Pattern:	<no override=""> ··· ··</no>	
Color:	Red	
Weight:	<no override=""></no>	~
Clear Overrides	OK Cance	el

Perform the same override task on the **Connected Analytical Nodes** filter although please note that the color used will be **Green**. When both overrides have been set, click **OK** to leave the dialog.

Vi	sibility/Graphic Overrides for 3D	View: Analytic	al Connectivity	y					×
Μ	odel Categories Annotation Cate	gories Analyti	cal Model Categ	ories Imported	d Categories Filter	S			
								1	_
	Name	Visibility	Pi Lines	rojection/Surfa			ut	Halftone	
	Unconnected Analytical N	·	Lines	Patterns	Transparen	Lines	Patterns		_
	Connected Analytical Nodes								
	Add Remove	Up		Down					
	All document filters are define	d and							
	modified here		Edit/New	v					
					OK	Cano	el Appl	y He	lp

The color coding overrides should now be applied onto the model.



3.9 Manually adjusting the Revit analytical model

Analytical nodes (and the associated instance analysis wire) can be relocated using the **Analytical Adjust** command (**Analyze** toolbar).

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File	Architecture Stru	cture Steel	Systems In	isert Ai	nnotate	Analyze	Massing & Site	Collabora	ate View M
Ø				- <u>1</u>	<u> </u>				
Modify	Boundary Loads Conditions	Load L Cases Comb	oad Adju pinations	st keset	Supports	Consistency	/ Space Spa Separ		Space Zone Naming
Adjust A	nalytical Model (AA)			Annytic	al Model 1	Tools 3	۷ Sp	oaces & Zone	5 ▼
1	the analytical model (AA)		member in rela	tion					
	of the elements to w		member in rela		x 😥	3D Isometric	View 🕜	Analytical C	onnectivity X
Press F1	for more help				1	~ ~		_	
V					•			® (<	/ X
3D View:	Analytical Connectiv	ity	~ 8	🖥 Edit Ty	pe	Wall Adjustmen	Openings Ar It	alytical Fir Link	nish Cancel
Graphics				*	~		Edit Analyti	cal Model	
View Sca	le	1:50							

To adjust a location, simply click and hold the left mouse button while hovering over a node position. Move the mouse onto a member providing support and then use a snap shortcut for the node location before finally releasing the mouse button.

An alternative to this is to use the **Align** command (**Modify** tab). Please note that adjusting the analytical wire position does not affect the physical position of the element.

Openings can be analytically removed from slabs and walls by using the **Openings** option within the **Edit Analytical Model** submenu. Simply enable or disable the selection box shown in the center of each opening to enable or disable the analytical opening.

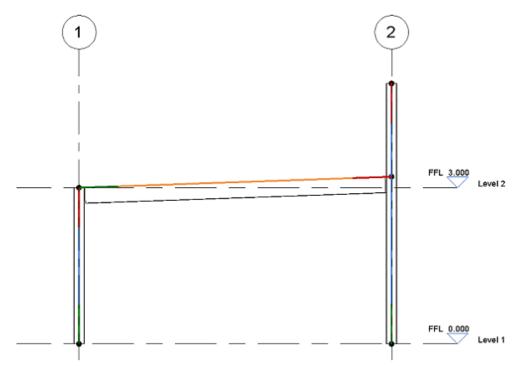
Click on the **Finish** command (**Edit Analytical Model** submenu) to save the positions of any amended analytical positions.

3.10 Modeling sloped items as being flat for integration purposes

When using Tekla Structural Designer, it may be required to design very shallow slopes as flat for engineering efficiency reasons (e.g. to avoid the problem of modeling non-planar roofs).

The Revit model would still need to be created correctly for BIM sharing and contract documentation purposes though. This section runs through the process of creating physically sloping members but having the analysis wires specified as following a horizontal plane.

In order to create a sloping member with an analytical wire following a horizontal plane it will be necessary to firstly generate the geometry. This will initially set the analysis model as following the model geometry.

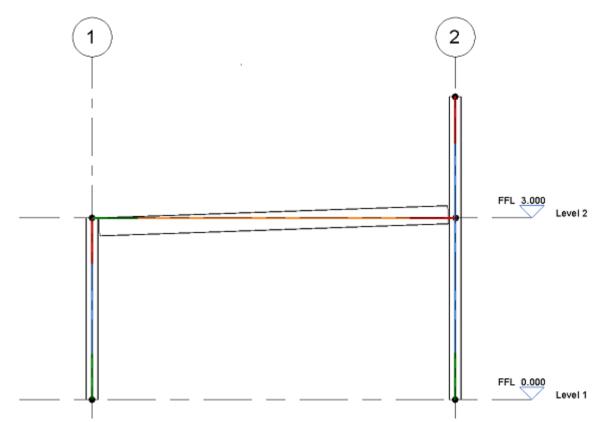


As well as generating the sloping member itself, it will be necessary to create either a **Level** element or a **Reference Plane** for the analysis wire to follow. Once this has been achieved, access the analysis properties of the sloping beam instance and flag the analysis wire as following the level/reference plane.

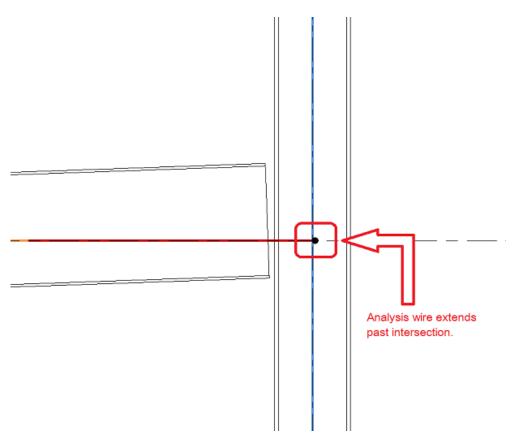
As mentioned earlier, this can be done by changing the z-projection settings held under the **Analytical Alignment** section. Change the z-projection alignment to be the same as the adjacent level or reference plane (in our example, **Level 2**).

Properties		×	Properties		:
R			R		
Analytical Beams (1)	•	Edit Type	Analytical Beams (1)	- 8	Edit Type
Analytical Model		* *	Analytical Model		\$
Analyze As	Gravity		Analyze As	Gravity	
Analytical Links	From Column		Analytical Links	From Column	
Analytical Properties		\$	Analytical Properties		\$
Family Type	UB-Universal Beams :	UB305	Family Type	UB-Universal Beams : U	B305
Physical Material Asset	Steel 43-275		Physical Material Asset	Steel 43-275	
Length	6003.7		Length	6007.3	
Cross-Section Rotation	0.000°		Cross-Section Rotation	0.000°	
Analytical Alignment		\$	Analytical Alignment		\$
Start Alignment Method	Auto-Detect		Start Alignment Method	Projection	1
Start y Projection	Location Line		Start y Projection	Center of Element	
Start z Projection	Location Line		Start z Projection	Level : Level 2	
End Alignment Method	Auto-Detect		End Alignment Method	Projection	
End y Projection	Location Line		End y Projection	Center of Element	
End z Projection	Location Line		End z Projection	Level : Level 2	1

The result is that the physical shape of the member still slopes but the analysis wire is now modeled horizontally.



With the analysis wire now following the flat plane, it may be noted that the wire may extend further than the required amount. This is due to Revit calculating the length of the analysis wire over the inclined distance rather than the flat distance.



The wire can be shortened and adjusted so that it then connects to the correct location by using the **Analytical Adjust** command within Revit. If you have trouble in selecting the intersection point, consider modeling a dummy member from the intersection point to provide a reference to snap onto. The dummy member can be deleted once the operation has been completed.

An alternative method may be to use the Align command (Modify tab).

Once the wire location has been corrected, the entire frame can be copied to further required locations and then integrated with Tekla Structural Designer.

When the member has been imported into Tekla Structural Designer, the alignment will be set to the center of the object. This is due to the analysis wire no longer following the same projection as the physical shape. The alignment however will not make any difference to the analysis and design of the frame within Tekla Structural Designer.

As long as the beam member is not moved or adjusted in any way within Tekla Structural Designer, the analytical wire and offsets will not be affected within the Revit model.

If the member is moved in Tekla Structural Designer then the physical shape in Revit will be altered to suit the settings of the member in Tekla Structural Designer (Aligned **center-center** as default).

It may be useful to consider performing all geometric changes for non-planar roofs within Revit and only performing the analysis process within Tekla Structural Designer. This would then avoid any data from being altered to suit the Tekla Structural Designer settings.

3.11 Continuous members

Continuous members originating in Revit should be modelled from end to end in one long piece. Revit has no concept of internal member nodes and so the connectivity to any supporting members is defined within Tekla Structural Designer.

Once the model has been transferred into Tekla Structural Designer, collision of element errors will be encountered at the intended support positions.

The user should then click on the continuous member, click on the central node and then simply click to model a new node on top of the supporting member position(s). This process will then generate the correct member fixity over the support position.

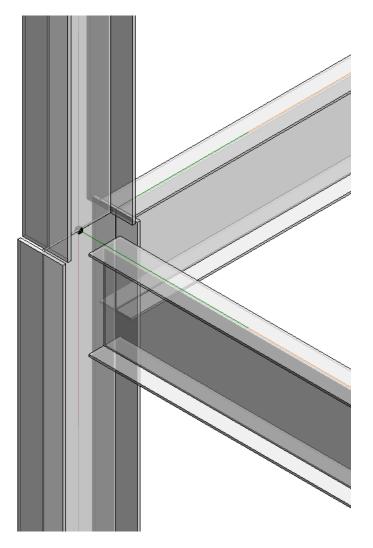
On return to Revit, steel members will not be split around the internal node position and will instead be returned as one long member. The control to toggle this behavior is held within the **Settings** command (**Home** tab) within Tekla Structural Designer.

Settings	×
	OK Cancel

3.12 Spliced columns

To model spliced columns within Revit, simply model one column on top of the other. In order to recognize the connection as a splice, some criteria must also be met.

- Both the upper and lower columns modelled in Revit must be Steel Structural Column instances
- The joint location between columns must be located on a level
- The joint location must be restrained by Structural Framing instances in both the major and minor axis directions.



If these criteria are met then the splice condition will be integrated into Tekla Structural Designer (with a fixed splice offset of **48**" or **600mm** depending on the unit system used).

47 (230)

4 Managing the mapping of sections, families and types.

This section covers the mapping of section sizes within Tekla Structural Designer and the mapping of families and types within Autodesk Revit.

As Tekla Structural Designer designs to specific section sizes, it is important to ensure that members modelled in the Structural BIM software are recognized on transfer.

4.1 Family location

For Autodesk Revit users, it is important to ensure that the program looks at the correct location for all Revit content. The content may be families generated by Autodesk or it may be content created by the customer.

- For users of imperial content, we use an entry in the **Places** dialog referenced as **Imperial** Library.
- For users of metric content, we use an entry in the Places dialog referenced as Metric Library.

Please note that the name in the **Places** dialog must use the exact spelling as written above and the location should be set as being the main library directory for that particular country content. For example:-

- USA content :
- UK content :
- Singapore content :

C:\ProgramData\Autodesk\RVT 20xx\Libraries\US Imperial C:\ProgramData\Autodesk\RVT 20xx\Libraries\UK C:\ProgramData\Autodesk\RVT 20xx\Libraries\Singapore

Library Name	Library Path
Imperial Library	C:\ProgramData\Autodesk\RVT 20III\Libraries\US Imperi
Metric Library	C:\ProgramData\Autodesk\RVT 20III\Libraries\UK
Tekla Library	C:\ProgramData\Tekla\Structural\TSD Integrator\20

The location may also be set as being a server location if content is not directly installed to your local drive.

It is important to ensure that either **Imperial Library** or **Metric Library** entries exist within the **Places** dialog. If these dialogs do not exist, correct section mapping may not be automatically determined.

The entry for **Tekla Library** is automatically generated as part of the first import or export process and does not require any sort of manual entry.

4.2 Model composition

Prior to performing an export of a Revit model to Tekla Structural Designer, please take some time to review the model and confirm that all of the modelled elements are required within the analysis and design model.

The integration process works on a very simple rule, only items that have a valid analytical element can be considered for export. Therefore, any item that does not have the analytical element enabled will not be exported from Revit.

Items that are not required can be omitted from any export processes by simply disabling the **Enable Analytical Model** checkbox. This checkbox can be found within the **Instance Properties** dialog.

Properties		×	Properties		×	Poparties	
Basic Wall Generic - 8" Ma	warry	-	W-Wide Flang		-	Floor 6* Concrete	
Walls (1)	• 🗄 Edit Type		Structural Framing (Sinder) (n • 9	Edit Type	Finors (1)	• 🔠 Edit Type
Constraints			t hatfication	Top	0.000	Constraints	
Location Line	Finish Face: Interior		a Offset Value	-0 21/2"		Level	Level1
Ease Constraint	Level 1		Materials and Finishes		1.0	Height Offset From Level	0.0.
Ease Offset	0.0.		Structural Material	Steel ASTM A992		Room Bounding	2
Date is Attached.	10		Structural	2001120112100		Related to Mars.	0
Base Extension Distance	0.0	6	Stick Symbol Location	Center of Geometry	1000	Structural	
Top Constraint	Up to level: Level 1		Statt Connection	None		Standard	and the second se
Unconnected Height	9.0		End Connection	None		Enable Analytical Model	198
Top Offset	9.0.		Cut Langth	15° 10 1/LW	1	Total Contraction of the Party	to the collection walks, joints
Top is Attached	10		Structural Usage	Girder	- 17	Reber Cover - Bottom Face	Interior (slabs, walls, joints
Top Extension Datance	10.4		Start Attachment Type	End Elevation		Reber Cover - Other Faces	Interior (slabs, wells, joints
Room Bounding	2		End Attachment Type	End Elevation	1.1	Dimensions	A loss of the second
Related to Mass			Camber Size			Slope	
tructural			Mumiter of stats			Petimatar	5440' 10/26'
Orachinal			Enable Analytical Model	8		Ayes	42872.29.5F
Enable Analytical Model	8		California			Volume	21436.15 CF
STOLEN R DOUGH	50000		Langth	27 0 9/256*		Thickmean	0.6
Rebar Cover - Exterior Face	Exterior - #3 to #5 +0' -1		Wolume.	0.96.07		Identity Data	
Rebar Cover - Interior Face	Interior (clabs, walls, joints		Identity Data			Image	
Rebar Cover - Other Faces	Interior talebs, walls, sorets		Imege		÷	Comments	
Properties help	Apply		Expecties.help		Apply	Properties.help	Apply

Instances with the **Enable Analytical Model** checkbox disabled will no longer have an analysis wire, and therefore will not be exported.

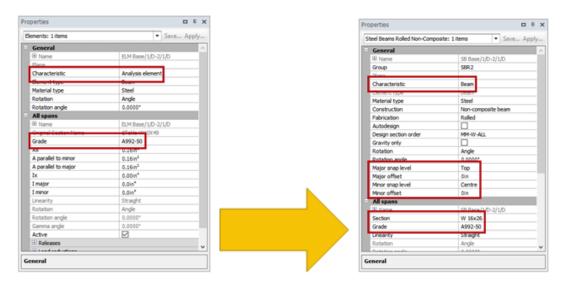
4.3 Unmapped Sections

4.3.1 From Autodesk Revit into Tekla Structural Designer

Where members cannot be mapped importing into Tekla Structural Designer, analysis elements will be created. Please note that analysis elements cannot be designed within the software.

However, analysis elements can be corrected and altered to beam, column or bracing elements by editing the properties dialog within the Tekla Structural Designer software.

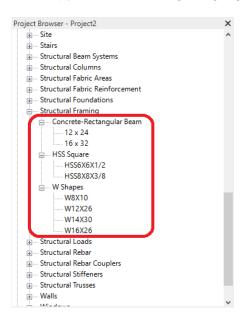
(NB: orientation settings are not needed for analysis elements so no offsets will be transferred for analysis element objects and the orientation settings will be lost during the transfer process).



4.3.2 From Tekla Structural Designer into Autodesk Revit

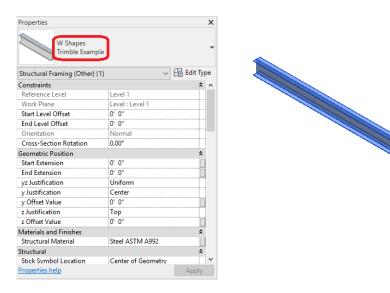
Where members are not mapped on import into Autodesk Revit, any unrecognized sections are generated by copying an existing type listed in the current Revit project and renaming to suit.

For example, in the following view, any new unrecognized Structural Framing sections would be created as a copy of one of the eight highlighted types.



The assigned name would be taken from the incoming neutral file but the section shape and properties assigned would probably not match the design intent.

To ensure the correct shape and properties were assigned, family and type mapping would have needed to be performed.



4.4 Unmapped material

4.4.1 From Autodesk Revit into Tekla Structural Designer

Unrecognized material will be flagged during the import process into the Tekla Structural Designer software. Users will need to specify the Material Type and Grade of all unrecognized materials before being able to continue with the import processes.

Please note that mapping choices on import can only be set against the predefined material held in the Tekla Structural Designer database. It is not possible to map onto user defined material grades even if these exist within the model prior to the import process.

BIN	1 Integration : St	ructural BIM Im	port			x
м	apping - Mate	rial Grades				
	Import Name	Material Type		Grade	Concrete Type	Timber Fabrication
E	ixample	Steel	~	8 ~		
	Cancel		Previo	Dus	Next	Finish

4.4.2 From Tekla Structural Designer into Autodesk Revit

It can be common to find that one or more materials require mapping. This is usually related to the Revit model or template not containing an appropriate grade to use.

We would recommend that users update their own templates so that all commonly used materials are held within.

Grades can be mapped as described later within this section, or by keeping the materials unmapped, corresponding materials will be generated.

The generated material will be created with the correct name and type (concrete, steel, wood etc.) but will contain no analysis information – this should not be a problem however, as we intend for all analysis and design procedures to be performed inside the Tekla Structural Designer software. The material creation process will also be listed in the log file.

mport from	Tekla Structural Designer		—	
	Tekla® Structu	\mathbf{U})⊛:Tri	mble
Mapping - M	laterial Grades			
Mapping - M		Revit Name	Advanced	1

4.5 Mapping members

4.5.1 From Tekla Structural Designer into Autodesk Revit

The mapping dialog of the integration wizard allows users to identify members, materials or panels which are not recognized.

Unrecognized sections can be mapped by using the Review Mapping option.

	In Import File	Not Recognized	Mapping File		Review Mapping	
Structural Column Types	4	1)	Clr		
Structural Framing Types	5	0		Clr		
Materials	3	2)	Clr		
Steel Decks	0	0		Clr		
The Integrator automatically	y maps standard	Revit names to 7	es for Families, Types and Material N. Fekla Structural Designer names, but appings so that all items passed to Te	if you have		

If the Review Mapping switches are selected, the following dialogs will cover the mapping of Structural Column objects, Structural Framing objects, Materials and Steel Decks in turn. On the individual mapping screen, three styles of icons will be shown:-

Blue circular tick

Both the family and type can be mapped. There is no further work required.

Yellow triangular exclamation marks

The family file can be mapped but the individual type is unrecognized.

Red circular cross icons

The family file cannot be determined; therefore, all types listed underneath are also unrecognized.

52 (230)

	Tekla® Struct	ural Designer	
X	Integrator for Auto		(): Trimble
lapping	g - Structural Framing		
Status	Import Name	Revit Name	Override
Status	Import Name	Revit Name	Override
		Revit Name	Override

As Tekla Structural Designer uses a set list of sections within its database, it is rare to see members being unrecognized on integration import processes into Autodesk Revit.

Where import processes are not detecting the correct families to use, please check the Places dialog to ensure that the entry is valid (see section on **Family Location**). You may also wish to ensure that the location listed contains a full range of families and types.

Use of user defined families and types.

It is common for users to want to use their own families rather than the Autodesk Revit default content. It is therefore possible to choose own families by the use of the **Override** button to the right hand side of the Mapping dialog.

Status	Import Name	Revit Name	Override
\bigcirc	Circular Hollow Structural Section	HSS-Round Structural Tubing	
\bigcirc	Square Hollow Structural Section	HSS Square	
\bigcirc	□ W & M-Wide Flange	W Shapes	
\bigcirc	W 10x12	W10X12	
\bigcirc	W 12x19	W12X19	
\bigcirc	W 12x26	W12X26	
\bigcirc	W 14x22	W14X22	
\bigcirc	W 16x26	W16X26	
\bigcirc	W 16x31	W16X31	
\bigcirc	W 8x13	W8×13	
\bigcirc	W 8x15	W8X15	

Within the **Override** dialog, the existing entry can be removed and new content can be selected by using the **Add** button and browsing to the required family. Click **OK** when done.

Important Note: Structural Column and Structural Framing families inside Revit contain very different parameters and program hierarchy. Please ensure that you do not manually map onto the wrong object category.

🖳 Advanced M	lapping - Structural Framing Family	_		×
Mapping -3	W & M-Wide Flange 1			
Add	C:\ProgramData\Autodesk\RVT 2019\Libraries\US Im eri	al\Structura	al Framing\	Steel
Remove				
2				
	<			>
	ОК		Cance	el .:

Once the family file has been set, the mapping dialog will list the type references underneath. These may be recognized as the type names are the same as default Autodesk Revit content but similarly, the names may not be recognized.

For any unrecognized type name, click in the blank cell to the right and choose the section type from the dropdown range.

mport fro	- 0		
		tural Designer odesk Revit® 2019	(): Trimble.
Status	Import Name	Revit Name	Override
0	Circular Hollow Structural Section	HSS-Round Structural Tubing	
0	Square Hollow Structural Section	HSS Square	
4	□ W & M-Wide Flange	Trimble W Shapes	
A	W 10x12		~
À	W 12x19	Trimble 10W112 Trimble 10W100	^
<u> </u>	W 12x26	Trimble 10W88	
À	W 14x22	Trimble 10W77 Trimble 10W68	
À	W 16x26	Trimble 10W60 Trimble 10W54	
À	W 16x31	Trimble 10W49 Trimble 10W45	
A	W 8x13	Trimble 10W39	
<u>^</u>	W 8x15	Trimble 10W33 Trimble 10W30	
		Trimble 10W26 Trimble 10W22	
		Trimble 10W19	
		Trimble 10W17	
		Trimble 10W12	
		Trimble 8W58	
		Trimble 8W48 Trimble 8W40	
		Trimble 8W35 Trimble 8W31	
		Trimble 8W28	
		Trimble 8W24 Trimble 8W21	
		Trimble 8W18	ish Cancel
		Trimble 8W15 Trimble 8W13	~

After the families and types have been mapped, and there are no red or yellow icons remaining in the dialog, click **Next** to continue.

At this stage, you should be prompted to save your mapping choices as an XML format file mapping file. If the file is saved, it will then be used for all future mapping choices (See the **Section and Material Mapping** dialog on future import and export dialogs).

This means then that previous mapped section profiles and/or material does not require repeat work to map the same sections again.

4.5.2 From AutoDesk Revit to Tekla Structural Designer

The same processes that are applicable to imports into Revit are also applicable to Export processes. Where the two methods differ however is when the **Review Mapping** dialog is accessed.

As Tekla Structural Designer uses a very specific list of sections, the **Override** button is replaced by an **Advanced** button. The Tekla Structural Designer section shape can be chosen from the **Export Name** dropdown by clicking in the blank cell.

Export to	Tekla Structural Designer		– o ×
	Tekla® Struct	\mathbf{U})): Trimble
Mapping Default F Default U			
Status	Revit Name	Export Name	Advanced
0	🗄 L-Angle		
•	Trimble W-Wide Flange		
0	12W16	Analysis Element	
0	14W34	TSD AutoDesign Structural Tee from Imperial UB (Connental)	
0	14W38	Structural Tee from Imperial UC (C nental)	
0	W18X50	W & M-Wide Flange	
0	W24X84	HP-Bearing Pile C-Channel	
		MC-Miscellaneous Channel	
		Rectangular Hollow Structural Section Square Hollow Structural Section	
		Pipes WT. MT & ST-Structural Tee	
		Circular Hollow Structural Section	
		L-Angle Double Angle (Equal)	
		Double Angle (Long Leg Back+to-Back) Double Angle (Short Leg Back+to-Back)	
		Flat Bars Rectangular and Square Bars	
		Round Bars	
		Structural Studs 33ksi Framing Track 33ksi	
		Structural Studs 50ksi Framing Track 50ksi	
		BG Joist Girder DLH-Series Bar Joist	lext > Cancel
		- G loist Girder	

Once the section shape has been selected, you may find that some mapping is automatically completed as the type name being exported matches the same name as the Tekla Structural Designer database entry.

	⊞ L-Angle			
A				
<u> </u>	Trimble W-Wide Flange	W & M-Wide F	lange	
À	12W16			
À	14W34			
A	14W38			
0	W18X50	W 18x50		
\bigcirc	W24X84	W 24x84		
0	W24X84	W 24x84		

The missing entries can again be manually mapped by clicking on the blank cell under the **Export Name** column and selecting the most appropriate section size.

kport to	- 0		
	(): Trimble		
Mapping	-Structural Framing		
Default F	Region Any 🗸		
Default U	Inits Imperial V		
Status	Revit Name	Export Name	Advanced
0	± L-Angle		
<u>^</u>	Trimble W-Wide Flange	W & M-Wide Flange	
A	12W16		×
<u>^</u>	14W34	W 10x45	^
À	14W38	W 10x49 W 10x54	
0	W18X50	W 10x60 W 10x68	
\bigcirc	W24X84	W 10x77 W 10x88	
		W 10x100	
		W 10x112 W 10x14	
		W 12x16	
		W 12x22	
		W 12x26 W 12x30	
		W 12x35 W 12x40	
		W 12x45	
		W 12x50 W 12x53	
		W 12x58 W 12x65	
		W 12x72	
		W 12x79 W 12x87	lext > Cance
		W 12x96 W 12x106	

It is also possible to map from one single Revit family into two or more section shapes within Tekla Structural Designer by clicking on the **Advanced** button.

The **Advanced Mapping** dialog allows multiple Tekla Structural Designer shapes to be chosen and then a larger section list will be available from the **Mapping** dialog.

🛃 Advanc	ed Mapping - Structural Framing Family	_	\Box \times
Mapping	- L-Angle		
Region	USA 🗸		
Units	Imperial V		
Material	Metal ~		
	sis Element	Any-Any	^
	ion - Plated	Any-Any	
	AutoDesign M-Wide Flange	Any-Any USA-Imperial	
	erican Standard	USA-Imperial	
	saring Pile	USA-Imperial	
C-Cha		USA-Imperial	
MC-M	liscellaneous Channel	USA-Imperial	
Recta	ngular Hollow Structural Section	USA-Imperial	
	e Hollow Structural Section	USA-Imperial	
Pipes		USA-Imperial	
	AT & ST-Structural Tee	USA-Imperial	
	ar Hollow Structural Section	USA-Imperial	
L-Ang		USA-Imperial	
	e Angle (Equal) e Angle (Leng Leg Pack to Pack)	USA-Imperial USA-Imperial	
	e Angle (Long Leg Back-to-Back) e Angle (Short Leg Back-to-Back)	USA-Imperial	
Flat B		USA-Imperial	~
		ОК	Cancel

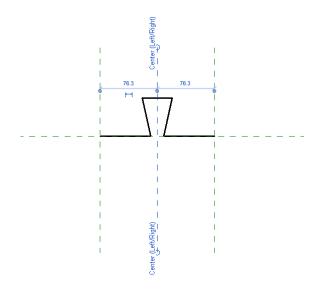
Once all of the families and types have been mapped and there are no red or yellow icons remaining in the dialog, click **Next** to continue.

At this stage, you should be prompted to save your mapping choices as an XML format file mapping file. If the file is saved, it will then be used for all future mapping choices (See the **Section and Material Mapping** dialog on future import and export dialogs).

This means then that previous mapped section profiles and/or material does not require repeat work to map the same sections again.

4.6 Mapping Steel Decks

Steel deck profiles inside Revit are used for the mapping and generation of composite floor slabs. The family is simply a sketched profile of the repeating shape required for the slab soffit so that the floor instance is shown correctly within section views.

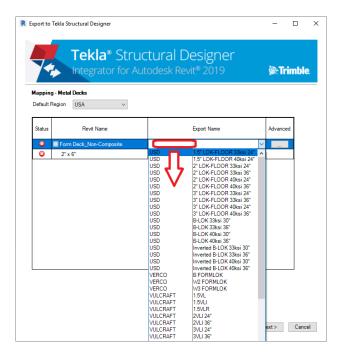


4.6.1 Mapping Steel Decks from Revit to Tekla Structural Designer

Tekla Structural Designer works with a specific list of decking manufacturers and profiles. Although this list can be amended, the integration processes from Revit into Tekla Structural Designer will only allow for mapping onto this very specific list.

In order to map decking profiles during export processes from Revit, click in the blank cell adjacent to the decking manufacturer name. A dropdown list showing the manufacturer name and the decking profile will then appear and you can then select the correct profile.

The gauge should also be mapped in a very similar method.



4.6.2 Mapping Steel Decks from Tekla Structural Designer to Autodesk Revit

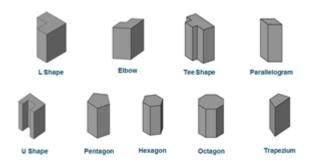
If the import process cannot determine the correct family to be used, click on the Override button and directly browse to a suitable profile family.

After performing the mapping, you should be prompted to save your mapping choices as an XML format file mapping file. If the file is saved, it will then be used for all future mapping choices.

nport from Tek	la Structural Designer		- 0
	Tekla® Structur Integrator for Autode)): Trimbl
Mapping - Stee	l Decks		
Status	Import Name	Revit Name	Override
	m Deck_Non 2" x 6"		
Q 22			

4.7 The Tekla Library

To help with the integration process, we install an additional library of sections. These are installed into the *C:\ProgramData\Tekla\Structural\TSD Integrator\20xx\Tekla Library* directory as default.



This library completes the section lists for:-

- Hollow sections (Hot rolled and Cold Formed)
- Timber sections
- Cold rolled steelwork
- Concrete polygonal columns
- Other important families (plate girders, fabsec, ribbon cut westok etc.)

For import processes, you may notice that families from this library are used in preference to the default Autodesk content. When constructing a model in the Revit environment we would recommend that these families be used wherever possible to ensure correct transfer of data.

4.7.1 Unusual/custom shapes from Revit

The Autodesk Revit user may at times want to model section shapes and sizes that do not exist within the Tekla Structural Designer software but still have these elements analyzed.

Examples of these shapes include box sections built from welded plate fabrications or individual plates welded together to form a solid rectangular steel member.

These items can be exported as being Analysis Elements within the mapping stage.

This provides support for an entire range of bespoke families that can then be transferred to Tekla Structural Designer for analytical purposes.

No analytical properties will be populated in the resulting analytical elements but the project engineer to suit their own requirements can generate these.

When an updated results file is provided back to Revit from Tekla Structural Designer, the analytical elements will be mapped to the original families and no alterations to these particular families will be made.

Where new elements are to be formed from analytical elements generated inside Tekla Structural Designer, these will be imported as concrete rectangular members of **100mm** x **100mm** size (approx. $4^n x 4^n$) to ensure that no elements are lost from the transfer process.

4.8 Specifying Tekla Structural Designer object types within Revit.

When objects are imported from Revit into Tekla Structural Designer, the style of the object is set to be a copy of the item in the BIM software (e.g. beam instances will be integrated into Tekla Structural Designer as beam objects, bracing instances as brace objects etc.).

It is possible to override this though and stipulate the object style on import by setting text in the type field. The following text can be set within the **TSDI_TYPE** parameter on each object to force the element to be imported as that style of object within Tekla Structural Designer.

Some of the entries relating to Portal Frames cannot be imported into Tekla Structural Designer at present and are only included for list completion.

TSDI_TYPE entry	Description	
Columns		
SIMPLE_COLUMN	Column with the simple design option checked	
GENERAL_COLUMN	Column with the simple design option unchecked	
GABLE_POST	Gable post member	
Beams and Braces		
COMP_BEAM	Composite beam – No edge conditions set	
EDGE_COMPOSITE_BEAM	Edge condition composite beam	
INT_COMPOSITE_BEAM	Internal condition composite beam	
GENERAL_BEAM	Beam member	
BRACE	Bracing member	
JOIST	USA joist member	
SB_CANTILEVER_A	Cantilevered beam; free at start end	
SB_CANTILEVER_B	Cantilevered beam; free at finish end	
GB_FREE_END_A	General beam; free at start end	
GB_FREE_END_B	General beam; free at finish end	
GB_FREE_BOTH_ENDS	Multi-span general beam member	
WSTK_WESTOK	Ribbon cut Westok beam	
WSTK_CANTILEVER_A	Cantilevered Westok member; free at start end	
WSTK_CANTILEVER_B	Cantilevered Westok member; free at finish end	
ANALYSIS	Analysis element	
EAVES_BEAM	Eaves beam member	
RAIL	Sheeting rail member	
PURLIN	Purlin member	

Truss Members		
INT_TRUSS	Internal truss member	
SIDE_TRUSS	Side truss member	
TOP_TRUSS	Top chord of truss	
BOT_TRUSS	Bottom chord of truss	
Portal Sections		
PORTAL_COLUMN	Portal frame stanchion (export from Tekla Structural Designer only)	
PORTAL_RAFTER	Portal frame rafter (export from Tekla Structural Designer only)	
PORTAL_TIE	Portal frame tie member (export from Tekla Structural Designer only)	
PARAPET_POST	Portal frame parapet post (export from Tekla Structural Designer only)	
Shear Walls		
MESHED	Shear wall using mesh analysis method	
MID_PIER	Shear wall under mid-pier theory	
Slabs		
RC_SLAB	Two way spanning slab on beams	
RC_SLAB_1WAY	One way spanning slab on beams	
COMP_SLAB	Composite slab	
FLAT_SLAB	Flat slab	
CAST_SLAB	Precast slab	
STEEL_DECK	Two way spanning steel deck slab	
STEEL_DECK_1WAY	One way spanning steel deck slab	
TIMBER_DECK	Timber deck slab	

4.9 Specific Object Mapping

4.9.1 Autodesign sections

Autodesign sections are members that have been flagged as autodesigned within the Tekla Structural Designer software but have not undergone any part of the design process yet.

Revit will import any member which has been flagged as autodesigned as a **TSD_Autodesign** type. This is an I-section shape of **100mm** depth (**3.937**") and **60mm** (**2.362**") width.

We would recommend that the Tekla Structural Designer validation process is completed correctly and models are designed before performing any sort of export to Revit. This ensures that correctly designed section sizes are integrated.

Family: W Shapes)	~ D	Load uplicate	
Type Parameters				
Parameter		Value	= ^	
Structural Section Geome			*	
Width	2.362"			
Height	3.937"			
Flange Thickness	0.197"			
Web Thickness	0.197"			
Web Fillet	0.197"			
Centroid Horizontal	1.181"			
Centroid Vertical	1.969")		
Vhat do these properties do?	ОК	Cancel	Apply	

It is also possible to export any member from Revit as being a **TSD_Autodesign** section. This imports the member into Tekla Structural Designer as the default section for the particular order file being used and with the AutoDesign check being enabled.

The option to do this is held within the Advanced Mapping dialog.

🛃 Advand	ced Mapping - Structural Framing Family	_	
Mapping	- W Shapes		
Region	USA 🗸		
Units	Imperial ~		
Material	Metal ~		
	sis Element	Any-Any Any-Any	^
	AutoDesign	Any-Any	
S-Am	erican Standard	USA-Imperial	
	earing Pile	USA-Imperial	
C-Cha		USA-Imperial	
	liscellaneous Channel	USA-Imperial	
	ngular Hollow Structural Section	USA-Imperial	
	re Hollow Structural Section	USA-Imperial	
Pipes		USA-Imperial	
	MT & ST-Structural Tee lar Hollow Structural Section	USA-Imperial USA-Imperial	
L-Ang		USA-Imperial	
	le Angle (Equal)	USA-Imperial	
	le Angle (Long Leg Back-to-Back)	USA-Imperial	
	le Angle (Long Leg Back-to-Back) le Angle (Short Leg Back-to-Back)	USA-Imperial	
Flat B		USA-Imperial	~
		ОК	Cancel

4.9.2 Concrete Families and Types within Revit

When exporting Concrete shapes from Revit to Tekla Structural Designer, please be aware that we actively search for two specific parameters:-

- b
- h

These two parameters must exist within the family otherwise; the export process will fail during the processing stage. If users wish to use their own parameters, please create the two required parameters and flag these as being populated by the main breadth and depth parameters.

Please note that the **b** and **h** parameters must be listed under the **Dimensions** branch.

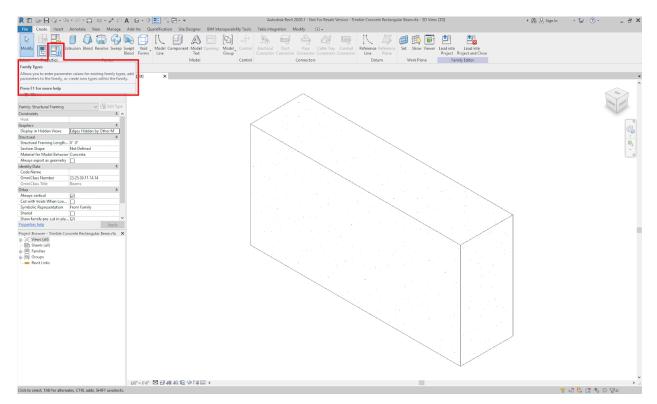
ype name: 700	0 x 1000mm		× 🛅 🛙	AD *D
Search parameter	8			9
Parame	ter	Value	Formula	Lock
Materials and Fi	inishes	8		
Structural Mater	ial	Concrete - Cast-in-Plac	*	
Dimensions		Sec	10 10	2
Clear Height (re	(hoq	2300.0	5	
Height (report)		2500.0	=	
Slab Depth (defa	uit)	200.0	-	M
W		700.0	=	Ø
0		1000.0	4	NNNNN
b	-	1000.0	= D	
h		700.0	=W	
Identity Data				
/ D D			Manage Looku	p Tables

4.9.3 Adding parameters to existing families.

This section covers the alteration of an existing family to introduce parameters b and h and to have these parameters populated by the existing parameters for the breadth and depth of the family.

Open the family within a session of Revit by either directly opening the **.rfa** file or by using the command **Edit Family** within an existing Revit project.

To view the existing parameters, click on the Family Types command.



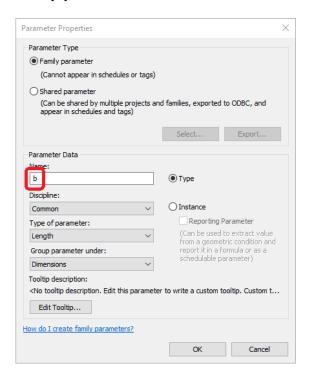
Within the **Family Types** dialog, we can see that this particular family is using the parameters **Beam Breadth** and **Beam Depth** rather than the traditional b and h parameters to control its size. We will therefore have to introduce the **b** and **h** parameters.

Click on the New Parameter command.

Family Types			×
Type name: 12 x 24		~ 🎦 [<u>.</u>
Search parameters			Q
Parameter	Value	Formula	Lock
Materials and Finishes Structural Material (default	Concrete Cart-in-Place	=	*
Dimensions	geonerete, cast-in-Place	_	*
Length (default)	5' 0"	=	
Beam Breadth	1' 0"	=	
Beam Depth	2' 0"	=	
Identity Data			¥
	۵. ۸.		i
	≩↓ <u>\$</u> ↑	Manage Looku	p Tables
How do	ОК	Cancel A	pply

When accessing the Parameter Properties dialog, set the name as being **b**. Keep the remaining parameters at the default settings.

Parameter Type:Family ParameterDiscipline:CommonType of parameter:LengthGroup parameter under:Dimensions



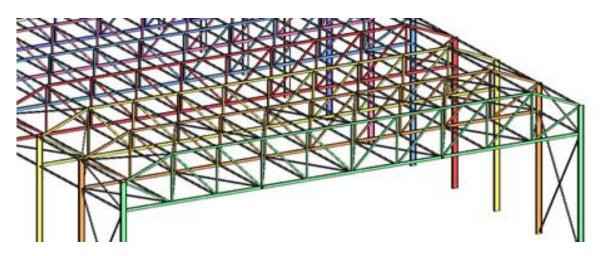
Click **OK** when done and then repeat the process to create parameter **h**.

After creating parameters **b** and **h**, flag these as being copies of the existing breadth and depth parameters by typing the values in the **Formula** field. If the entries are typed correctly then the **Value** field should update automatically (click in another field or press **Enter** to finalize the data entry).

ype name: 12 x 24		× *	AI 🎦
Search parameters			Q
Parameter	Value	Formula	Lock
Materials and Finishes			*
Structural Material (def	ault Concrete, Cast-in-Plac	e =	
Dimensions			\$
Length (default)	5' 0"	=	
Beam Breadth	1' 0"	=	
Beam Depth	2' 0"		\checkmark
b	1' 0"	= Beam Breadth	
h	2' 0"	= Beam Depth	
Identity Data			×
			l
🧷 🎦 🎦 🕇	FE \$↓ \$1	Manage Loo	kup Tables
/			
low do I manage family ty		K Cancel	

Click **OK** to exit the dialog and either use the **Save** command to save the Family for use later, or use the command **Load into Project** to update an existing Revit project.

4.9.4 Truss members



Structural Truss elements within Revit are specialized items. All types within a truss family share the same profile layout with individual types specified within the truss hosting other parameters, such as the structural framing families used for modeling chords and web members.

Structural Truss elements are grouped together and displayed as a series of dashed blue lines. Structural Truss objects generally lock the type parameters for individual members and pin the subinstances so that positions cannot be easily adjusted.

When it comes to the integration of Structural Truss instances, all trusses and instances held within the assembly will be exported from Revit and imported into Tekla Structural Designer as a series of individual truss members.

Please note however that due to a restriction of the AutoDesk API, Structural Truss elements cannot be imported into Revit. This means that when design results are returned from Tekla Structural Designer, vertical elements will be altered to become Structural Column objects.

Due to the limitations of Structural Truss objects and the pinning of the individual boom and strut instances, the update process will be unable to adjust material grades, section sizes or positions. We would recommend that Structural Truss families be exploded to allow correct round tripping.

4.9.5 Plate Girders, Plated Columns, Fabsec Beams and Westok Plate Girders

Plated sections of varying depths and widths can be modelled within Revit by using the families installed as part of the Tekla Library. These are:-

Plated Column

C:\ProgramData\Tekla\Structural\TSD Integrator\20xx\Tekla Library\Columns\Steel\Plate Column.rfa

Plate Girder Beam

- C:\ProgramData\Tekla\Structural\TSD Integrator\20xx\Tekla Library\Framing\Steel\Plate Girder.rfa • Fabsec Beam
 - C:\ProgramData\Tekla\Structural\TSD Integrator\20xx\Tekla Library\Framing\Steel\Fabsec.rfa

Westok Plate Girder Beam

C:\ProgramData\Tekla\Structural\TSD Integrator\20xx\Tekla Library\Framing\Steel\Westok Plate Girder.rfa

It is also possible to use custom Revit families to show similar representations within the Revit project. Please note however that for mapping purposes, it is necessary to map the section type through the Advanced Mapping dialogs for Structural Column and Structural Framing families.

Mapping - UB-Universal Beams Region UK Units Metric Units Metric Material Metal Meta	_		\times
Units Metric Material Metal M			
Material Metal Analysis Element I Section - Plated Fabsec Westok Plated T3D-AuxOctignt Westok Ribbon Cut UB-Universal Beams UC-Universal Columns RSJ-Rolled Steel Joists ASB-Asymmetric Slimflor Beams PFC-Parallel Flange Channels PFC-Parallel Flange Channels SHS-Square Hollow Sections CHS-Circular Hollow Sections T-Fees from Universal Beams			
Asslysis Element I Section - Plated Fabsec Westok Plated T55 Aux0custyn Westok Ribbon Cut (Single Cell) UB-Universal Beams UC-Universal Columns RSJ-Rolled Steel Joists ASB-Asymmetric Slimflor Beams Old Steel Channels PFC-Parallel Flange Channels PFC-Parallel Flange Channels RHS-Rectangular Hollow Sections SHS-Square Hollow Sections CHS-Circular Hollow Sections T-Tees from Universal Beams			
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UC-Universal Columns RSJ-Rolled Steel Joists ASB-Asymmetric Slimflor Beams Rolled Steel Channels PFC-Parallel Flange Channels RHS-Rectangular Hollow Sections SHS-Square Hollow Sections CHS-Circular Hollow Sections T-Tees from Universal Beams	UK-Metric		
RSJ-Rolled Steel Joists AsB-Asymmetric Slimflor Beams Rolled Steel Channels PFC-Parallel Flange Channels RHS-Rectangular Hollow Sections SHS-Square Hollow Sections CHS-Circular Hollow Sections T-Tees from Universal Beams	UK-Metric		
ASB-Asymmetric Slimflor Beams Rolled Steel Channels PFC-Parallel Flange Channels RHS-Rectangular Hollow Sections SHS-Square Hollow Sections CHS-Circular Hollow Sections T-Tees from Universal Beams	UK-Metric		
Rolled Steel Channels PFC-Parallel Flange Channels RHS-Rectangular Hollow Sections SHS-Square Hollow Sections CHS-Circular Hollow Sections T-Tees from Universal Beams	UK-Metric UK-Metric		
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RHS-Rectangular Hollow Sections SHS-Square Hollow Sections CHS-Circular Hollow Sections T-Tees from Universal Beams	UK-Metric		
SHS-Square Hollow Sections CHS-Circular Hollow Sections T-Tees from Universal Beams	UK-Metric		
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T-Tees from Universal Beams	UK-Metric		
T-Tees from Universal Columns	UK-Metric		
· <u> </u>	UK-Metric		¥
	OK	Cance	el

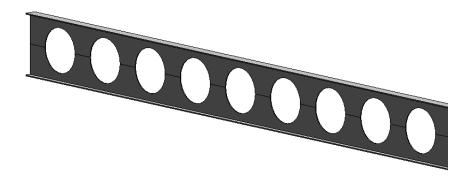
It should also be noted that the integration requires six specific parameters to be generated. These are:-

- Depth; d ٠ Top flange breadth: bt •
- Bottom flange breadth; bb • tft
- Top flange thickness; •
- Bottom flange thickness; tfb •
- Web thickness; tw

These parameters must be generated for successful integration to occur.

4.9.6 Westok Ribbon Cut beams

Westok beams are a modern version of the traditional castellated beam, but far more flexible and with a greater range and depth of applications. They are primarily used within the UK region and manufactured by Kloeckner Metals.



Users of Revit may notice that they have four families that can be used to model Westok Sections.

Cellular Beam

C:\ProgramData\Autodesk\RVT 20xx\Libraries\UK\Structural Framing\Steel\Cellular Beam.rfa

Cellular Beam with un-Equidistant End Holes

 C:\ProgramData\Autodesk\RVT 20xx\Libraries\UK\Structural Framing\Steel\Cellular Beam with un-Equidistant End Holes.rfa

Westok Ribbon Cut

C:\ProgramData\Tekla\Structural\TSD Integrator\20xx\Tekla Library\Framing\Steel\Westok Ribbon Cut.rfa

Westok Ribbon Cut Short

• C:\ProgramData\Tekla\Structural\TSD Integrator\20xx\Tekla Library\Framing\Steel\Westok Ribbon Cut Short.rfa

We would advise that the family **Westok Ribbon Cut.rfa** is the correct file to be used for the following reasons:-

• Cellular Beam.rfa

Sets out all web openings incorrectly (from the center of the section) and calculates the beam depth incorrectly.

• Cellular Beam with un-Equidistant End Holes.rfa

Sets out the web openings correctly but calculates the (fixed) depth using a formula which does not take account of ribbon cutting techniques.

• Westok Ribbon Cut.rfa

Sets out the web openings correctly and allows for variable depths of tee sections. This is the correct family to use.

• Westok Ribbon Cut Short.rfa

This should only be used for automated import processes where designers have mistakenly generated extremely short Ribbon Cut Westok sections within Tekla Structural Designer and no cellular openings would be present.

When using the family **Westok Ribbon Cut.rfa**, users may note that there are a number of parameters that require details. These are detailed as following

Construction Parameters		
h1	Half of the Cellular Hole Diameter (can be auto-calculated from parameter Do)	
h2	Half of the Cellular Hole Diameter (can be auto-calculated from parameter Do)	
Setback Right	User defined distance to make allowance of the difference between the analytical length and cut (solid) length of the beam.	
Setback Left	User defined distance to make allowance of the difference between the analytical length and cut (solid) length of the beam.	
S1	Dimension from the start end of the cut shape to the center of the first cellular opening.	
S	Cellular Hole Horizontal Spacing (Hole Centers)	
Do	Cellular Hole Diameter	

Structural Parameters

Name1	The 'TYPE' value (section name) of the upper tee section.
W1	Section weight (kg/m) of the upper tee section
Name2	The 'TYPE' value (section name) of the lower tee section.
W2	Section weight (kg/m) of the lower tee section

If these parameters are set to unrecognized section names, then mapping problems may occur related to the Westok Tee section. The Westok Tee entry should be mapped to a recognized UB, UC or Corus Advanced equivalent section. If the Westok Tee section is not correctly mapped then no information will be set for the beam.

Dimension Parameters

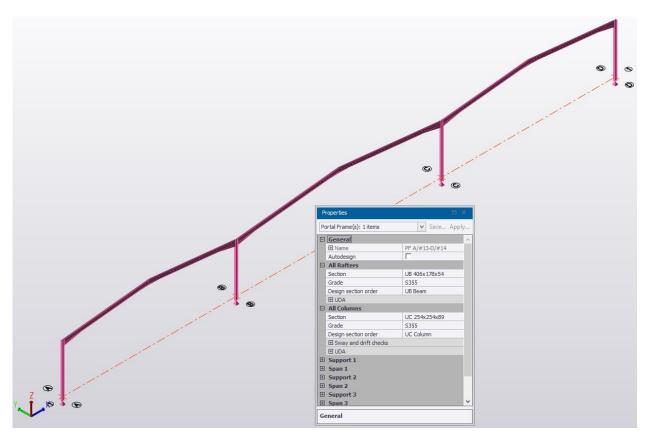
Top Base Member

d1	The overall depth of the upper section.	
bf1	The flange width of the upper section.	
tf1	The flange thickness of the upper section.	
tw1	Web thickness of the upper section.	
k1	The distance of the flange thickness added to the root radius.	
Bottom Base Member		
d2	The overall depth of the lower section.	
bf2	The flange width of the lower section.	
tf2	The flange thickness of the lower section.	
tw2	Web thickness of the lower section.	
k2	The distance of the flange thickness added to the root radius.	

4.9.7 Portal Frames

Portal Frames are specialized long span, low-rise moment frames generally used in the UK construction market. Portal Frame objects in Tekla Structural Designer are modelled as a single element that contains the stanchions, rafters and haunch objects.

Please note that Portal Frame objects are entirely different from regular moment frames modelled from several column and beam elements.



As these frames are modelled as one item within Tekla Structural Designer, there are some rules governing the integration transfer into Revit.

- Portal Frame objects can only be exported from Tekla Structural Designer and imported into Revit. They cannot be exported from Revit and imported into Tekla Structural Designer.
- Eaves haunches and apex haunches will not be transferred by the integration process, as there are no corresponding objects within Revit that can be used.
- Portal Frame objects will be 'exploded' on export into the constituent Structural Column and Structural Framing instances.

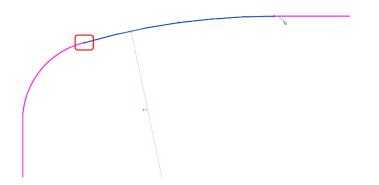
4.9.8 Floor elements

Floor objects will be mapped from Revit to Tekla Structural Designer with the outline of the resulting slab being identical to the analytical outline within the Revit model.

For this reason, it is important to ensure that slabs are analytically connected (see previous section) and some simple rules are followed.

• Floors with two distinct outlines in a single floor definition will not be exported. Please use two separate floor instances within Revit if this is the intent.

 Avoid curved edges abutting curved edges. This may on occasion cause issues with the processing of the analysis wire. Try to separate curved edges with a small linear edge (We recommend a minimum length of 3/32" (or 3mm)).



- Ensure that the floor outline does not self-intersect.
- Holes drawn as part of the slab outline are beyond the scope of the integration process. Use shaft openings, vertical opening or Opening by face commands to model any hole requirements. Openings drawn as part of the floor boundary will not be transferred although the opening intent will be shown as a sketched outline.

Floors should ideally be created so that a minimum of 2" or 50mm exists from the edge of any opening, or from the outline of any column member to the edge of the slab.

These distances will ensure that the floor slab can be correctly meshed when the analysis stage is performed in Tekla Structural Designer.

If these minimum distances cannot be met within the Revit software, consider removing the floor instance from the integration process and instead have the engineer generate the slab within the Tekla Structural Designer software to meet his or her own requirements.

4.9.9 Wall elements

Wall elements in Autodesk Revit are exported to Tekla Structural Designer based on the Structural Usage setting:-

• Bearing

•

Shear

- : Exports the wall as a Bearing Wall element.
- : Exports the wall as a Concrete Wall element.
- : Exports the wall as a Concrete Wall element.

Properties	×
Basic Wall Generic - 8"	-
Walls (1)	✓ ₽ Edit Type
Constraints	* ^
Location Line	Wall Centerline
Base Constraint	Level 1
Base Offset	0' 0"
Base is Attached	
Base Extension Distance	0' 0"
Top Constraint	Up to level: Level 2
Unconnected Height	10' 0"
Top Offset	0' 0"
Top is Attached	
Top Extension Distance	0' 0"
Room Bounding	
Related to Mass	
Structural	*
Structural	
Enable Analytical Model	
Structural Usage	Rearing
Rebar Cover - Exterior F	Bearing
Rebar Cover - Interior Fa.	Shear Structural combined
Rebar Cover - Other Face	
Properties help	Apply

Structural Combined

In addition to this setting, the **Function** property (listed under **Type** properties) must be set as either an **Interior** wall, **Exterior** wall or **Core-Shaft** wall. All other **Function** settings will result in the wall being omitted from the export process.

pe Properties						
Family: S	ystem Family: Basic	: Wall	\sim	Load		
Type:	Generic - 8"		\sim	Duplicate		
				Rename.		
Type Parameter	s					
Pa	rameter		Value		=	^
Construction					\$	
Structure			Edit			
Wrapping at l	nserts	Do not wrap				
Wrapping at E	nds	None				
Width		0' 8"		_		
Function		Exterior		~		
Graphics		Interior		_	*	
Coarse Scale F	ill Pattern	Exterior				
Coarse Scale F	ill Color	Foundation Retaining				
Materials and	Finishes	Soffit			\$	
Structural Mat	terial	Core-shaft				
Analytical Pro	norties				۵	

We would strongly recommend that all users are aware of the analytical differences between a Bearing Wall and a Concrete Wall.

Please note that Walls are <u>ALWAYS</u> initially created in Revit as **Bearing** walls, the **Structural Usage** field cannot be modified until the wall has been generated.

Properties Basic Wall Generic - 8*		,
New Walls	🗸 🔀 Edit	Type
Constraints		2 /
Location Line	Wall Centerline	
Base Constraint	Level 1	
Base Offset	0. 0.	
Base is Attached		
Base Extension Distance	0.0.	
Top Constraint	Up to level: Level 2	
Unconnected Height	10' 0"	
Top Offset	0' 0"	
Top is Attached		-1
Top Extension Distance	0. 0.	
Room Sounding	2	
Related to Mass		
Structural		2
Structural		
Enoble Analytical Model	2	
Structural Usage	Bearing	
Robert Count - Exterior Face	Exterior 3 to #5 <0' - 1 1/2">	
Rebar Cover - Interior Face Properties help	Interior (slabs, walls, ioists) - #3 App	

4.9.9.1 Bearing Walls

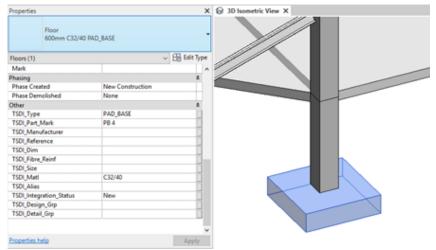
Bearing Wall elements create a number of internal vertical elements (with a base minimum of five elements), based on the aspect ratio of the wall.

• The lower the wall height, the more vertical elements will be created.

More vertical elements per wall will have an effect on the performance of the import into Tekla Structural Designer, and the creation (and validation) of the solver model.

The use and position of Bearing Walls needs to be considered with care as they offer only limited structural capabilities.

4.9.10 Foundation objects



Structural Foundation objects

Structural Foundation category instances are beyond the scope of the integrator. This is due to Structural Foundations within Revit having no ability to adjust the analytical model. Structural Foundation objects will show an analytical wire within the object but this cannot be adjusted to support eccentric positions or support variable foundation depths.

In addition to this, Structural Foundations do not easily provide support for non-rectangular pad arrangements and non-standard pile arrangements. Users will also notice that the vast majority of analytical settings are not available when using Structural Foundation objects.

Due to these limitations, we provide support for Floor objects as these can provide bi-directional integration along with supporting alterations to sizes, eccentricities and pile positions.

Foundations imported from Tekla Structural Designer

Foundation objects can be integrated from Tekla Structural Designer to Autodesk Revit. These objects include:

- Pad Base Column objects
- Strip Base Wall objects
- Pile Cap Column objects

These objects are integrated as floor objects and although the instance is initially created from the import from Tekla Structural Designer, size alterations made inside Autodesk Revit may be returned. No foundation objects created from scratch with Autodesk Revit can be integrated into Tekla Structural Designer due to the limitations listed in the section above.

Foundation Piles imported from Tekla Structural Designer

Piles modelled in Tekla Structural Designer will be integrated as individual Structural Column instances into Autodesk Revit. Changes made to the piling configuration such as numbers of piles, pile location, pile shapes or piling lengths will be maintained and returned to Tekla Structural Designer, albeit as a new piling type within the software.

No piles created from scratch with Autodesk Revit will be integrated into Tekla Structural Designer.

4.9.11 Column Drop Objects

Column drops are imported from Tekla Structural Designer into Autodesk Revit as Floor objects. The shape of the drop head is controlled by Tekla Structural Designer, so although the object can be returned from Autodesk Revit, no size alterations can be returned.

No drop heads created from scratch with Autodesk Revit can be integrated into Tekla Structural Designer.

4 Managing the mapping of sections, families and types.

5 Synchronization

5.1 **Overview**

Synchronization may be performed at any time, although we would always recommend that exports from Tekla Structural Designer be performed after the design process has been completed.

5.1.1 Information Transferred

From Autodesk Revit to Tekla Structural Designer

The following information is transferred from Autodesk Revit to Tekla Structural Designer:-

- All grid lines in Autodesk Revit are imported.
- All levels in Autodesk Revit are imported as levels with floor and diaphragm flags set.
- There is no suitable mapping between Boundary Conditions in Autodesk Revit and Supports in Tekla Structural Designer, so by default supports are created at the bottom of every column unless a supporting member can be detected.
- All selected Autodesk Revit beams, columns and braces are imported, including curved beams. Their snap alignment position, orientation, material type, grade and section size will be maintained. In addition:
 - o Member releases at the ends of the physical members will be maintained.
 - In Autodesk Revit, horizontal brace should be defined as beams with the structural usage property set to horizontal brace.
 - o Structural Parametric Trusses are identified as Tekla Structural Designer Truss Members.
 - US Joists are transferred from Autodesk Revit to Tekla Structural Designer as Steel Joist objects.
 - Slanted columns are handled.
- All selected Autodesk Revit Slab objects will be imported:-
 - Horizontal and sloping slabs will be imported as slabs covering the same area. Holes where they have been modeled in the Revit model will be transferred to suit the requirements of the Tekla Structural Designer software.
 - Slabs in Autodesk Revit without concrete plank or decking information will be transferred as generic slabs. These can be differentiated using the TSDI_Type parameter.
 - Slab with a metal deck layer or the appropriate shared parameter will be defined as composite slabs with the relevant decking.
 - Slabs with concrete plank shared parameters will be defined as composite slabs with the relevant precast concrete plank. Please note that the planks themselves are not supported yet.
 - Slab span direction will be determined and imported. To set the span direction in Revit, refer to the Autodesk Revit Help.
- All selected Autodesk Revit Walls will be transferred.
 - Composite and cavity walls cannot be transferred.

Please also note that due to the current limitations of Autodesk Revit, certain items may have to be modeled as in-place families. Due to the lack of analysis settings, these items will be flagged as non-structural and the export process will not consider them.

Limitations

The following limitations exist in the current release:-

- No curved walls or warped structural concrete slabs
- No Foundation objects created within Revit
- No Rebar objects

- No precast concrete beams or columns •
- No web openings and stiffeners •
- No slab overhangs will be returned
- Portal Frame members will not be exported to Tekla Structural Designer. This is because it is not yet possible to create full Portal Frames in Revit with haunches and correctly positioned physical members.

5.1.2 From Tekla Structural Designer to Autodesk Revit

Information Transferred

The following information is transferred from Tekla Structural Designer to Autodesk Revit:-

- All grid lines in Tekla Structural Designer are exported.
- All construction levels are exported if set to floor. •
- All Columns are exported; all rotations are exported. For concrete filled columns, a user attribute of concrete grade is also set up.
- All Beams are exported; all rotations and end releases are exported. •
 - For Composite Beams, the standard Revit parameters Camber Size and Number of Studs are populated.
 - o If a Beam changes size along its length in Tekla Structural Designer, it will be split into separate physical members.
- US Steel Joists are exported including Special Joists and Joist Girders although the physical ٠ representation of the latter two categories will be limited in Revit.
- All Truss Members are exported; all rotations and end releases are exported. •
- Braces are exported.
- Portal Frames are exported as separate members but due to limitations in the Revit API, • haunches are not exported and the physical positions of various members will need to be adjusted.
 - As a result, it is not possible to export such members back to Tekla Structural Designer.
- Slabs are exported with metal deck or concrete plank information as appropriate -where . possible, metal decks will be represented physically, where not possible they will be represented by shared parameters.
- Foundations in the shape of Pad Base Columns and Strip Base Walls are transferred as Autodesk Revit Floor objects. These items will also be returned to Tekla Structural Designer in the case of updating the Tekla Structural Designer model with changes made in Revit.
- Foundation piles are integrated as Structural Column objects. Note that both pile caps and pile • objects are imported as individual object instances.
- Please note that (new) foundation items created from scratch inside Revit will not be transferred • into Tekla Structural Designer.
- Shear Walls are exported. •
- All bearing walls are exported.

Limitations

Guidance Notes

The following limitations exist in the current release:-

- Column, brace and truss member snap points and offsets are not exported. •
- Beam snap points are exported but not offsets. •
- No wind walls are exported. •
- No roofs are exported.
- No connection information is exported. •
- No loading, load case or load combination information is exported.
- In addition, due to current limitations in Autodesk Revit itself and operations it permits during the • import process then :-

- Grid line moving may not work 100%.
- The section sizes in Revit Trusses can be updated, but no geometric changes can be made.
- It is not possible to update the floor type of an existing slab or its outline during the import process, so modified slabs are deleted and replaced with new items.
- It is not possible to create a new slab with metal deck unless at least one floor type was previously loaded into the model with the correct profile, (i.e. the user should load from the Autodesk Revit library and search for the relevant deck profile).
 If this has not been done, then the slab will be imported with no deck and the user will be
- warned to update it manually.
 Bison Planks cannot be modeled physically in Revit, but information is available through shared parameters.
- It is not possible to create analytically sloping slabs in Revit. The user will be warned, but nothing will be imported.
- Structural Framing Tags are not created automatically for new beams and braces. These can be added by using the Tag or Tag All Not Tagged commands in the Annotate Menu.
- Span direction symbols are not created automatically for new slabs. These can be added manually using the Span Direction command in the Annotate Menu.
- Autodesk Revit does not currently have the ability to handle a number of section types (e.g. some SlimFlor beams, some deck types and some cold rolled members may be missing). Users with models containing these section types need to take care when transferring models.

5.1.3 Information retained within Tekla Structural Designer when merging models from Revit.

The following information is not transferred once created in Tekla Structural Designer but is maintained during any merge processes.

- Floor settings for diaphragms, imposed load reduction settings.
 - Identical floor settings will be reset.
 - Column attributes including :
 - o design criteria,
 - Releases,
 - o restraints and effective lengths,
 - Notional eccentricities.
 - Beam attributes including:-
 - design criteria,
 - o support types,
 - o restraints and effective lengths,
 - o floor construction,
 - o effective widths,
 - o stud layout,
 - Westok data not modeled in Autodesk Revit.
 - Brace attributes including:-
 - Connection type.
 - Analysis attributes.
 - Tension/compression design attributes.
 - Support data at the base of columns only.
 - Loading and combinations including all Wind Data.
 - Roof and Wall positions and attributes.
 - Analysis and design options.
 - List of Frames.

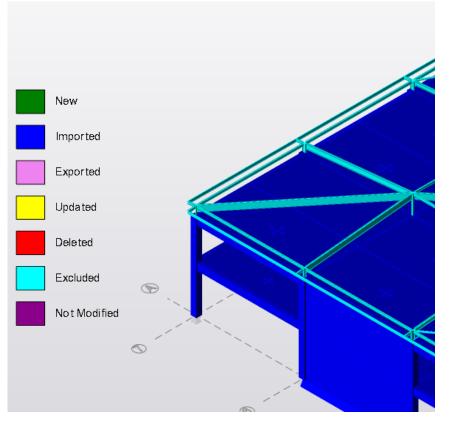
•

• Selection Groups.

Part models can be exported from both Tekla Structural Designer and Autodesk Revit.

5.2.1 From Tekla Structural Designer

For managing partial model exports, the BIM Status view (which is contained in the Review mode) allows control over the status of each object in the Tekla Structural Designer software. The status is color coordinated so that the engineer can easily determine the BIM status of each item.



In addition to viewing the status of each item, the BIM Status command also allows you to exclude items from the BIM Integration process by simply clicking on them.

Selecting the element in this way will change the color to cyan indicating that it is now excluded from BIM Integration and will no longer be exported. This option works as a toggle so that if the wrong member is selected; simply click on the element again to return it to its original coloring.

Using scene content to control the items visible on the screen at any one time can also help with the selection process. This allows users to quickly include or exclude objects from the BIM integration process.

An additional command to toggle the BIM Status of all objects is also available within this screen by right clicking on the mouse button.

っ	Undo	Ctrl+Z		1		
C	Redo	Ctrl+Y				
	Save View Config	uration				
	Zoom Out					
	Add free point					
	Toggle BIM status	5	×		Exclude All	
	Check Slabs				Include All	
	Design Slabs					
	Redraw					
	Save Screenshot					

It should also be noted that global export filters also exist within the Structural BIM export command. These allow you to transfer models based on just grids and levels, members, walls and slabs only if required.

This set of options can be complemented by the import options available within the Autodesk Revit integrator to ensure correct partial model transfer to be achieved.

5.2.2 From Autodesk Revit

Selecting objects prior to performing an export process will flag that only the selected objects will be exported from Revit as a default.

Export to Telda Structural Desi Tekl Tekl Select Structural Objects to Selection Entire Structural Model Selected part of Structural	a® Stru ator for Al	ctural utodesk F	Desig Revit® 20	gner D19	– □ ×
Integration Filter	Include	Openings/ Stiffeners	Arcs	Sloping	
Grids			\checkmark		
Levels					
Slabs / Decks					
Members			\checkmark		
Foundations					
Shear / Bearing Walls					
Note : Some Revit properties, e. Hover over each name above fo	g. "Analyze As" aff or more details.	ect inclusion in the	e Structural Mo	del.	Next > Cancel

5.2.3 Items omitted from the selection process

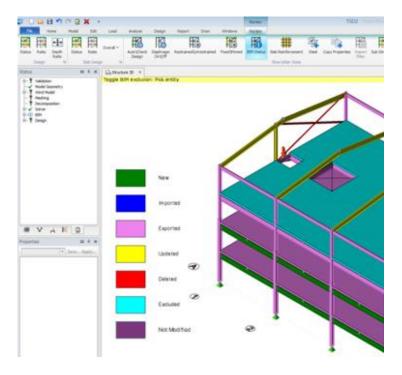
The Revit Integrator is currently unable to differentiate between deleted items and omitted items at present. The result is that the integrator believes that any item not been exported from Tekla Structural Designer has been deleted and removes the corresponding object from the merged Revit model. To avoid this from occurring, select the items within Revit which are affected by the export from Tekla Structural Designer prior to running the import/merge process. By default, only the selected objects will be updated in the model and the remaining (omitted) objects will not be affected at all by the merge process.

5.3 Integration management

It is possible to change changes made to the model as part of the merge process, in both Tekla Structural Designer and within Revit.

5.3.1 Integration management in Tekla Structural Designer

Once the synchronization process has been completed, the command **BIM Status** (held under the **Review** tab) can be used to provide a color-coded indication of how the model has been affected in the last import. This view identifies all the changes to Tekla Structural Designer members and slabs that have occurred because of the merge process.

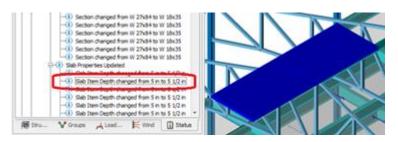


Color	Description
New	Object has been created in Tekla Structural Designer and has not yet been exported to Autodesk Revit.
Imported	Object has been created by the import from Autodesk Revit.
Exported	Object has been previously exported to Autodesk Revit and has not been altered by any subsequent merge processes.
Updated	Member has been modified because of the Structural BIM import. Check the BIM status tree for details.
Deleted	Object has been deleted in Autodesk Revit but has been retained during the merge process due to the Integration Filter settings.
Excluded	Object will not be communicated from Tekla Structural Designer to Autodesk Revit.
Not Modified	Object has not been modified in any way during the last merge process.

New indicates members that have not been communicated to Autodesk Revit yet. As Autodesk Revit should hold the master physical model, it is advisable to first export the Tekla Structural Designer to Autodesk Revit and then perform the merge again with the updated Autodesk Revit model.

5.3.2 Structural BIM Import Status Tree

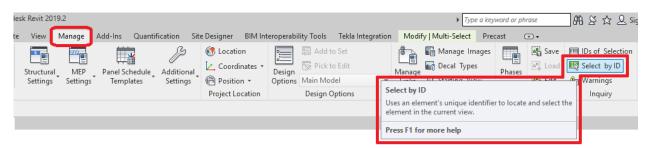
Once the synchronization process has been completed, the Structural BIM Import status tree (held under the Status tab) will show all newly created items or modifications performed by the merge process. These alterations to the model can be identified by double clicking on each entry in turn. This will highlight the affected member/object within the main Structure 3D view.



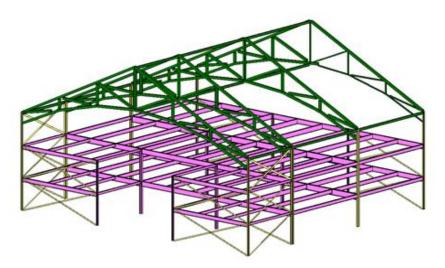
This status list can then be used to track alterations made to the model in the last import process.

5.3.3 Integration management in Autodesk Revit

Interrogating the log files created on import and export from Revit may help identify altered elements. The log files are automatically saved to the same location where the CXL file was located, and can be opened with any text editor program. Elements with ID references listed can be found using the **Select by ID** command held in the **Manage** tab.



One of the shared parameters transferred from Tekla Structural Designer to Revit is the **TSDI_Integration_Status** parameter that indicates members that are newly created, updated or unchanged during the last integration process.



Using an Autodesk Revit filter to color items based on the **TSDI_Integration_Status** parameter will allow you to easily identify members that have been integrated.

5.4 Creating an Integration Status filter and applying to a drawing view

This section will describe how to create a filter which can be applied onto a 3D view (but potentially onto any Revit view) to set color-coding onto the structural items. The color-coding applied should then match the same capabilities of the Tekla Structural Designer command BIM Status.

The filter works on the settings applied onto members, panels and walls with the **TSDI_Integration_Status** parameter. Using the various settings of this parameter, we can set up the filter accordingly.

Create a new 3D view for the integration status settings by clicking on the **View** tab and using the command **3D View** - **Default 3D View**.



This should create a new view titled {3D}.

Please note that if this view name already exists within your project, please rename the existing view in order to be able to create a new 3D Isometric view.

Rename the new 3D view by right clicking over the name held in the project browser and choosing the option **Rename**. Set the name to be **Tekla Integration Status**.

Once the view has been created and renamed, access the **Visibility/Graphics Overrides** dialog by either clicking on the relevant **Edit** button within the view properties dialog or by using the **VG** or **VV** keyboard shortcuts.

Properties						×
	Structural Plan					•
Structural Pla	in: Level 2		~	8	Edit Ty	pe
Graphics					\$	^
View Scale		1/8" = 1	-0"			
Scale Value	1:	96				
Display Mod	lel	Normal				
Detail Level		Coarse				
Parts Visibilit	ty	Show Or	iginal			
Visibility/Gra	phics Overri		Edit			
Graphic Disp	olay Options		Edit			
Orientation		Project N	lorth			
Wall Join Dis	play	Clean all	wall joins	5		
Discipline		Structura				
Show Hidde	n Lines	By Discip	line			
Color Schem	ne Location	Backgrou	und			
Color Schem	ne		<none></none>			
System Colo	or Schemes		Edit			
Default Anal	ysis Display	None				
Sun Path						
Underlay					\$	
Range: Base	Level	None				1
Properties hel	lp .				Apply	

Click on the Filter tab and then on the Add button to create a new filter.

				Projection/Surf	ace	(Cut	
Na	ame	Visibility	Lines	Patterns	Transparen	Lines	Patterns	Halftone
Add	Remov			Down				

When accessing the Add Filters dialog, click on Edit/New to create a new filter.

Add Filters	×
Select one or more filters to insert. Rule-based Filters Approved Connections Connected Analytical Nodes Rejected Connected Analytical Nodes Selection Filters	Edit/New
OK Cancel	Help:

Click on **New** to create a new filter and enter the name as being **Unchanged** with the filter option as being **Define rules**.

Filters			\times
Filters Rule-based Filters Approved Connections Connected Analytical Nodes Rejected Connected Analytical Nodes Selection Filters	Categories Select one or more categories to be included in the filter. Parameters common to these categories will be available for defining filter rules. Filter list: Hide un-checke Hide un-checke Analytical Analyt	Filter Rules AND (All rules must be true) Add Rule Add Set X N Connection Status Unconnected Cancel	
	Check All Check None		
How do I create and use view filters?		OK Cancel Apply	

Click **OK** when this information has been entered.

Once the filter has been created, the categories and filter rules fields should have become active allowing certain objects and parameters to be filtered.

Within the categories window, tick the following entries:

- Floors
- Structural Columns
- Structural Framing
- Walls

Set the filter rules to be-

- TSDI_Integration_Status
- Equals
- Unchanged

Filters		×
Filters Rule-based Filters Connected Analytical Nodes Unchanged Unconnected Analytical Nodes Selection Filters	Categories Select one or more categories to be included in the filter. Parameters common to these categories will be available for defining filter rules. Filter list: Filter list: show.org Filter list: www.show.org Filter list: www.show.org Will be un-show.org Walls	Filter Rules AND (All rules must be true) Add Rule Add Set All Selected TSDI_Integration_Status equals Unchanged
ti 🗈 🛋 🏠	Check All Check None	
How do I create and use view filters?		OK Cancel Apply

After the **Unchanged** filter has been correctly created, highlight the filter name and then use the **Duplicate** option to create two copies.

Filters
Filters Rule-based Filters
How do I g

After creating the two duplicates, you should have three filters.

Rename one of the filter duplicates to be **Updated** and change the data entry for the **Filter Rules** from **Unchanged** to be **Updated**.

Rename the second duplicated filter to be **New**. Similarly alter the data entry for the **Filter Rules** from **Unchanged** to be **New**.

Once the data for all three filters has been correctly created, click on the **OK** button to return to the **Add Filters** dialog.

Within the **Add Filters** dialog, you can choose all three filter names to apply directly onto the drawing view. Click **OK** when the selection is made.

Add Filters	×
Select one or more filters to insert.	Edit/New
OK Cancel	Help

You should now have been returned to the main **Visibility/Graphics Overrides** dialog and should be able to see the three filters that have been created.

Click to highlight the entry for **Unchanged** and then choose to **Override** the **Patterns** applied on the surface of an object.

			P	Projection/Surface Cut		ut		
Na	me	Visibility	Lines	Patterns	Transparen	Lines	Patterns	Halftone
Jnchanged		\checkmark	Override	Override	Override	Override	Override	
Jpdated		✓						
New		✓						
Add	Remove		Up	Down				

When editing the pattern overrides, set the **Foreground** color to be **RGB 255-000-255** and the pattern to be **Solid Fill**.

Click **OK** when done.

Fill Pattern Graphics X
Pattern Overrides Foreground Visible
Pattern: <solid fill=""></solid>
Color: Magenta
Background 🗹 Visible
Pattern: <no override=""> ···</no>
Color: <pre>Color:</pre>
How do these settings affect view graphics?
Clear Overrides OK Cancel

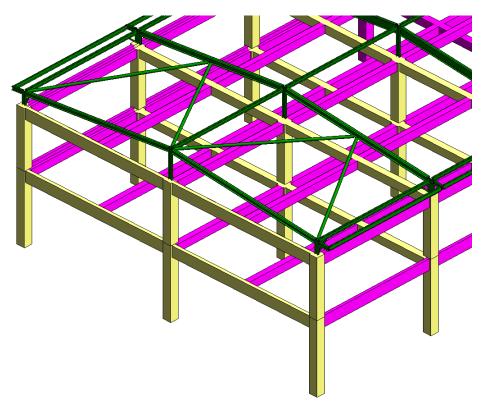
Perform the same override task on the **Updated** and **New** filters although please note that the colors used will alter.

Updated: RGB 255-255-128

New: 000-128-000.

When foreground pattern overrides for all three filters have been set, click **OK** to leave the dialog.

The color coding overrides should now be applied onto the model. This will allow you to easily identify which members are new, updated or unchanged. This is very similar to the BIM Status command within Tekla Structural Designer.



5 Synchronization

6 Other Information

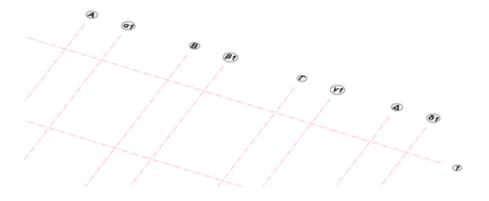
6.1 Grid Lines and Construction Lines

Please be aware that there is a clear difference between Grid objects and Construction Line objects within the Tekla Structural Designer software :-

- Construction Lines are view specific objects and only appear on the view that they were created in.
- Construction Lines will not be exported to Revit.

6.1.1 Grids transferred from Revit into Tekla Structural Designer

For gridlines, all gridlines in the model will be transferred. There are no practical limitations to the symbols used for the gridline references or the level references. We would obviously recommend the use of clear and concise references for your own benefit though.



6.1.2 For initial imports into Revit (i.e. No existing Revit model exists)

All grid information from Tekla Structural Designer will be imported into Autodesk Revit using identical element definition points.

As the amount of grids used in the Tekla Structural Designer model may not meet the requirements of the Revit user, extraneous grids may be removed or new entries added to suit their needs.

6.1.3 For merging results into Revit (i.e. Returning information into an existing Revit model)

When merging results from Tekla Structural Designer into Revit, the API restricts the modification of existing grid objects.

If grids have been moved, lengthened or shortened within Tekla Structural Designer, the API requires the deletion of the existing grid and its replacement with a new grid object.

As this will have an effect on any predefined dimensions or sheets within Revit, we recommend that grids are not included in any updates to the Revit model.

6.2 Construction levels

6.2.1 Floor Setting

When generating levels within Tekla Structural Designer, it is important to understand that not all levels need to be transferred using the Integrator.

For levels generated in Tekla Structural Designer, only levels that have been flagged as **Floor** items will be exported. The exception to this rule is the lowest most entry in the dialog, which is **ALWAYS** exported, regardless of the **Floor** flag setting.

E.g. When looking at the example below, we find that four levels would be exported. Three of the levels are flagged as **Floor** whilst the lowest most level is always exported.

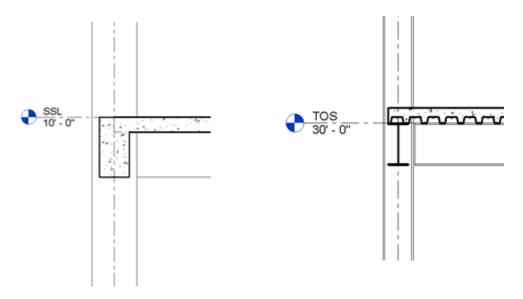
Ref	Name	Туре	e	Level[ft, in]	Spacing[ft, in]	Source		Slab Th. [in]	Floor	ОК		
	Apex	T.O.S	•	37 4"	8'8"	-unique-	•			Cancel		
5	Eaves	T.O.S	•	28' 8"	1' 4"	-unique-	٠			Insert Above	h.	
4	Partial Third	T.O.S	•	27 4"	4' 8"	-unique-	٠					
3	Third Floor	T.O.S	•	22' 8"	10' 8"	-unique-	٠			Insert Below	H.	
2	Second Floor	T.O.S	•	12' 0"	12' 0"	-unique-	٠			Quick Above	H.	
1	Ground	T.O.S	•	0"	12' 0"	-unique-	٠			Quick Below	н	
B1	Base	T.O.S	٠	-12' 0"		-unique-	٠				H	The second second second sector of
										Delete	1 -	These levels exported

6.2.2 Level Type

Level entities in Tekla Structural Designer can be defined as **Structural Slab Level** (SSL), **Top of Foundations** (TOF) or **Top of Steel** (TOS). Concerning the integration process with Revit, this affects the vertical slab location.

Where levels are defined as **Top of Steel**, the slab will be offset equal to its depth so that the underside of the slab is located in line with the level entity.

Where levels are defined as either **Structural Slab Level** of **Top of Foundations**, the slab will not be offset. The top of the slab will be in line with the level entity.



6.2.3 Level Source

Tekla Structural Designer can use the concept of source levels to duplicate the content and simplify the modelling process. It is important to note that Revit has no concept of duplicate floors within the software, therefore duplicate levels are imported into Revit as independent unique levels.

If this model is then returned from Revit to Tekla Structural Designer, the source/duplication settings are reset during the merge process and all levels are flagged as unique.

No items will be physically lost as part of this change and the flag can be reapplied if necessary.

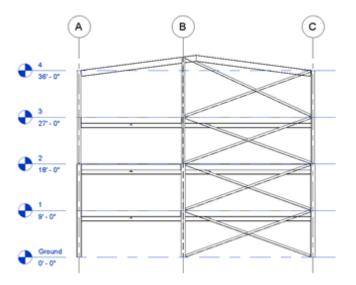
Ref	Name	Туре	e	Level[m]	Spacing [m]	Source		Slab Th. [mm]	Floor	OK
12	12	T.0.5	٠	57.000	4.000	-unique-	٠			Cancel
11	11	T.0.5	٠	53.000	4.000	-unique-	٠			Insert Above
10	10	T.0.5	٠	49.000	4.000	1				
9	9	T.0.5	٠	45.000	4.000	1				Insert Below
8	8	T.0.5	٠	41.000	4.000	1	٠		1	Quick Above
7	7	T.0.5	٠	37.000	4.000	1	٠			Quick Below
6	6	T.0.5		33.000	4.000	1			V	_
5	5	T.0.5	٠	29.000	4.000	1				Delete
4	4	T.0.5	٠	25.000	4.000	1				
3	3	T.0.5		21.000	4.000	1				
2	2	T.0.5	٠	17.000	4.000	1				
1	1	T.0.5	٠	13.000	4.000					
Base	Base	T.0.5	٠	9.000	4.000					
81.2	81.2	S.S.L		5.000	4.000	Base		0.0		
81.1	81.1	5.5.L	٠	1.000	4.000	Base		0.0		
B1	81	S.S.L	٠	-3.000		-unique-		0.0		

6.2.4 Level transfer from Revit into Tekla Structural Designer

When exporting models from Revit, please note that only levels containing a structural node will be exported.

For levels created when importing a model into Tekla Structural Designer, levels will be generated where either:-

- A level has been exported from Revit (see following section)
- Three or more beam or joist members are on the same horizontal plane



6.3 Working with Real World Coordinates

It is usual to find Revit models located to real world coordinates by use of the **Specify Coordinate at Points** or the **Project Base Point** features.

It is usual to find analysis and design software requiring models to be generated around the 0,0,0 base datum to avoid rounding errors or any other sort of numerical discrepancies from occurring. Therefore, most Analysis and Design software packages do not support the use of real world coordinates within projects.

To remove this as being a potential issue from any integration processes, Tekla Structural Designer will allow users to relocate models from real world coordinate positions during the import process.

BIM Integra	tion : Structural I	BIM Import		x
Relocate	Import Model			
Move impor	t model by		Range for imported coordinates	
x	0"	ft, in	X -9' 6 1/2" to 91' 8" ft, in	
Y	0"	ft, in	Y 0" to 136' 8 1/4" ft, in	
z	0"	ft, in	Z -2' 0 ⁼ to 22' 6 ⁼ ft, in	
Rotation	0.0000	•		
Can	cel	Pre	vious Next Finish	

When using the BIM Import command, the **Relocate Import Model** dialog will show the coordinate range of the incoming model on the right hand side. Please note that the **Project Base Point** entry is not directly recorded to the CXL file format and so users should liaise with the Revit user to be able to correctly relocate the incoming model to suit.

Please note that a similar dialog is also shown during the **Export to Revit** command wizard. Users should ensure that the same distances that were used to import the model into Tekla Structural Designer are also used when exporting data from Tekla Structural Designer.

Failure to use the same distances may result in the import of updates into Revit relocating the model to a different location.

6.4 End releases

End release conditions are transferred between Revit and Tekla Structural Designer.

Therefore, for models originating from Revit, it is important to ensure that release information has been correctly defined prior to transfer.

Releases for each instance are set within the Analytical Properties dialog.

Properties	×
R	
Analytical Beams (1)	✓ 📴 Edit Type
Releases / Member Forc	es â A
Start Release	Fixed
Start Fx	
Start Fy	
Start Fz	
Start Mx	
Start My	
Start Mz	
End Release	Fixed
End Fx	
End Fy	
End Fz	
End Mx	
End My	
End Mz	
Member Forces	Edit
Identity Data	\$
Member Number	0
Comments	
Properties help	Apply

Note that the default end release setting for Structural Framing members (including Steel Beams) is to have Fixed ends. This may have an effect on the stability of the resulting Analysis and Design model. Members can be adjusted en-masse within the Autodesk Revit software by the use of selection filter commands.

6.5 Group information

Group information cannot be exported from the Revit software and 'round tripping' will not be possible if items are held within Groups. (This is due to a restriction within the Autodesk Revit API).



Do not use groups when intending to round trip a model from Revit.

R 🗈 🕞 🗌 🖓 • 🖘 • 🖓 - 😭 🚔 • 🖍 😰 • 🖓 🚼 말 다 - = File Steel Architecture Structure Systems Insert Annotate Analyze Massing & Site Collaborate View Active Workset: 2 Modify Collaborate Vorksets Synchronize Reload Relinquish Show 🚱 Gray Inactive Worksets with Central * Latest All Mine Requests History Synchronize on Collaborate Enables collaboration so team members can work on a model simultaneously. Press F1 for more help

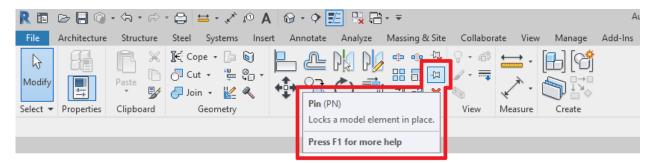
6.6 Worksharing and Worksets

Tekla Structural Designer has no concept of worksharing or worksets therefore any collaboration information set within Revit will not be affected in any way. No workset or collaboration information will be written into the CXL format neutral file when exporting models to Tekla Structural Designer. All supported categories and instances held in worksets will be exported from Revit into Tekla Structural Designer. The collaboration information is not altered by any modifications performed in Tekla Structural Designer. When the model is returned to Revit, the workset information will still be unchanged. (If worksets have been updated in the time between the Export to Tekla Structural Designer and the returning information being merged in Revit, the workset change will also be kept.) However as Tekla Structural Designer has no information relating to the Revit collaboration commands, any new members created within Tekla Structural Designer will not have workset information defined. These members will be imported into the currently active workset.

Please ensure that when merging models together in Revit that you have full access to all worksets. Please note that any locked worksets or borrowed elements cannot be updated.

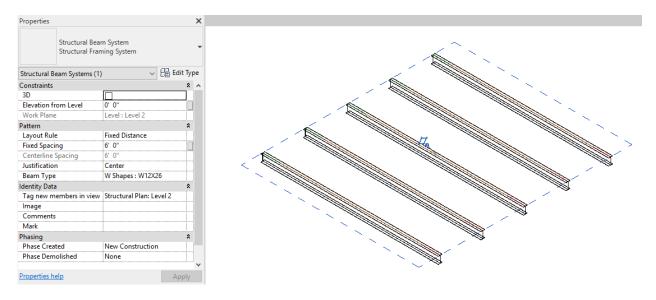
6.7 Pinning members

The Pin command causes problems within Revit if you are trying to update the model with changes exported from Tekla Structural Designer. Items pinned are essentially locked in location and cannot be relocated or updated by any merge processes.



Use the Pin command with care, and possibly not at all if integrating the model. It can prevent the correct updating of models.

6.8 Beam Systems



Revit **Structural Beam System** instances have no equivalent object within Tekla Structural Designer and need to be handled with care.

Although the beam system object itself will not be integrated, the beams held in the system are integrated. The beams will be exported as individual members.

As long as the sections do not change, the beam system will be unaffected on returning results from Tekla Structural Designer back into Revit.

However...

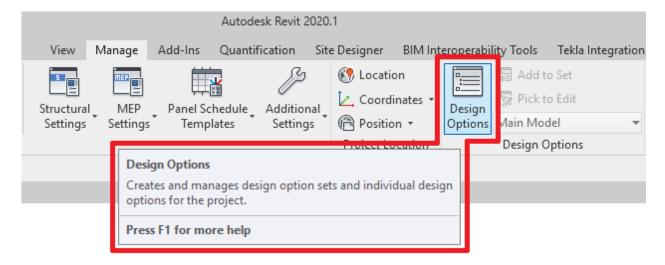
- If one or more beams is changed in section size by the design process, the structural framing instance(s) will be similarly updated in section size on return to Revit. The altered instances will still be retained in the same beam system.
- Any changes to the **Beam Type** parameter in the **Structural Beam System** instance will have no effect on the updated instance (it remains at the imported section size).
- Any changes to the layout or justification parameters in the **Structural Beam System** may also adjust the position of the updated beam but the size cannot be affected.

Changing any adjusted beam size to suit the same type reference as held in the **Beam Type** parameter will reset the instance. It will now alter to suit any changes made to the **Beam Type** parameter.

The use of **Structural Beam System** Tags (**Annotate** \rightarrow **Beam System Symbol**) will not show correct information where individual instances have been adjusted by the merge process.

6.9 **Design Options**

The design option function in Revit allows you to explore different design options for various parts of your project. Design Options are parts of your model that are separated from the Main Model. The Revit user defines Option Sets, in which multiple Design Options can exist. Revit will only allow one of the Design Options from a set to be shown at any given time, so there is no duplicate geometry on any created view.



Items held in design sets are still part of the main Revit file and will be exported to Tekla Structural Designer as default.

This can easily lead to overlapping or collision of element errors occurring when the Tekla Structural Designer model is validated.

To avoid these potential errors from occurring, we would advise that only one design option be integrated with the Tekla Structural Designer software. To do this, simply access a view showing unrequired design options and disable the **Enable Analytical Model** checkbox for all visible elements.

7 Appendix A: Creating tags to suit Tekla Structural Designer content.

This section covers a number of examples of tags that can be created to show imported data from Tekla Structural Designer. The examples here are not exhaustive and you can use the information listed to generate tags to suit your own company standards.

Please note that the following examples have been generated to suit a particular drawing style and may not meet the requirements of any particular company or standard.

7.1 Creating a Structural Framing Tag to show End Forces

This example will cover how to set up a Structural Framing Tag that can then be used to flag shear forces applied to the ends of the beam. We would usually recommend using a predefined Autodesk Structural Framing tag and alter this to suit. Suitable tags include:-

• USA Imperial

C:\ProgramData\Autodesk\RVT 20xx\Libraries\US Imperial\Annotations\Structural\Structural Framing Tag-w-Start Reactions.rfa

• UK

C:\ProgramData\Autodesk\RVT 20xx\Libraries\UK\Annotations\Structural\Structural Framing Tag-w-Start Reactions.rfa

• South East Asia

C:\ProgramData\Autodesk\RVT 20xx\Libraries\South Asia\Annotations\Structural\Structural Framing Tag-w-Start Reactions.rfa

To begin, click on **Open**, browse to the correct path as shown above and open the file **Structural Framing Tag-w-Start Reactions.rfa**.

R 🗈 🔁 🖥 🗇 • 🗠 • 🗠 • 😂 🖶 • 🖍 🖉	🔂 • 🔶 📕		.
Open (Ctrl+O)	Annotate	Analyze	Massing & Site
Opens a project, family, annotation, or template file.	tegrator		
Use the file browser to navigate to the folder containing the file.	lew Notes		
Press F1 for more help			

Firstly, click to select the contents of the current tag label, and then using the option **Edit Label** from the ribbon to alter the contents.

File Creat				Add-Ins Cut +)) oin +)) - +		on Site	Designe	• •• • 88 61 48		ity Tools • [℃		Load into	Modify Label	• •
Select • P	roperties	Clipboa	2	Geometry	. t . (Mo	ці 111	븨 븳 >	Vicusu	ie Create	Label Label	-	Project and Close nily Editor	
Modify Labe	el 🛛						Edit I							
Properties					×	🔂 3D	Modi	fies the defa	ult text tha	t displays	n a note.			
-	abel tandard ning Tags (1))		~ 1	Edit Type		Press	F1 for mor	e help]		
Graphics					*									
Sample Text		1	Start Mome	ent - Dead										
Label				Edit								T /		L
Wrap betwee			\checkmark									NT.	ar	Γ
Horizontal Ali			Center											
Vertical Align			Middle											
Keep Readabl Visible	le													
VISIDIE												2	ta	rt

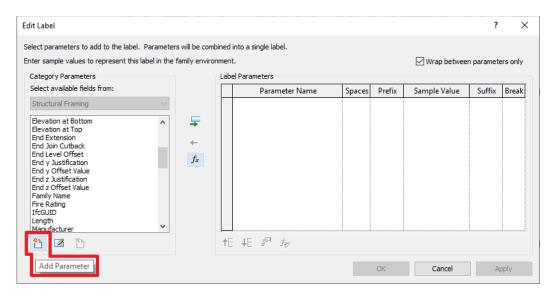
Remove all of the current tag entries by selecting each one from the label parameters box and then using the **Remove parameter from label** option.

Continue to perform this task until all 6 existing labels have been removed from the list of label parameters.

Edit Label				?	×
Select parameters to add to the label. Parameters will be Enter sample values to represent this label in the family er			Wrap between	paramete	ers only
Category Parameters	Label Parameters		<u> </u>		-
Select available fields from:	Parameter Name	Spaces P	refix Sample Value	Suffix	Break
Structural Framing 🗸 🗸	1 tart Moment - Dead	1	Start Moment - De		
Flevation at Bottom	2 Start Moment - Live	1	Start Moment - Liv		
Elevation at Bottom	3 Start Moment - Total	1	Start Moment - To		
End Extension	4 Start Reaction - Dead	1	Start Reaction - De		
End Join Cutback	5 Start Reaction - Live	1	Start Reaction - Liv		
End y Justification f.	Remove parameter from label	1	Start Reaction - To		
End y Offset Value	Remote parameter normaber				
End z Justification					
Family Name					
Fire Rating					
IfcGUID Length					
Manufacturer					
* Z *	te ↓e # <i>f</i> ₹				
		Oł	< Cancel	Ap	oply

The parameters that we need to show within the tag are written into the family properties as a part of the integration process.

Because of this, the labels do not exist within the default Revit parameters available to be included within a family. We will need to load in the parameters that we will need to use within the tag. Click **Add Parameter** to add in a new label entry.



Adding a new parameter will access the **Parameter Type** dialog, click on the option to **Select** a shared parameter.

Parameter Properties	×
Parameter Type Shared parameter (Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags) Select Export	
Parameter Data Name: <pre> </pre> Vio parameter selected > Discipline:	
Type of Parameter:	
OK Cancel Help	

The next dialog **Shared Parameters** will show a list of all available parameters from the TSD Integrator Parameter Group.

Click on the entry for **Result_StartVShearMax** to highlight and then click **OK**.

Choose a parameter group, and a parameter.		
Parameter group:		
TSD Integrator	\sim	
Parameters:		
Result_ColVShearMin Result_EndAxialMax Result_EndAxialMaxNeg Result_EndMomentMax Result_EndMomentMaxNeg Result_EndVShearMax Result_EndVShearMaxNeg Result_StartAxialMaxNeg Result_StartAxialMaxNeg Result_StartWomentMax Result_StartWomentMax	^	Edit
TSDI_Alias TSDI_Check_ID TSDI_Concrete_Fill	~	
	~	Help

Choose OK also on the Parameter Type dialog to return to the main Edit Label dialog.

The parameter **Result_StartVShearMax** will now be shown in the list of available **Category Parameters** to the left hand side of the dialog.

Highlight the parameter and then use the **add** button, (or simply double click on the name) to add the entry into the list of label parameters on the right hand side of the dialog.

Edit Label					?	×
Select parameters to add to the label. Parameters will be con Enter sample values to represent this label in the family envir	-	-		Wrap betweer	oaramet	ara only
Category Parameters	Label Parameters	3		e map between	rparamet	LIS ONLY
Select available fields from:	Parameter Na		Prefix	Sample Value	Suffix	Break
Structural Framing V	1 Result_StartVShearM	ax 1	-	Result_StartVShear		
End z Offset Value Family Name Fire Rating IfcGUID Length Manufacturer Mark Model Number of studs OmniClass Number OmniClass Title Cherric Die Under Result StartVShearMax Kertic Cherrica Die Voor	dd parameter(s) to label					
🔁 🗷 造	te ↓e ₽ f _v					
			ОК	Cancel	A	pply

We will now add a prefix to the label parameter so that the overall tag will show the force title. The prefixes that we will use are as follows (suitable for EC3 member coordinate systems):

Label parameter: Result_StartVShearMax
 Prefix

Prefix: **FyMax =**

Please note that the prefix should contain a trailing space character after the equals sign. Click **OK** when all data has been set-up to return to the main Revit screen.

FyMax = Result_StartVShearMax

The style of the tag can be altered by again highlighting the label entry but this time using the **Edit Type** command that is held in the properties dialog.

Properties	×
Label standard	-
Structural Framing Tags (1)	~ 🔐 Edit Type
Graphics	*
Sample Text	FyMax = Result_StartVShearMax
Label	Edit
Wrap between parameters only	
Horizontal Align	Center
Vertical Align	Middle
Keep Readable	
Visible	
Properties help	Apply

The dialog for the **Type Properties** will show the various settings governing the size, color and font of the tag itself. Any of these settings can be altered to suit your own company requirements. Make any changes required and then click **OK** when done.

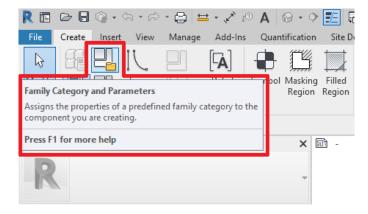
The Tag family can then be saved by using the **Save As** family option and choosing a suitable filename and location. We would recommend the use of prefixing all user created families with a company reference so that they can be easily differentiated from the default Autodesk content held in the model template.

7.1.1 Creating a similar tag for the end 2 reactions

The created tag can also be modified and adjusted to suit a tag picking up on the shear force reported on the finish end of the member. Simply follow a similar process as before:-

- Save As to create a copy of the existing tag. Provide a suitable name and choose a location to save the family to.
- Edit the label contents; remove the existing Result_StartVShearMax parameter from the list.
- Add a new parameter of **Result_EndVShearMax** and then host this new parameter into the **Label Parameters** window.
- Add a suitable label prefix and then click **OK** to leave the dialog.

The last alteration is to change the label location from the start of the member to the end of the member. To do this, click on the **Family Category and Parameters** command.



Within this command, change the Attachment Point value from Start to be End. Click OK when done.

Family Category and Parameters				
Family Category				
Filter list: <show all=""></show>	~			
Stair Support Tags Stair Tags Structural Area Reinforc Structural Area Reinforc Structural Beam System Structural Column Tags Structural Connection T Structural Fabric Reinfor Structural Fabric Reinfor Structural Fabric Reinfor Structural Framing Tags Structural Path Reinforc	ement Tags Tags ags rcement Symbols rcement Tags ags	~		
Family Parameters				
Parameter	Value			
Rotate with component				
Attachment Point	Start	\sim		
	<none> Start</none>			
	Middle			
1	End			
	ОК	Cancel		

The second tag is now complete; you can **Save** all of your changes. **Exit** out of the family and return to your main model.

The tags can be loaded into the model (or template) using the **Load Family** command (**Insert** tab) and then placed by using commands such as **Tag by Category** or **Beam Annotations**.

7.1.2 Variations

The preceding notes cover the creation of a tag showing the maximum Shear on member ends. For moment connections, you may wish to consider creating an additional tag family that contains Axial and Moment information.

Parameters which you want to consider including may be **Result_StartAxialMax**, **Result_StartMomentMax**, **Result_EndAxialMax** and **Result_EndMomentMax**.

The **Break** option on the right hand side of the dialog will split each of the parameters onto a separate line. If this is unticked then the parameters will all exist on the same line. Please take care of the tag width in this case though as truncation may occur if the width box is too small.

The completed dialog for a moment connection end force tag may look similar to the following:-

Edit Label							?	×
Select parameters to add to the label. Par	rameters will be com	bined	into a single label.					
Enter sample values to represent this labe	l in the family enviro	nmen	t.			🗹 Wrap between	paramete	ers only
Category Parameters		Lab	el Parameters					
Select available fields from:			Parameter Name	Spaces	Prefix	Sample Value	Suffix	Break
Structural Framing		1	Result_StartVShearMax	1	FzMax =	Result_StartVShear		
Description	^	2	Result_StartAxialMax	1	FxMax =	Result_StartAxialM		
Elevation at Bottom Elevation at Bottom Elevation at Top End Extension End Join Cutback End Level Offset End y Justification End y Offset Value End z Justification End z Offset Value Family Name Fire Rating IfcGUID Length	 ▲ f_x 		Result_StartMomentMax	1	MyMax	Result_StartMome		
🐴 🗹 造		†E	↓E # ²¹ <i>f</i> _₹ ∕					
					OK	Cancel	Ap	pply

You may also want to consider creating tags which cover uplift (use result parameters with **...Neg** suffixes) for both pinned and moment connections. The process is almost identical to as described previously apart from the different parameters and prefix information.

7.2 Creating Column Tags to indicate End Forces

This example will cover how to set up a Structural Column Tag that can then be used to flag shear and moment forces applied to the base of the column.

Please note that as there is no Structural Column tag similar to this already present within the AutoDesk Revit library we will show how to take an existing framing tag and alter this to suit. Suitable tags include :-

• USA Imperial

C:\ProgramData\Autodesk\RVT 20xx\Libraries\US Imperial\Annotations\Structural\Structural Framing Tag-w-Start Reactions.rfa

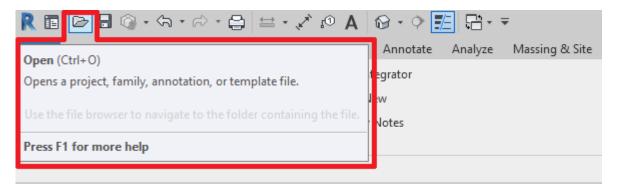
• UK

C:\ProgramData\Autodesk\RVT 20xx\Libraries\UK\Annotations\Structural\Structural Framing Tag-w-Start Reactions.rfa

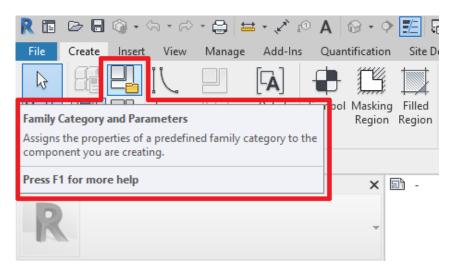
South East Asia

C:\ProgramData\Autodesk\RVT 20xx\Libraries\South Asia\Annotations\Structural\Structural Framing Tag-w-Start Reactions.rfa

To begin, click on **Open**, browse to the correct path as shown above and open the file **Structural Framing Tag-w-Start Reactions.rfa**.



After opening the correct Structural Framing tag family, the first task to achieve is to change the category so that the tag is applicable to Structural Columns. To do this access the command **Family Category and Parameters**.



Within the **Family Category and Parameters** dialog, click on **Structural Column Tags** to set the correct category and then click **OK**.

Family Category Filter list: <pre></pre>	•]	
Stair Support Tags Stair Tags Structural Area Reinforce Structural Area Reinforce Structural Column Tags Structural Column Tags Structural Fabric Reinforc Structural Fabric Reinforc Structural Fabric Reinforce Structural Framing Tags Structural Path Reinforce	ment Tags ement Symbols ement Tags Is	~
Family Parameters		
Parameter	Value	
Rotate with component		
	2	
	ОК	Cancel

The contents of the label can be altered, by firstly clicking to select the current tag label and then using the option **Edit Label** from the ribbon.

R 🖬 🖻 🖥 🎯 • th • th	> • 🖨 🖴 • 🖍 🕫 A 😪 • ¢		Autodesk Revit 2019.2 - Not For Resale
File Create Insert View	Manage Add-Ins Quantification	Site Designer BIM Interoperability Tools	Tekla Integration Modify Label
Modify Paste Select • Properties	K C Join → C ard Geometry		Edit Load into Label Froject Project and Close
Modify Label	in oconcary	Edit Label	
Properties	×	Modifies the default text that displays in	a note.
Label standard	•	Press F1 for more help	
Structural Column Tags (1)	V 🗄 Edit Type		
Graphics Sample Text	Start Moment - Dead		
Label	Edit		
Wrap between parameters only Horizontal Align	Center		Star
Vertical Align	Middle		
Keep Readable			
Visible			

Remove all of the current tag entries by selecting each one from the label parameters box and then using the **Remove parameter from label** option. Continue to perform this task until all six existing labels have been removed from the list of label parameters.

Edit Label				?	×
Select parameters to add to the label. Parameter Enter sample values to represent this label in the	-		☑ Wrap between	paramet	ers only
Category Parameters Select available fields from:	Parameter Name	Spaces Pref	ix Sample Value	Suffix	Break
Structural Framing \checkmark	1 tart Moment - Dead	1	Start Moment - De	Sumx	
-	2 Start Moment - Live	1	Start Moment - Liv		
Elevation at Bottom	3 Start Moment - Total	1	Start Moment - To		
End Extension	4 Start Reaction - Dead	1	Start Reaction - De		
End Join Cutback End Level Offset	5 Start Reaction - Live	1	Start Reaction - Liv		
End y Justification	f. Remove parameter from label	1	Start Reaction - To		
End y Offset Value End z Justification					
End z Offset Value					
Family Name Fire Rating					
IfcGUID					
Length Manufacturer					
* Z *	↑E ↓E # ² <i>f</i> ₂				
		ОК	Cancel	А	pply
		- On	Curreer		

The parameters that we need to show within the tag are written into the family properties as a part of the integration process. Because of this, the labels do not exist within the default Revit parameters available to be included within a family. We will need to load in the parameters that we will need to use within the tag.

Click Add Parameter to add in a new label entry.

Edit Label				?	×
Select parameters to add to the label. Parameters will be com	bined into a single label.				
Enter sample values to represent this label in the family enviro	nment.		Wrap between	n paramete	ers only
Category Parameters	Label Parameters				
Select available fields from:	Parameter Name	Spaces Prefix	Sample Value	Suffix	Break
Structural Framing					
End Level Onset fx End y Justification fx End y Offset Value Family Name Family Name Fire Rating IfcGUID Length Manufacturer ✓					
	t +E +E # ²¹ 5 _{₹?}				
Add Parameter		OK	Cancel	Ap	pply

Adding a new parameter will access the **Parameter Parameters** dialog, click on the option to **Select** a shared parameter.

Parameter Properties	\times
Parameter Type	
Shared parameter	
(Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags)	
Select Export	
Parameter Data	
Name:	
<no parameter="" selected=""></no>	
Discipline:	
\sim	
Type of Parameter:	
~	
OK Cancel Help	

The next dialog **Shared Parameters** will show a list of all available parameters from the TSD Integrator parameter group. Click on the entry for **Result_ColVShearMax** to highlight and then click **OK**.

Shared Parameters			×
Choose a parameter group, and a parameter.			
Parameter group:			
TSD Integrator	\sim		
Parameters:			
Result_AxialMax Result_ColMajorMomentMax Result_ColMajorMomentMin Result_ColMajorShearMax Result_ColMajorShearMin Result_ColMinorMomentMax Result_ColMinorMomentMin Result_ColMinorShearMax	^	Edit	
Result_EndAxialMax Result_EndAxialMaxNeg Result_EndMomentMax Result_EndMomentMaxNeg Result_EndVShearMax	*		
OK Cancel		Help	

Choose OK also on the Parameter Properties dialog to return to the main Edit Label dialog. The parameter **Result ColVShearMax** will now be shown in the list of available **Category Parameters** to the left hand side of the dialog. Highlight the parameter and then use the add button, (or simply double click on the name) to add the entry into the list of label parameters on the right hand side of the dialog.

Edit Label					?	×
Select parameters to add to the label. Parameters Enter sample values to represent this label in the f Category Parameters	-			☑ Wrap between	n paramete	ers only
Select available fields from:	Parameter Name	Spaces	Prefix	Sample Value	Suffix	Break
Structural Columns	2 Result_ColVShearMax 3 Add parameter(s) to label fx			Result_ColVShear		
	↑E ↓E <i>₽ f</i> ₂			-		
			ОК	Cancel	A	oply

Repeat the previous steps so that 10 parameters are shown in the dialog:

- **Result ColVShearMax** •
- **Result ColVShearMin** •
- **Result ColMaiorShearMax** •
- Result ColMajorShearMin •
- **Result ColMinorShearMax** •
- Result_ColMinorShearMin •
- **Result ColMajorMomentMax** •
- Result_ColMajorMomentMin •
- Result ColMinorMomentMax •
- Result ColMinorMomentMin

Please note that this will obviously create a label that contains 10 entries, some of which may not be used with any reasonable results. If you do not wish to have all of these entries, simply do not add the relevant parameter to the list.

You may also wish to consider simply creating a schedule that references all of the column base forces; this will be covered in a separate section of these guidance notes.

Add prefixes to each of the label parameters so that the overall tag will show the force titles. The prefixes that we have used are as follows (suitable for EC3 member coordinate systems):-

- Label parameter: Result_ColVShearMax Prefix: FvMax = • Label parameter: Result ColVShearMin Prefix: **FvMin =** • Label parameter: **Result ColMajorShearMax** Prefix: FvMax = • Label parameter: Result ColMajorShearMin Prefix: FyMin = • Label parameter: Result ColMinorShearMax Prefix: FzMax = • Label parameter: Result_ColMinorShearMin Prefix: FzMin = • Label parameter: Result_ColMajorMomentMax • Prefix: MyMax = Label parameter: Result_ColMajorMomentMin Prefix: MyMin = • Label parameter: Result ColMinorMomentMax Prefix: MzMax = • Label parameter: Result_ColMinorMomentMin •
 - Prefix: MzMin =

Please note that each prefix should contain a trailing space character after the equals sign. To ensure that each label is set on a separate line within the tag, please check the **Break** option to the right hand side of the **Label Parameters** window.

		Parameter Name	Spaces	Prefix	Sample Value	Suffix	Break
\sim	1	Result_ColVShearMax	1	FvMax =	Result_ColVShear		\checkmark
	2	Result_ColVShearMin	1	FvMin =	Result_ColVShear		
^ ∓	3	Result_ColMajorShearMax	1	FyMax =	Result_ColMajorS		\checkmark
	4	Result_ColMajorShearMin	1	FyMin =	Result_ColMajorS		\checkmark
	5	Result_ColMinorShearMax	1	FzMax =	Result_ColMinorS		\checkmark
f_x	6	Result_ColMinorShearMin	1	FzMin =	Result_ColMinorS		
	7	Result_ColMajorMomentMax	1	MyMax =	Result_ColMajorM		
	8	Result_ColMajorMomentMin	1	MyMin =	Result_ColMajorM		
	9	Result_ColMinorMomentMax	1	MzMax =	Result_ColMinorM		
	1(0 Result_ColMinorMomentMin	1	MzMin =	Result_ColMinorM		
		↑ ↓ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑	2 Result_ColVShearMin 3 Result_ColMajorShearMax 4 Result_ColMajorShearMin 5 Result_ColMinorShearMax	2 Result_ColVShearMin 1 3 Result_ColMajorShearMax 1 4 Result_ColMajorShearMin 1 5 Result_ColMajorShearMax 1 6 Result_ColMinorShearMin 1 7 Result_ColMinorShearMin 1 8 Result_ColMajorMomentMax 1 9 Result_ColMajorMomentMin 1	2 Result_ColVShearMin 1 FvMin = 3 Result_ColMajorShearMax 1 FyMax = 4 Result_ColMajorShearMax 1 FyMax = 5 Result_ColMajorShearMax 1 FzMax = 5 Result_ColMinorShearMax 1 FzMax = 6 Result_ColMinorShearMin 1 FzMax = 7 Result_ColMajorMomentMax 1 MyMax = 8 Result_ColMajorMomentMin 1 MyMin = 9 Result_ColMinorMomentMax 1 MzMax =	2 Result_ColVShearMin 1 FvMin = Result_ColVShear 3 Result_ColMajorShearMax 1 FyMax = Result_ColMajorS 4 Result_ColMajorShearMax 1 FyMax = Result_ColMajorS 5 Result_ColMinorShearMax 1 FzMax = Result_ColMajorS 5 Result_ColMinorShearMax 1 FzMax = Result_ColMinorS 6 Result_ColMinorShearMin 1 FzMax = Result_ColMinorS 7 Result_ColMajorMomentMax 1 MyMax = Result_ColMajorM 8 Result_ColMinorMomentMax 1 MyMax = Result_ColMajorM 9 Result_ColMinorMomentMax 1 MzMax = Result_ColMinorM	2 Result_ColVShearMin 1 FvMin = Result_ColVShear 3 Result_ColMajorShearMax 1 FyMax = Result_ColMajorS 4 Result_ColMajorShearMax 1 FyMax = Result_ColMajorS 5 Result_ColMinorShearMax 1 FyMin = Result_ColMajorS 5 Result_ColMinorShearMax 1 FzMax = Result_ColMinorS 6 Result_ColMinorShearMin 1 FzMin = Result_ColMinorS 7 Result_ColMajorMomentMax 1 MyMax = Result_ColMajorM 8 Result_ColMajorMomentMin 1 MyMin = Result_ColMajorM 9 Result_ColMinorMomentMax 1 MzMax = Result_ColMajorM

Click OK, when all data has been set-up to return to the main Revit screen.

```
FvMax = Result_ColVShearMax
FvMin = Result_ColVShearMin
FyMax = Result_ColMajorShearMax
FyMin = Result_ColMajorShearMin
FzMax = Result_ColMinorShearMax
FzMin = Result_ColMinorShearMin
MyMax = Result_ColMajorMomentMax
MyMin = Result_ColMajorMomentMin
MzMax = Result_ColMinorMomentMax
MzMin = Result_ColMinorMomentMax
```

The style of the tag can be altered by again highlighting the label entry but this time using the **Edit Type** command that is held in the properties dialog.

Properties			×
Labe stan	el dard		-
Structural Column	n Tags (1)	~	🗄 Edit Type
Graphics			*
Sample Text		FvMax = Result_ColVSh	earMax
Label		Edit	
Wrap between p			
Horizontal Align		Center	
Vertical Align		Middle	
Keep Readable			
Visible			
Properties help			Apply

The dialog for the **Type Properties** will show the various settings governing the size, color and font of the tag itself. Any of these settings can be altered to suit your own company's requirements. Make any changes required and then click **OK** when done.

The Tag family can then be saved by using the **Save As** family option and choosing a suitable filename and location. We would recommend the use of prefixing all user created families with a company reference so that they can be easily differentiated from the default Autodesk content held in the model template.

As the tag is now complete and saved, you can **Exit** out of the family and return to your main model. The tags can be loaded into the model (or template) using the **Load Family** command (**Insert** tab) and then placed by using commands such as **Tag by Category** or **Tag All**.

7.3 Creating a Structural Column Tag to show the Tekla Structural Designer part mark

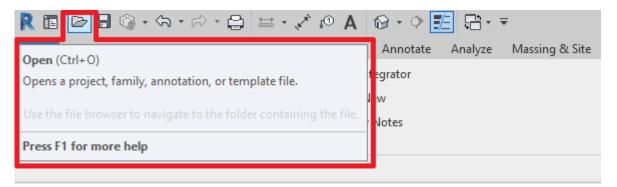
This example will cover how to set up a Structural Column tag that can then show the Tekla Structural Designer part mark in addition to the section size. Column tags that show the section size already exist within the default Autodesk Revit library so we will use one of these families and simply modify the contents. Suitable tags include:-

- USA Imperial
 - C:\ProgramData\Autodesk\RVT 20xx\Libraries\US Imperial\Annotations\Structural\Structural Column Tag.rfa
- UK
 - C:\ProgramData\Autodesk\RVT 20xx\Libraries\UK\Annotations\Structural\Anno_Structural_Column.rfa
 South East Asia

C:\ProgramData\Autodesk\RVT 20xx\Libraries\South Asia\Annotations\Structural\Structural Column Tag.rfa

Please note the different filename for the UK content.

To begin, click on **Open**, browse to the correct path as shown above and open the file **Structural Column Tag.rfa** or **Anno_Structural_Column.rfa**.



Firstly, click to select the contents of the current tag label, and then using the option **Edit Label** from the ribbon to alter the contents.

R 🖬 🕞 🖥 🎯 • 🖘 • r	o • 🖶 🖶 • 🔨 ©	A 🗟 • 🗘		Autodesk Revit 2019.2 - Not F
File Create Insert View	Manage Add-Ins	Quantification	Site Designer BIM Interoperability Too	ols Tekla Integration Modify Label
Modify	 ✗ ☑ Cut • ☑ Join • ☑ • 	₽ ♣ °		Coad into Load into Label Project Project and Close
Select Properties Clipbo	oard Geometry			reate Labor Family Editor
Modify Label			Edit Label	
Properties		×	Modifies the default text that displays i	n a note.
Label standard		-	Press F1 for more help	
Structural Column Tags (1)	~ {	🖥 Edit Type		
Graphics		\$		
Sample Text	1i			
Label	Edit			
Wrap between parameters only				
Horizontal Align	Center			
Vertical Align	Middle			
Keep Readable				
Visible				

Within the **Edit Label** dialog, we can see that there is an existing entry of **Type Name** already present. We will simply add the Tekla Structural Designer part mark parameter to this content so that the tag family contains two parameters.

The parameter that we need to show within the tag is written into the family properties as a part of the integration process.

Because of this, the specific parameter does not exist within the default Revit parameters available to be included within a family. We will need to load in the parameter required: Click **Add Parameter** to add in a new label entry.

Edit Label						?	×
Select parameters to add to the label. Parameters	will be combined	into a single label.					
Enter sample values to represent this label in the fa	mily environment	t.			Wrap betwee	n paramete	ers only
Category Parameters	Lab	el Parameters					
Select available fields from:		Parameter Name	Spaces	Prefix	Sample Value	Suffix	Break
Structural Columns \sim	1	Type Name	1		1i		
Comments Cost Description Family Name IfcGUID Manufacturer Mark Model OmniClass Number OmniClass Title Section Shape Structural Material Top Offset Tupe Comments	\rightarrow \leftarrow f_x						
*)	ŤE	↓E # ^{S1} <i>f</i> _{₹?}					
Add Parameter				ОК	Cancel	A	pply

Adding a new parameter will access the **Parameter Type** dialog, click on the option to **Select** a shared parameter.

Parameter Properties	\times
Parameter Type	
Shared parameter	
(Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags)	
Select Export	
Parameter Data Name:	
<no parameter="" selected=""></no>	
Discipline:	
~	
Type of Parameter:	
~	
OK Cancel Help	

The next dialog **Shared Parameters** will show a list of all available parameters from the TSD Integrator Parameter Group.

Click on the entry for **TSDI_Part_Mark** to highlight and then click **OK**.

Shared Parameters		\times
Choose a parameter group, and a parameter.		
Parameter group:		
TSD Integrator	\sim	
Parameters:		
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_ID TSDI_Integration_Status TSDI_Manufacturer TSDI_Matl TSDI_Not_Converted TSDI_Not_Converted TSDI_Not_Converted TSDI_Part_Mark TSDI_Size TSDI_StartConn TSDI_Trans_Reinf TSDI_Trape	~	Edit
OK Cancel		Help

Choose OK also on the Parameter Type dialog to return to the main Edit Label dialog.

The parameter **TSDI_Part_Mark** will now be shown in the list of available **Category Parameters** to the left hand side of the dialog.

Highlight the parameter and then use the **add** button, (or simply double click on the name) to add the entry into the list of label parameters on the right hand side of the dialog. After adding the parameter it will be shown below the **Type Name** parameter, this can be adjusted using the **Move parameter up** option underneath the **Label Parameters** window.

Selecting the option **Break** against the first line will ensure that the two parameters exist on separate lines in the family.

Edit Label				?	×			
Select parameters to add to the label. Parameters will be comb	pined into a single label.							
Enter sample values to represent this label in the family environ	nment.	Wrap between parameters only						
Category Parameters	Label Parameters			(5)				
Select available fields from:	Parameter Name	Spaces Pro	efix Sample Value	Suffix Br	aak			
Structural Columns 🛛 🗸 🕗	1 Type Name 3	1	1 i					
Comments Cost Description Family Name IfcGUID Manufacturer Mark Model OmniClass Number OmniClass Title Section Shape Structural Material TSDL Part Mark	2 TSDI_Part_Mark	1	TSDI_Part_Mark					
	t \downarrow E \mathscr{F}^{1} $\mathscr{J}_{\mathscr{D}}$ Move parameter up	ОК	Cancel	Apply				

Click **OK** when all data has been set-up to return to the main Revit screen. As the width of the tag may be too small to fit the part mark or section size on one line without truncating the entry, click and drag either of the grip points to expand the box.



The style of the tag can be altered by again highlighting the label entry but this time using the **Edit Type** command that is held in the properties dialog.

Properties	×
Label standard	
Structural Column Tags (1)	~ 🖁 Edit Type
Graphics	*
Sample Text	FvMax = Result_ColVShearMax
Label	Edit
Wrap between parameters only	
Horizontal Align	Center
Vertical Align	Middle
Keep Readable	
Visible	
Properties help	Apply

The dialog for the **Type Properties** will show the various settings governing the size, color and font of the tag itself. Any of these settings can be altered to suit your own company requirements. Make any changes required and then click **OK** when done.

The Tag family can then be saved by using the **Save As** family option and choosing a suitable filename and location. We would recommend the use of prefixing all user created families with a company reference so that they can be easily differentiated from the default Autodesk content held in the model template.

As the tag is now complete and saved, you can **Exit** out of the family and return to your main model. The tags can be loaded into the model (or template) using the **Load Family** command (**Insert** tab) and then placed by using commands such as **Tag by Category** or **Tag All**.

7.3.1 Variations

The preceding notes cover the creation of a tag for use on elevation and section views. For plan views, you may wish to use a family that is orientated at 45 degrees to the column location.

The creation process is identical to previously described however we would recommend the use of a different base family. We would recommend the use of the family **Structural Column Tag-45.rfa** (for UK content use **Anno_Tag_Structural_Column_45.rfa**) and this should be found in the same directory location as the previously modified family.

7.4 Creating a Structural Framing Tag to show Composite Beam information

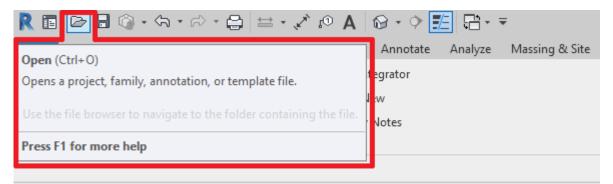
This example will cover how to set up a Structural Framing Tag that can then be used to flag composite beam information that has been imported from Tekla Structural Designer

We would recommend using a predefined Autodesk Structural Framing tag as a base point and then altering this to suit. Suitable tags include:-

- USA Imperial
 - C:\ProgramData\Autodesk\RVT 20xx\Libraries\US Imperial\Annotations\Structural\Structural Framing Tag.rfa
- UK
 - C:\ProgramData\Autodesk\RVT 20xx\Libraries\UK\Annotations\Structural\Anno_Tag_Structural_Framing.rfa
 South East Asia

C:\ProgramData\Autodesk\RVT 20xx\Libraries\South Asia\Annotations\Structural\Structural Framing Tag.rfa Please note the different filename for the UK content.

To begin, click on **Open**, browse to the correct path as shown above and open either the file **Structural Framing Tag.rfa** or **Anno_Tag_Structural_Framing.rfa**.



Firstly, click to select the contents of the current tag label, and then using the option **Edit Label** from the ribbon to alter the contents.

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File Cr	eate Insert	View	Man	nage A	Add-Ins	Quantif	ication	Site	e Design	er Bl	M Inter	operabili	ity Tools	Tekla Int	egration	Modify Label
↓ ↓ Modify ↓		Paste	11 7	🕤 Cut 👉 Join	•	□	<u>گ</u> ک					↓ ↓ ↓	· [6] • ∔×	Edit Label	.oad into Project	
Select 🔻	Properties	Clipboa	ard	Geor	metry				vtitv			Measu	re Create	Laker	Fa	mily Editor
Modify Lat	pel								lit Label							
Properties							X [a) 🖄	odifies t	ne deta	uit text	that disp	lays in a n	ote.		
								Pi	ess F1 f	or more	e <mark>help</mark>					
	Label 3mm						*									
Structural Fra	aming Tags (1)				\sim	Edit T	ype									
Graphics							\$									
Sample Text	t		1i													
Label					Edit											
Wrap betwe	en parameters	only														
Horizontal A	Align		Cente	er												
Vertical Alig	ın		Middl	le												
Keep Reada	ble		\square													
Visible			\checkmark													

Within the **Edit Label** dialog, we can see that there is an existing entry of **Type Name** already present. We will simply add the additional Tekla Structural Designer parameters to this content so that the tag family contains the following references:

- Part Mark
- Type Name
- Tekla Structural Designer Material Grade
- Numbers of Studs (parenthesized)
- Additional transverse reinforcement

The Tekla Structural Designer parameters that we need to show within the tag are written into the family properties as a part of the integration process.

Because of this, some of the specific parameters do not exist within the default Revit parameters available to be included within a family. We will need to load in the parameter required: Click **Add Parameter** to add in a new label entry.

Edit Label							?	×	
Select parameters to add to the label.	Parameters will	be combin	ned into a single label.						
Enter sample values to represent this l	label in the famil	Wrap between parameters only							
Category Parameters			Label Parameters						
Select available fields from:			Parameter Name	Spaces	Prefix	Sample Value	Suffix	Break	
Structural Columns	\sim		1 Type Name	1		1i			
Comments Cost Description Family Name IfcGUID Manufacturer Mark Model OmniClass Number OmniClass Title Section Shape Structural Material Top Offset Type Comments		← <i>f</i> x							
1 🖸			te ∔e #ª <i>t</i> e						
Add Parameter					OK	Cancel	Aj	oply	

Adding a new parameter will access the **Parameter Type** dialog, click on the option to **Select** a shared parameter.

Parameter Properties	\times
Parameter Type	
Shared parameter	
(Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags)	
Select Export	
Parameter Data	
Name:	
<no parameter="" selected=""></no>	
Discipline:	
\sim	
Type of Parameter:	
\sim	
OK Cancel Help	

The next dialog **Shared Parameters** will show a list of all available parameters from the TSD Integrator Parameter Group.

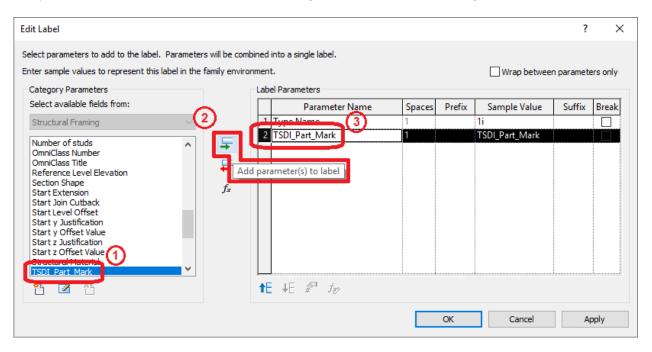
Click on the entry for TSDI_Part_Mark to highlight the entry and then click OK.

Shared Parameters		×
Choose a parameter group, and a parameter.		
Parameter group:		
TSD Integrator	\sim	
Parameters:		
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_ID TSDI_Integration_Status TSDI_Manufacturer TSDI_Matd TSDI_Not_Converted TSDI_Not_Converted TSDI_Part_Mark TSDI_Part_Mark TSDI_Size TSDI_Size TSDI_Size TSDI_Size TSDI_Trans_Reinf TSDI_Type	~	Edit
OK Cancel		Help

Choose OK also on the Parameter Type dialog to return to the main Edit Label dialog.

The parameter **TSDI_Part_Mark** will now be shown in the list of available **Category Parameters** to the left hand side of the dialog.

Highlight the parameter and then use the **add** button, (or simply double click on the name) to add the entry into the list of label parameters on the right hand side of the dialog.



Repeat the previous steps so that five parameters are shown in the dialog:

- Type Name
 - (Should already be present)
- TSDI_Part_Mark
- TSDI_Matl
- Number of Studs

• (This is a default Revit parameter and should already exist within the Category Parameters window)

• TSDI_Trans_Reinf

After adding the parameters, they will be shown in order of loading. Highlight particular lines, use the Move parameter up, and **Move parameter down** options to reorder the parameters as follows:

- TSDI_Part_Mark
- Type Name
- TSDI_Matl
- Number of Studs
- TSDI Trans Reinf

Please also enable the **Break** option against the parameters **TSDI_Part_Mark** and **Number of Studs** to break the data into three separate lines.

Edit Label								?	×
Select parameters to add to the label. Parameters will be combined into a single label. Enter sample values to represent this label in the family environment.									
Category Parameters			La	oel Parameters					
Select available fields from:				Parameter Name	Spaces	Prefix	Sample Value	Suffix	Break
Structural Framing			1	Type Name	1		1i		
OmniClass Title		$ \simeq $	- 2	TSDI_Part_Mark	1		TSDI_Part_Mark		
Reference Level Elevation	<u>^</u>	-	3	TSDI_Matl	1		TSDI_Matl		
Section Shape			4	Number of studs	1		Number of studs		
Start Extension Start Join Cutback		- -	5	TSDI_Trans_Reinf	1		TSDI_Trans_Reinf		
Start Level Offset		f_x							
Start y Justification Start y Offset Value									
Start z Justification									
Start z Offset Value									
Structural Material TSDI_Matl									
TSDI_Part_Mark									
TSDI Trans Reinf	~		÷						
1			1	E ₽E ₽ [®] <i>f</i> ₹					
			٦	Move parameter up		ОК	Cancel	A	pply

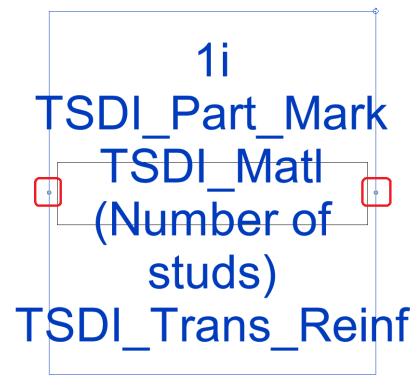
Add prefix and suffix information to help break up the data in the tag:

- TSDI_Part_Mark : Suffix of a single space character
- TSDI_Matl :

Number of Studs:

Suffix of a single space character Prefix of ((open brackets character), suffix of) (close brackets character)

Click **OK** when all data has been set-up to return to the main Revit screen. As the width of the tag will be too small to fit all of the data without truncation occurring, click and drag either of the grip points to expand the box.



The lines that denote the width of the Boxed option of the tag may also be deleted if required. (NB: The **Boxed** option itself can be deleted by using the **Family Types** command if required)

TSDI_Part_Mark 1i TSDI_Matl (Number of studs) TSDI_Trans_Reinf

The style of the tag can be altered by highlighting the label entry but this time using the **Edit Type** command that is held in the properties dialog.

Properties	×
Label standard	-
Structural Framing Tags (1)	~ ि Edit Type
Graphics	
Sample Text	FyMax = Result_StartVShearMax
Label	Edit
Wrap between parameters only	
Horizontal Align	Center
Vertical Align	Middle
Keep Readable	
Visible	
Properties help	Apply

The dialog for the **Type Properties** will show the various settings governing the size, color and font of the tag itself. Any of these settings can be altered to suit your own company requirements. Make any changes required and then click **OK** when done.

The Tag family can then be saved by using the **Save As** family option and choosing a suitable filename and location. We would recommend the use of prefixing all user created families with a company reference so that they can be easily differentiated from the default Autodesk content held in the model template.

The tag can be loaded into the model (or template) using the **Load Family** command (**Insert** tab) and then placed by using commands such as **Tag by Category** or **Beam Annotations**.

7.4.1 Variations

The preceding notes cover the creation of a tag showing a large amount of information within a single tag. It may be that two tags are preferred on plan drawings (one above the member and one below), if this is preferred simply follow the same guidance but create two separate tag families.

One family would contain the part mark information whilst the other family contains the remainder of the information. These two tags can then be placed on drawing views using the **Beam Annotations** command or similar.

For more general tags that simply show the Tekla Structural Designer part mark and the Type Name, follow the preceding notes but only include the parameters **TSDI_Part_Mark** and **Type Name** within the Label Parameters window. This style of tag may be suitable for steel bracing along with steel and concrete beams where more information can be shown in a schedule (see separate section on how to generate schedules containing Tekla Structural Designer information).

7.5 Creating a Wall tag indicating the Wall Name reference

This example will cover how to set up a Wall tag that can then be used to show the Tekla Structural Designer Wall Name reference on drawing views. We would usually recommend using a predefined Autodesk Wall tag and alter this to suit. Suitable tags include:-

- USA Imperial
 - C:\ProgramData\Autodesk\RVT 2019\Libraries\US Imperial\Annotations\Architectural\Wall Tag.rfa
- UK
 - C:\ProgramData\Autodesk\RVT 2019\Libraries\UK\Annotations\Tags\Anno_Tag_Wall_Type_Mark.rfa
 South East Asia
- C:\ProgramData\Autodesk\RVT 2019\Libraries\South Asia\Annotations\Architectural\Wall Tag.rfa Please note the different filename for the UK content.

To begin, click on **Open**, browse to the correct path as shown above and open the file **Wall Tag.rfa** (or **Anno_Tag_Wall_Type_Mark.rfa** for UK content)

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Open (Ctrl+O)	Annotate Analyze Massing & Site						
	1=grator						
Opens a project, family, annotation, or template file.	lw.						
Use the file browser to navigate to the folder containing the file.	votes						
Press F1 for more help							

Firstly, click to select the contents of the current tag label, and then using the option **Edit Label** from the ribbon to alter the contents.

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File Create Ir	nsert View	Manage	Add-Ins	Quantificati	on	Site Designer	BIM Inter	operability	Tools	Tekla Int	egration	Modify Label
Modify Select • Propertie			ut + 🕅 in + 🙄 + eometry	₽ ₽ ₽	⊨ [} (······································		Edit Label		Load into Project and Close mily Editor
Modify Label						Edit Label						
Properties				×	5	Modifies the o	default text	that displa	ys in a ne	ote.		
Label 3mm						Press F1 for r	nore help					
Wall Tags (1)			~	Edit Type								
Graphics				\$								
Sample Text		1t										
Label			Edit									
Wrap between paran	meters only										Г	
Horizontal Align		Center										
Vertical Align		Middle										
Keep Readable Visible		☑ ☑										
VISIOIC												

Remove the existing **Type Mark** entry from the **Label Parameters** window by selecting the line and then using the **Remove parameter from label** option.

Edit Label					?	×	(
Select parameters to add to the label. Parameter Enter sample values to represent this label in the	family environment.			Wrap betwee	n paramete	ers only	
Category Parameters Select available fields from:	Label Parameters Parameter Name	Spaces	Prefix	Sample Value	Suffix	Break	
Walls Description Family Name Fire Rating Heat Transfer Coefficient (U) IfcGUID Length Manufacturer Mark Model Roughness Structural Material Thermal Resistance (R) Tvpe Comments	1 Type Mark			1t			
*	te ↓e #™ <i>f</i> _e >						
			ОК	Cancel	Aj	oply	

The parameters that we need to show within the tag are written into the family properties as a part of the integration process.

Because of this, the labels do not exist within the default Revit parameters available to be included within a family. We will need to load in the parameters that we will need to use within the tag. Click **Add Parameter** to add in a new label entry.

Edit Label				? ×
Select parameters to add to the label. Parameters will	e combined into a single label.			
Enter sample values to represent this label in the family	environment.		Wrap between	n parameters only
Category Parameters	Label Parameters			
Select available fields from:	Parameter Name	Spaces Prefix	Sample Value	Suffix Break
Walls \vee				
Family Name Fire Rating Heat Transfer Coefficient (U)				
	te ∔e # ^{sa} f _i			
Add Parameter		OK	Cancel	Apply

Adding a new parameter will access the **Parameter Type** dialog, click on the option to **Select** a shared parameter.

Parameter Properties	×
Parameter Type	
Shared parameter	
(Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags)	
Select Export	Ľ,
Parameter Data	
Name:	
<no parameter="" selected=""></no>	
Discipline:	
~	
Type of Parameter:	
~ ~	
OK Cancel Help	

The next dialog **Shared Parameters** will show a list of all available parameters from the TSD Integrator Parameter Group.

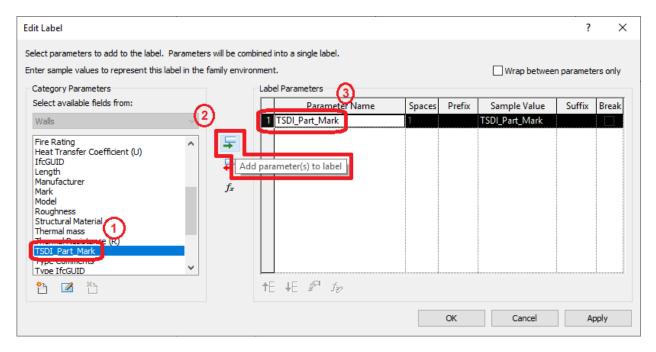
Click on the entry for **TSDI_Part_Mark** to highlight and then click **OK**.

Shared Parameters		\times
Choose a parameter group, and a parameter.		
Parameter group:		
TSD Integrator	\sim]
Parameters:		
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_D TSDI_Integration_Status TSDI_Manufacturer TSDI_Matu TSDI_Matu TSDI_Not_Converted TSDI_Not_Converted TSDI_Not_Converted TSDI_Not_ TSDI_Part_Mark TSDI_Part_Mark TSDI_Deference TSDI_Size TSDI_Size TSDI_Size TSDI_Trans_Reinf TSDI_Type	*	Edit
OK Cancel		Help

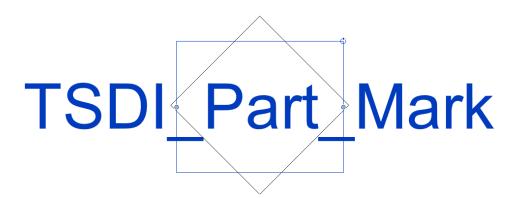
Choose OK also on the Parameter Type dialog to return to the main Edit Label dialog.

The parameter **TSDI_Part_Mark** will now be shown in the list of available **Category Parameters** to the left hand side of the dialog.

Highlight the parameter and then use the **add** button, (or simply double click on the name) to add the entry into the list of label parameters on the right hand side of the dialog.



Click **OK** when all data has been set-up to return to the main Revit screen.



The style of the tag can be altered by again highlighting the label entry but this time using the **Edit Type** command that is held in the properties dialog.

Properties	×
Label 3mm	-
Wall Tags (1)	↓ 🖓 Edit Type
Graphics	×
Sample Text	TSDI_Part_Mark
Label	Edit
Wrap between parameters only	
Horizontal Align	Center
Vertical Align	Middle
Keep Readable	
Visible	
Properties help	Apply

The dialog for the **Type Properties** will show the various settings governing the size, color and font of the tag itself. Any of these settings can be altered to suit your own company requirements. Make any changes required and then click **OK** when done.

The Tag family can then be saved by using the **Save As** family option and choosing a suitable filename and location. We would recommend the use of prefixing all user created families with a company reference so that they can be easily differentiated from the default Autodesk content held in the model template.

As the tag is now complete and saved, you can **Exit** out of the family and return to your main model. The tags can be loaded into the model (or template) using the **Load Family** command (**Insert** tab) and then placed by using commands such as **Tag by Category** or **Tag All**.

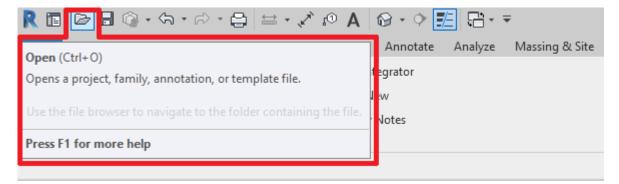
7.6 Creating a Floor tag which shows the Slab Name reference

This example will cover how to set up a Floor tag that can then be used to show the Tekla Structural Designer Slab Name reference on drawing views. We would usually recommend using a predefined Autodesk Floor tag and alter this to suit. Suitable tags include:-

- USA Imperial
 - C:\ProgramData\Autodesk\RVT 2019\Libraries\US Imperial\Annotations\Architectural\Floor Tag.rfa
- UK
 - C:\ProgramData\Autodesk\RVT 2019\Libraries\UK\Annotations\Tags\Anno_Tag_Floor.rfa
- South East Asia

C:\ProgramData\Autodesk\RVT 2019\Libraries\South Asia\Annotations\Architectural\Floor Tag.rfa Please note the different filename for the UK content.

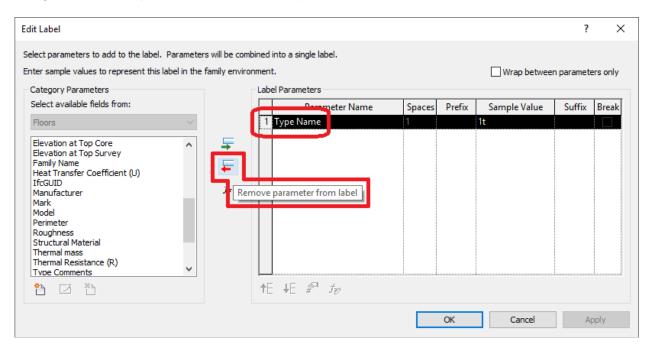
To begin, click on **Open**, browse to the correct path as shown above and open the file **Floor Tag.rfa** (or **Anno_Tag_Floor.rfa** for UK content)



Firstly, click to select the contents of the current tag label, and then using the option **Edit Label** from the ribbon to alter the contents.

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File Create Insert View	Manage Add-Ins	Quantification	Site Designer	BIM Interoperabilit	y Tools 🛛 Tekla	Integration Modify Label
Modify Properties Clipbo	Cut + 5 Join + 6	₽ ₽ ₽				el Project Project and Clos
	ard Geometry		Edit Label	medaan	Ldi	
Modify Label			Mar IC and have	والمراجع والمحاصر والمحاصر والمراجع	in a mate	
Properties		×	iviodifies the	default text that displ	ays in a note.	<u>-</u>
Label 3mm		-	Press F1 for i	more help		
Floor Tags (1)	~ {	🗟 Edit Type				
Graphics		*				
Sample Text	1t					
Label	Edit					
Wrap between parameters only						
Horizontal Align	Center					
Vertical Align	Middle					
Keep Readable						
Visible						

Remove the existing **Type Mark** entry from the **Label Parameters** window by selecting the line and then using the **Remove parameter from label** option.



The parameters that we need to show within the tag are written into the family properties as a part of the integration process.

Because of this, the labels do not exist within the default Revit parameters available to be included within a family. We will need to load in the parameters that we will need to use within the tag. Click **Add Parameter** to add in a new label entry.

Edit Label							?	×
Select parameters to add to the label. Pa			single label.			_		
Enter sample values to represent this labe	l in the family enviro					Wrap betwee	n paramet	ers only
Category Parameters		Label Par	ameters					
Select available fields from:			Parameter Name	Spaces	Prefix	Sample Value	Suffix	Break
Floors		1 Туре	2 Name	1		1t		
Elevation at Top Core Elevation at Top Survey Family Name Heat Transfer Coefficient (U) IfcGUID Manufacturer Mark Model Perimeter Roughness Structural Material Thermal Mass Thermal Resistance (R) Tupe Comments	▲ ★ <p< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></p<>							
1 I I		tE ∔	# <i>f_V</i>					
Add Parameter					OK	Cancel	A	pply

Adding a new parameter will access the **Parameter Type** dialog, click on the option to **Select** a shared parameter.

Parameter Properties	\times
Parameter Type	
Shared parameter	
(Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags)	
Select Export	
Parameter Data	
Name:	
<no parameter="" selected=""></no>	
Discipline:	
\sim	
Type of Parameter:	
\sim	
OK Cancel Help	

The next dialog **Shared Parameters** will show a list of all available parameters from the TSD Integrator Parameter Group.

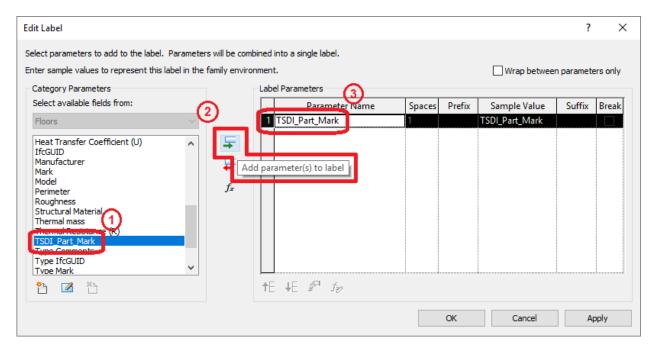
Click on the entry for **TSDI_Part_Mark** to highlight and then click **OK**.

Shared Parameters		\times
Choose a parameter group, and a parameter.		
Parameter group:		
TSD Integrator	\sim]
Parameters:		
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_D TSDI_Integration_Status TSDI_Manufacturer TSDI_Matu TSDI_Matu TSDI_Not_Converted TSDI_Not_Converted TSDI_Not_Converted TSDI_Not_ TSDI_Part_Mark TSDI_Part_Mark TSDI_Deference TSDI_Size TSDI_Size TSDI_Size TSDI_Trans_Reinf TSDI_Type	*	Edit
OK Cancel		Help

Choose OK also on the Parameter Type dialog to return to the main Edit Label dialog.

The parameter **TSDI_Part_Mark** will now be shown in the list of available **Category Parameters** to the left hand side of the dialog.

Highlight the parameter and then use the **add** button, (or simply double click on the name) to add the entry into the list of label parameters on the right hand side of the dialog.



Click **OK** when all data has been set-up to return to the main Revit screen.



The style of the tag can be altered by again highlighting the label entry but this time using the **Edit Type** command that is held in the properties dialog.

Properties	X
Label 3mm	-
Floor Tags (1)	~ 🖓 Edit Type
Graphics	
Sample Text	TSDI_Part_Mark
Label	Edit
Wrap between parameters only	
Horizontal Align	Center
Vertical Align	Middle
Keep Readable	
Visible	
Properties help	Apply

The dialog for the **Type Properties** will show the various settings governing the size, color and font of the tag itself. Any of these settings can be altered to suit your own company requirements. Make any changes required and then click **OK** when done.

The Tag family can then be saved by using the **Save As** family option and choosing a suitable filename and location. We would recommend the use of prefixing all user created families with a company reference so that they can be easily differentiated from the default Autodesk content held in the model template.

As the tag is now complete and saved, you can **Exit** out of the family and return to your main model. The tags can be loaded into the model (or template) using the **Load Family** command (**Insert** tab) and then placed by using commands such as **Tag by Category** or **Tag All**.

7.7 Setting tags as default within your company template

After creating and saving a number of tags to suit the content imported from Tekla Structural Designer, you may want to load these into your active project, or into your company template for use on future projects.

Loading the tag families can be performed using the Load Family command (held on the Insert tab).

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↓ Modit	y Link Link Revit IFC	Link Link	DWF Decal Point Markup Cloud	Coordination Man Model Lin	age Import Impo		Manage Load Images Family	
Select	-		Link			Import	N Loading	Library
Proper	ies			× 🔓 3D Isomet	Load	Family s a Revit family into the	e current file.	_
6	3D View			•	Press	s F1 for more help		

Once the tags have been loaded into the project or template, you can set the default tags to be used by clicking on the **Loaded Tags and Symbols** command (**Tag** submenu of the **Annotate** tab).

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Annota	te Ar	nalyze	Massin	g & Site	Collaborate	View	Manage	Add-Ins	Quan	tification	Site D	esigner	BIM In	teroperability Tools	Tekla Integration	Modify	Precast	•
	G Spot ordinate	Spot Slope	Detail Line	Region	Component	Revisio		Insulation	A Text		Find/ Replace	Tag by Category	Tag All	Beam Annotatio		🤌 Trea		[¹ 0 Keynote
	Detail Text																	
×									And Symbols	Tag 1								
lit Type					L	Press F1	for more	help						Click to e	expand the m	enu		

Within the **Loaded Tags and Symbols** dialog, you can browse to each of the required lines and simply use the drop down available under the **Loaded Tags** option to flag your created tag family as being the default tag to be used.

Loaded Tags And Symbols		×								
Select an available Tag or Symbol Family fo	r each Family Category listed									
Note: Multi-Category Tag Families are not s	Note: Multi-Category Tag Families are not shown below.									
Filter list: <show all=""></show>		Load Family								
Category	Loaded Tags	Loaded Symbols 🔺								
Supports										
Structural Area Reinforcement	M_Area Reinforcement Tag	M_Area Reinforcement								
Structural Beam Systems	M. Church and Desire Cystems T-									
Structural Columns	Trimble - M_Structural Colum	•								
Structural Connections										
Structural Fabric Reinforcement	M_Fabric Sheet Tag	M_Fabric Sheet Symbol								
Structural Foundations	M Structural Foundation Tag									
Structural Framing	Trimble - M_Structural Framin									
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Internal Area Loads										
Internal Line Loads										
Internal Doint Loads		×								
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	ОК Са	ancel Help								
	ОК Са	ancel Help								

When you have set all of the information required, click **OK** to exit the dialog.

8 Appendix B: Creating Schedules to suit Tekla Structural Designer content.

The following section covers how to generate schedules that then show information being populated from Tekla Structural Designer. There are a number of examples which follow but the basic principle of creating the schedule is very similar.

The examples provided here are not exhaustive and you can use the information listed to generate schedules to suit your own company standards if required.

Please note that the following examples have been generated to suit a particular drawing style and may not meet the requirements of any particular company or standard.

8.1 Creating a Composite Floor Schedule

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).

<u>/</u> 5	<u> </u>				Autoo	lesk Revit 20	19.2 - N	ot For Resa	le Version ·	- Project1 - S	chedule: TS	6D Composite	Floor So	hedule:	
Ana	lyze IV	lassing &	Site	Collaborat	te View	Manage	Add-	Ins Qua	ntification	Site Desig	ner BIM	l Interoperabil	ity Tools	Tekl	a Integr
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Cut Profile	Render	Render in Cloud		-	Section		Plan Views	Elevation	Drafting View	Duplicate View	Legends *	Schedules	Scope Box	Sheet	View
К	Pr	esentatio	n						Create	Sche	dule/Quan	tities			
				Sched	ule/Quan	tities				Grap	hical Colur	mn Schedule			
			Create	s a key scł	nedule or a se	chedule	of building	componer		erial Takeof	f				
				Press	F1 for mo	re help									
				_						LE Shee	t List				
										Note	Block				
										View	List				

After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Floors** from the **Category** list and set the name as being **TSD Composite Floor Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule	×
Filter list: <show all=""> ~</show>	2
Category:	Name:
Electrical Circuits	TSD Composite Floor Schedule
Electrical Fixtures	Schedule building components
Entourage Fire Alarm Devices	◯ Schedule keys
Fire Alarm Devices	Key name:
€ Floors	Phase:
Furniture Systems	New Construction \checkmark
Generic Models ⊕ Grids	
< >	
	3
ОК	Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedule Properties				×
Fields Filter Sorting/Grouping	Formatting	Appearance		
Select available fields from:				
Floors	~			
Available fields:			Scheduled fields (in order):	
Absorptance Area	^	—		
Assembly Code Assembly Description		+		
Assembly Name				
Comments Core Thickness				
Cost Count				
Default Thickness Description		*		
Elevation at Bottom Core Elevation at Bottom Survey				
Elevation at Top Core	New	parameter		
Elevation at Top Survey	¥			
2 °			∥" 🎦 🕇 🕂 E 📲 E	
Include elements in links				
		[OK Cancel	Help

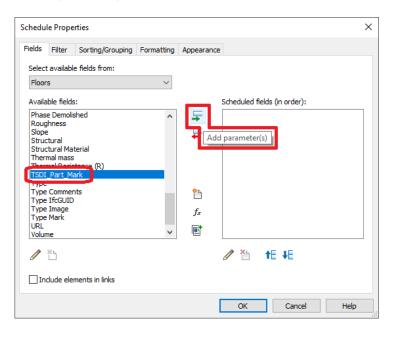
On the **Parameter Properties** dialog, choose to use a **Shared Parameter** and then click on **Select**.

Parameter Properties	×
Parameter Type Project parameter (Can appear in schedules but not in tags)	
 Shared parameter (Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags) 	
Select. Exp	ort
Parameter Data Name:	
<no parameter="" selected=""> O Type</no>	
Discipline: O Instance	
\sim	
Type of Parameter: Values are aligned per group type	e
○ Values can vary by group instance	e
Group parameter under:	
Dimensions ~	
Tooltip Description: <no a="" custom="" description,="" edit="" parameter="" th="" this="" to="" tool<="" tooltip="" tooltip,="" write=""><th>tips hav, , ,</th></no>	tips hav, , ,
Add to all elements in the category	Help
Cancer	nap

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters		×
Choose a parameter group, and a parameter.		
Parameter group:		
TSD Integrator	\sim	
Parameters:		
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_ID TSDI_Integration_Status TSDI_Maufacturer TSDI_Matl TSDI_Not_Converted TSDI_Part_Mark TSDI_Part_Mark TSDI_Size TSDI_StartConn TSDI_StartConn TSDI_Trans_Reinf TSDI_Type	~	Edit
OK Cancel		Help

With the TSDI_Part_Mark parameter now loaded into the schedule and listed in the Available Fields window, click to highlight and then use the Add parameter(s) command to place it into the Scheduled fields (in order) window.



Repeat the same commands to add the following parameters in the following order:

(NB. Positions of parameters can be adjusted by using the Move Parameter Up and Move Parameter Down commands held underneath the Scheduled fields... window).

- TSDI_Part_Mark •
 - : (TSD Integrator parameter group) **Elevation at Top**
- Level •

•

- **Elevation at Bottom** •
- : (Revit parameter should already be available to select) : (Revit parameter - should already be available to select)
- : (Revit parameter should already be available to select)

TSDI_Type •

: (TSD Integrator parameter group)

The next parameter to be included is the **Thickness** of the floor element. As this parameter is not available from either the default Revit content or the imported data from Tekla Structural Designer we will calculate the value.

Click on the Add calculated parameter command.

Schedule Properties		×
Fields Filter Sorting/G	Formatting	Appearance
Select available fields fro	m:	
Floors	~	
Available fields:		Scheduled fields (in order):
Model Perimeter Phase Created Phase Demolished Roughness Slope Structural Material Thermal Resistance (R) TSDI_Alias TSDI_Check_ID TSDI_Design_Grp TSDI_Detail_Grp TSDI_Detail_Grp		TSDI_Part_Mark Elevation at Top Level Elevation at Bottom TSDI_Type
/ *b		✓ TE +E
Include elements in lin	ks	
		OK Cancel Help

Set the Calculated Value as following (keep values at default unless noted below):

- Name : Thickness ٠
 - Formula: Elevation at Top-Elevation at Bottom.
 - o (NB: Using the ... button will allow the quick selection of the two Elevation parameters, rather than manually typing the name)

Calculated	d Value $ imes$
Name:	Thickness
Forr	nula OPercentage
Discipline:	Common ~
Type:	Number ~
Formula:	'ation at Top-Elevation at Bottom
ОК	Cancel Help

Click OK when the information has been set up and it will then be added to the list of Scheduled fields.

Complete the Scheduled fields window by adding another 5 parameters:

TSDI Matl •

•

: (TSD Integrator parameter group)

Volume

- : (Revit parameter should already be available to select) : (TSD Integrator parameter group)
- **TSDI Manufacturer** •
- TSDI_Reference •
- **TSDI** Dim •

- : (TSD Integrator parameter group)
- : (TSD Integrator parameter group)

Schedule Properties				×
Fields Filter Sorting/Grouping	Formatting	Appearance		
Select available fields from:				
Floors	\sim			
Available fields:			Scheduled fields (in order):	
Absorptance Area Assembly Code Assembly Description Assembly Name Comments Core Thickness Cost Count Default Thickness Description Elevation at Bottom Core Elevation at Bottom Survey Elevation at Top Core Elevation at Top Survey	~		TSDI_Part_Mark Elevation at Top Level Elevation at Bottom TSDI_Type Thidness TSDI_Matl Volume TSDI_Manufacturer TSDI_Reference TSDI_Dim	
Include elements in links				
		l	OK Cancel Help	

With the fields now set, we can set the filters so that only Composite Floor slabs are included in our schedule. Click on the **Filter** tab.

Run through the dialog to set the following filters:-

- Filter 1
 - Filter by : **TSDI_Type**
 - Action : equals
 - Search term : COMP_SLAB

Filter by: TSDI_Type equals COMP_SLAB And: (none) And: (none) And: (none) And: (none) And: (none) And: (none) And: (none) And: (none) And: (none) And: (none)	chedule Prope	erties					>
And: (none) And: (none) And: (none) And: (none) And: (none) <	Fields Filter	Sorting/Grouping	Formatting	Appearance			
And: (none)	Filter by:	TSDI_Type	\sim	equals	~	COMP_SLAB	~
And: (none) And: (none) And: (none) And: (none) And: (none)	And:	(none)	\sim		\sim		\sim
And: (none) V V V	And:	(none)	\sim		\sim		\sim
And: (none) V V V	And:	(none)	\sim		\sim		\sim
And: (none) V	And:	(none)	\sim		\sim		\sim
	And:	(none)	\sim		\sim		\sim
And: (none)	And:	(none)	\sim		\sim		\sim
	And:	(none)	\sim		\sim		\sim
				Г	OK	Cancel	Help

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following actions:

- Sort by : **TSDI_Type**
 - Ascending order
- Then by : Level
 - Ascending order
- Then by : TSDI_Part_Mark
 - Ascending order

Do not select the **Grand totals** option Keep the **Itemize every instance** option enabled.

Schedule Prope	rties						×
Fields Filter	Sorting/Grouping	Formatting	Appearance				
Sort by:	TSDI_Type		~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	Level		~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	TSDI_Part	Mark	~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Grand total	s:		\sim				
	Custom gra	nd total title:					
	Grand tota	Grand total					
Itemize eve	ery instance						
			E	ОК	Car	ncel He	lp .

Access the **Formatting** tab and make the following changes:

• TSDI_Part_Mark	
• Heading :	Part Mark
• Alignment :	Center
Elevation at Top	
 Hidden Field: 	Enabled
Level	
 Alignment : 	Center
 Elevation at Bottom 	
 Hidden Field: 	Enabled
 TSDI_Type 	
 Heading : 	Slab Type
 Alignment : 	Center
Thickness	
 Alignment : 	Center
TSDI Mati	
\circ^{-} Heading :	Material
 Alignment : 	Center
Volume	
 Alignment : 	Center
TSDI Manufacturer	
\circ Heading :	Decking Manufacturer
 Alignment : 	Center
• TSDI_RC_Cover	Conton
• Heading :	Decking Profile
 Alignment : 	Center
• TSDI Dim	Conter
=	Docking Gaugo
	Decking Gauge Enabled
• Hidden Field:	Endpieu

Schedule Properties		×
Fields Filter Sorting/Grouping Fields:	Formatting Appearance	
	OK Cancel Help	

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

Once you are happy with the contents and the format of the schedule, click **OK**.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

8.2 Creating a Concrete Beam Schedule (English: United Kingdom option)

(Please use these instructions if your Tekla Structural Designer software is set to use English: United Kingdom language format) From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).

<u>/</u> 5	<u>1</u> - ∓				Autod	esk Revit 2	019.2 - N	lot For Res	ale Version	- Project1 - S	chedule: TS	D Composite	Floor Sc	hedule	
Anal	lyze N	/lassing 8	Site	Collaborat	e View	Manage	e Add	-Ins Qu	antification	Site Desig	jner BIM	l Interoperabil	ity Tools	Tek	la Integr
		Ż		\bigotimes	9	Ő	G			F			°∰		
Cut Profile	Render	Render in Cloud		-	Section	Callout •	Plan Views	Elevation •	Drafting View	Duplicate View	Legends *	Schedules	Scope Box	Sheet	View
ы	Ρ	resentatio	n						Create	Sche	edule/Quan	tities			
				Sched	ule/Quant	ities				Grap	hical Colur	nn Schedule			
				Creates	s a key sch	edule or a s	schedule	of building	g componer		erial Takeof	f			
				Press F	1 for mo	re help				1					
										Shee	et List				
										Note	e Block				
										View	/ List				
										L			1		

After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Structural Framing** from the **Category** list and set the name as being **TSD Concrete Beam Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule	×
Filter list: <show all=""></show>	Name: 2
Sprinklers Structural Area Reinforcem Structural Beam Systems Structural Columns Structural Connections Structural Fabric Areas Structural Fabric Reinforcem. Structural Framing Structural Framing Structural Internat Loads Structural Loads	TSD Concrete Beam Schedule
ОК	3 Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedule Properties					×
Fields Filter Sorting/Gro	ouping Formatting	Appearance			
Select available fields from:					
Structural Framing	\sim				
Available fields:		1	Scheduled f	ields (in order):	
A Assembly Code Assembly Description Assembly Name Camber Size Coating Comments Cost Count Cross-Section Rotation Description Elevation at Bottom Elevation at Bottom Elevation at Top End Extension End Join Cutback	~	↓ ↓ ↓ New	parameter]	
/ *b			/ "D	te te	
Include elements in links	;				
		[OK	Cancel	Help

On the **Parameter Properties** dialog, choose to use a **Shared Parameter** and then click on **Select**.

Parameter Properties	×					
Parameter Type O Project parameter (Can appear in schedules but not in tags)						
Shared parameter (Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags)						
Select. Export						
Parameter Data Name:						
<no parameter="" selected=""> O Type</no>						
Discipline: O Instance						
Type of Parameter: Values are aligned per group type 						
✓ Values can vary by group instance						
Group parameter under:						
Dimensions						
Tooltip Description: <no a="" custom="" description.="" edit="" hav<="" parameter="" th="" this="" to="" tooltip="" tooltip.="" tooltips="" write=""><th></th></no>						
Add to all elements in the category OK Cancel Help						

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters	×
Choose a parameter group, and a parameter.	
Parameter group:	
TSD Integrator \checkmark	
Parameters:	
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_Ibregration_Status TSDI_Manufacturer TSDI_Maufacturer TSDI_Matt TSDI_Not_Converted TSDI_Not_Converted TSDI_Size TSDI_Size TSDI_StartConn TSDI_Trans_Reinf TSDI_Type	
OK Cancel Help	

With the **TSDI_Part_Mark** parameter now loaded into the schedule and listed in the **Available Fields** window, click to highlight and then use the **Add parameter(s)** command to place it into the **Scheduled fields (in order)** window.

Schedu	le Prope	rties				×
Fields	Filter	Sorting/Grouping	Formatting	Appearance		
Select	t available	e fields from:				
Struc	tural Fra	ming	~			
Availa	ble fields			_	Scheduled fields (in order):	
	Extension		^			^
Start	Level Of	ffset				
Start	y Justifi y Offset	t Value		Add	parameter(s)	
Start	z Justific z Offset	Value				
Charles and	tural Ma					
170				<u>*</u>		
Type Type	Commer IfcGUID	nts		f_x		
	Image Mark		~			~
	‰ъ,					
In	clude elei	ments in links				
				1	OK Cancel	Help
					Cancer	nep

Repeat the same commands to add the following parameters in the following order: (NB. Positions of parameters can be adjusted by using the Move Parameter Up and Move Parameter Down commands held underneath the Scheduled fields... window).

- **TSDI Part Mark** •
- Type •
- TSDI_Matl •
- Length •
- **Cut Lenath** •
- **TSDI Note** •
- TSDI_RC_Top •
- TSDI_RC_Bottom •
- **TSDI RC Links** •
- TSDI_RC_Cover •
- •

- : (TSD Integrator parameter group)
- : (Revit parameter should already be available to select)
- : (TSD Integrator parameter group)
- : (Revit parameter should already be available to select)
- : (Revit parameter should already be available to select)
- : (TSD Integrator parameter group)
 - : (TSD RC Information parameter group)
- **TSDI** Type
- : (TSD Integrator parameter group)

With the fields now set, we can set the filters so that only Concrete Beams are included in our schedule. Click on the Filter tab.

Run through the dialog to set the following filters:-

- Filter 1
 - Filter by : TSDI Matl 0
 - Action : contains 0
 - Search term : C
- Filter 2
 - Filter by : TSDI_Type 0
 - Action : does not contain 0
 - Search term : PILE 0
- Filter 3
 - Filter by : TSDI_Matl 0
 - Action : does not contain 0
 - 0 Search term : **Tbr**
- Filter 4
 - Filter by : TSDI_Matl 0
 - Action : does not contain 0
 - Search term : A \circ

Schedule Prop						>
Fields Filter	Sorting/Grouping	Formatting	Appearance			
Filter by:	TSDI_Matl	\sim	contains	~	C	
And:	TSDI_Type	\sim	does not contain	\sim	PILE	
And:	TSDI_Matl	~	does not contain	\sim	Tbr	
And:	TSDI_Matl	\sim	does not contain	\sim	A	
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following action:

- Sort by : TSDI_Part_Mark
 - Ascending order

Do not select the **Grand totals** option Keep the **Itemize every instance** option enabled.

Schedule Properties	5						×
Fields Filter So	rting/Grouping For	matting	Appearance				
Sort by:	TSDI_Part_Mar	·k	~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		Obescending	
Header	Footer:				\sim	Blank line	
Grand totals:			~				
	Custom grand t	otal title:					
	Grand total	Grand total					
Itemize every in	nstance						
			E	ОК	Ca	ncel Help	

Access the Formatting tab and make the following changes:

- TSDI_Part_Mark
 - Heading : Part Mark
 - Alignment : Center
- Type
 - Heading : Size
 - Alignment : Center
- TSDI_Matl
 - Heading : Material
 - Alignment : Center
- Length

•

- Alignment : Center
- Cut Length
 - Alignment : Center
- TSDI_Note
 - Heading : Notes
 - Alignment : Center
- TSDI_RC_Top
 - Heading : Rebar in Top
 - Alignment : Center
- TSDI_RC_Bottom
 - Heading : **Rebar in Bottom**
 - Alignment : Center

- TSDI_RC_Links
 - Heading : Rebar Links
 - Alignment : Center
- TSDI_RC_Cover
 - Heading : Designed Cover
 - Alignment : Center
- TSDI_Type
 - Hidden Field: Enabled

Schedule Properties	×	;
Fields Filter Sorting/Grouping Formatting Appearance		
	V Id Format	
OK Can]

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

Once you are happy with the contents and the format of the schedule, click **OK**.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

8.3 Creating a Concrete Beam Schedule (English: United States option)

(Please use these instructions if your Tekla Structural Designer software is set to use English: United States language format)

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).

<u>/</u> 5	<u></u> + ∓				Autoo	lesk Revit 2	019.2 - N	lot For Resa	le Version ·	- Project1 - S	chedule: T	SD Composite	Floor Sc	hedule	
Ana	lyze N	lassing &	Site	Collaborat	e View	Manage	e Add	-Ins Qua	ntification	Site Desig	iner BIN	1 Interoperabil	ity Tools	Tekl	la Integr
		Ż		\mathbf{i}	9	0°	G			F			•∰	^	b
Cut Profile	Render	Render in Cloud		-	Section	Callout	Plan Views	Elevation •	Drafting View	Duplicate View	Legends *	Schedules	Scope Box	Sheet	View
к	Pi	esentatio	n						Create	Sche	edule/Quar	ntities			
				Create	ule/Quan 5 a key sch 1 for mo	nedule or a	schedule	of building	componer	nts. Matu Matu Shee	vhical Colu erial Takeof et List e Block / List	mn Schedule ff			

After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Structural Framing** from the **Category** list and set the name as being **TSD Concrete Beam Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule	×
Filter list: <show all=""> <</show>	2
Category:	Name:
Sprinklers	TSD Concrete Beam Schedule
Stairs Structural Area Reinforcem Structural Beam Systems Structural Columns Structural Connections Structural Fabric Areas Structural Fabric Reinforcem. Structural Fabric Reinforcem. Structural Framing Structural Framing	Schedule building components Schedule keys Key name: Phase: New Construction
ini Structural Loads ✓ < >	
ОК	3 Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedul	e Prope	rties					×
Fields	Filter	Sorting/Grouping	Formatting	Appearance			
	available tural Fra	e fields from: mina	~				
A Asser	ble fields	le	^	₽	Scheduled f	ields (in order):	
Asser	nents			4			
Coun Cross Descr Eleva Eleva	t	op		ک New	parameter		
	loin Cutb	ack	¥		/ *b	te ∔e	
🗌 Inc	lude eler	ments in links					
				[OK	Cancel	Help

On the Parameter Properties dialog, choose to use a Shared Parameter and then click on Select.

Parameter Properties	×							
Parameter Type Project parameter (Can appear in schedules but not	t in tags)							
 Shared parameter (Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags) 								
	Select. Export							
Parameter Data Name:								
<no parameter="" selected=""></no>	○ Туре							
Discipline:	○ Instance							
Type of Parameter:	Values are aligned per group type							
	Values can vary by group instance							
Group parameter under:								
Dimensions	~							
Tooltip Description: <no description,="" edit="" para<="" td="" this="" tooltip=""><td>ameter to write a custom tooltip. Custom tooltips hav,,</td></no>	ameter to write a custom tooltip. Custom tooltips hav,,							
Add to all elements in the category								
	OK Cancel Help							

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters		×
Choose a parameter group, and a parameter.		
Parameter group:		
TSD Integrator	\sim	
Parameters:		
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_Integration_Status TSDI_Manufacturer TSDI_Matl TSDI_Matl TSDI_Part_Mark TSDI_Part_Mark TSDI_Size TSDI_Size TSDI_Size TSDI_StartConn TSDI_Trans_Reinf TSDI_Type	<	Edit
OK Cancel		Help

With the **TSDI_Part_Mark** parameter now loaded into the schedule and listed in the **Available Fields** window, click to highlight and then use the **Add parameter(s)** command to place it into the **Scheduled fields (in order)** window.

Schedu	le Prope	rties				×
Fields	Filter	Sorting/Grouping	Formatting	Appearance		
Select	t availabl	e fields from:				
Struc	tural Fra	ming	~			
Start	ble fields Extensio	n	^	F	Scheduled fields (in order):	^
Start	: Join Cut : Level O : y Justifi	ffset		4 Add	parameter(s)	
Start	y Offse z Justifi z Offset	cation				
Struc	tural Ma	terial				
Type	Part_M			*		
Type	Commer IfcGUID			f_x		
	Image Mark		~	ē		v
Ø	×>				🥒 造 🛛 🕇 🗜	
In	dude ele	ments in links				
					OK Cancel	Help

Repeat the same commands to add the following parameters in the following order: (NB. Positions of parameters can be adjusted by using the Move Parameter Up and Move Parameter Down commands held underneath the Scheduled fields... window).

- **TSDI Part Mark** •
- Type •
- TSDI_Matl •
- Length •
- **Cut Lenath** •
- **TSDI Note** •
- TSDI_RC_Top •
- TSDI_RC_Bottom •
- TSDI_RC_Stirrups •
- TSDI_RC_Cover •

- : (TSD Integrator parameter group)
- : (Revit parameter should already be available to select)
- : (TSD Integrator parameter group)
- : (Revit parameter should already be available to select)
- : (Revit parameter should already be available to select)
- : (TSD Integrator parameter group)
 - : (TSD RC Information parameter group)
- : (TSD RC Information parameter group)
- : (TSD RC Information parameter group)
- : (TSD RC Information parameter group)

• **TSDI** Type : (TSD Integrator parameter group)

With the fields now set, we can set the filters so that only Concrete Beams are included in our schedule. Click on the Filter tab.

Run through the dialog to set the following filters:-

- Filter 1
 - Filter by : TSDI Matl 0
 - Action : contains 0
 - Search term : C
- Filter 2
 - Filter by : TSDI_Type 0
 - Action : does not contain 0
 - Search term : PILE 0
- Filter 3
 - Filter by : TSDI_Matl 0
 - Action : does not contain 0
 - 0 Search term : **Tbr**
- Filter 4
 - Filter by : TSDI_Matl 0
 - Action : does not contain 0
 - Search term : A \circ

Schedule Prope	rties					×		
Fields Filter	Sorting/Grouping	Formatting	Appearance	ance				
Filter by:	TSDI_Matl	~	contains	~	С			
And:	TSDI_Type	~	does not contain	\sim	PILE			
And:	TSDI_Matl	~	does not contain	~	Tbr			
And:	TSDI_Matl	~	does not contain	\sim	A			
And:	(none)	~		\sim		~		
And:	(none)	\sim		\sim		~		
And:	(none)	\sim		\sim		~		
And:	(none)	\sim		\sim		~		
			C	ОК	Cancel	Help		

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following action:

- Sort by : TSDI_Part_Mark
 - Ascending order

Do not select the **Grand totals** option Keep the **Itemize every instance** option enabled.

Schedule Properties						×
Fields Filter Sortin	ng/Grouping Formatting	Appearance				
Sort by:	TSDI_Part_Mark	~	Ascending		ODescending	
Header	Footer:			\sim	Blank line	
Then by:	(none)	~	Ascending		Opescending	
Header	Footer:			\sim	Blank line	
Then by:	(none)	\sim	Ascending		Oescending	
Header	Footer:			\sim	Blank line	
Then by:	(none)	\sim	Ascending		Oescending	
Header	Footer:			\sim	Blank line	
Grand totals:		~				
	Custom grand total title	9;				
	Grand total					
Itemize every inst	ance					
		[OK	Car	ncel Help	

Access the Formatting tab and make the following changes:

- TSDI_Part_Mark
 - Heading : Part Mark
 - Alignment : Center
- Type
 - Heading : Size
 - Alignment : Center
- TSDI_Matl
 - Heading : Material
 - Alignment : Center
- Length
 - Alignment : Center
- Cut Length
 - Alignment : Center
- TSDI_Note
 - Heading : Notes
 - Alignment : Center
- TSDI_RC_Top
 - Heading : Rebar in Top
 - Alignment : Center
- TSDI_RC_Bottom
 - Heading : Rebar in Bottom
 - Alignment : Center
- TSDI_RC_Stirrups
 - Heading : Rebar Stirrups
 - Alignment : Center

- TSDI_RC_Cover
 - Heading : Designed Cover
 - Alignment : Center
- TSDI_Type
 - Hidden Field: Enabled

ields Filter So	orting/Grouping	Formatting	Appearance		
Fields: TSDI_Part_Mark Type TSDI_Matl Length Cut Length TSDI_Note TSDI_RC_Top TSDI_RC_Bottom TSDI_RC_Stirrup TSDI_RC_Cover TSDI_Type		Pa Hea Ho Ce Fiel	ding: rt Mark ding orientation: rizontal nment: nter d formatting: Hidden field Show conditional format	Field Format Conditional Format on sheets	
		No	calculation		\sim

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

Once you are happy with the contents and the format of the schedule, click **OK**.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

8.4 Creating a Concrete Column Schedule (English: United Kingdom option)

(Please use these instructions if your Tekla Structural Designer software is set to use English: United Kingdom language format)

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).

<u>/</u> 5	<u> </u>				Autod	esk Revit 20	019.2 - N	lot For Resa	le Version ·	- Project1 - S	chedule: T	SD Composite	Floor So	hedule	
Ana	lyze N	/lassing 8	ι Site	Collaborat	e View	Manage	Add	-Ins Qua	ntification	Site Desig	ner BIN	1 Interoperabil	ity Tools	Tek	la Integr
		Ż		\mathbf{i}	9	Ő°	G			F			•∰	<u>^</u>	
Cut Profile	Render	Render in Cloud		-	Section	Callout •	Plan Views	Elevation •	Drafting View	Duplicate View	Legends *	Schedules	Scope Box	Sheet	View
к	P	resentatio	n						Create	Sche	edule/Quar	ntities			
	Schedule/Quantities Graphical Column Schedule of building components.														
				-	1 for mo						erial Takeof	ff			
										L Shee	et List				
										Note	e Block				
										View	/ List				
]		

After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Structural Columns** from the **Category** list and set the name as being **TSD Concrete Column Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule	×
Filter list: <show all=""> <</show>	2
Category:	Name
RVT Links	TSD Concrete Column Schedule
Security Devices	
	Schedule building components
Spaces	◯ Schedule keys
Specialty Equipment	
Sprinklers	Key name:
Stairs	
Structural Area Reinforcem	Phase:
Structural Poam Systems	Phase:
Structural Columns 1	New Construction \checkmark
Structural Fabric Areas	
< >	
	3
	Cancel Help
UK OK	Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

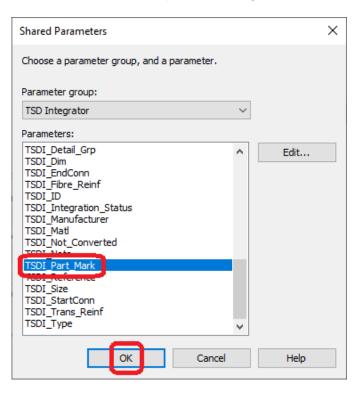
To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedule Properties				×
Fields Filter Sorting/Grouping	Formatting	Appearance		
Select available fields from:				
Structural Columns	\sim			
Available fields:			Scheduled fields (in order):	
A Assembly Code Assembly Description Assembly Name Coating Column Location Mark Comments Cost Count Description Estimated Reinforcement Volume Family Family and Type IfcGUID Image	~	↓ ↓ New	parameter	
d 🖉			∥ 🎦 🕇 🗜 ∔E	
Include elements in links				
		[OK Cancel	Help

On the **Parameter Properties** dialog, choose to use a **Shared Parameter** and then click on **Select**.

Parameter Properties		\times
Parameter Type O Project parameter (Can appear in schedules but not in t	ags)	
 Shared parameter (Can be shared by multiple projects a appear in schedules and tags) 	and families, exported to ODBC, and	
	Select. Export	
Parameter Data Name:		
<no parameter="" selected=""></no>	ОТуре	
Discipline:	○ Instance	
Type of Parameter:	Values are aligned per group type	
~	O Values can vary by group instance	
Group parameter under:	1	
Dimensions ~		
Tooltip Description: <no description,="" edit="" paramet<="" td="" this="" tooltip=""><td>ter to write a custom tooltip. Custom tooltips hav.</td><td></td></no>	ter to write a custom tooltip. Custom tooltips hav.	
Add to all elements in the category	OK Cancel Help	

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.



With the **TSDI_Part_Mark** parameter now loaded into the schedule and listed in the **Available Fields** window, click to highlight and then use the **Add parameter(s)** command to place it into the **Scheduled fields (in order)** window.

Schedu	le Prope	rties				×
Fields	Filter	Sorting/Grouping	Formatting	Appearance		
Struc Availa Phas Secti Struc	t available tural Col able fields e Demolis on Shape tural Mat	: hed	~	F	Scheduled fields (in order):	^
TSDI Type Type Type Type	Part Ma Commer IfcGUID Image Mark ne	its	×	*``` <i>f</i> = ©		~
1	<u>*</u>				🥒 🛍 🕇 🗜 🖡	
	clude eler	ments in links				
					OK Cancel	Help

Repeat the same commands to add the following parameters in the following order: (NB. Positions of parameters can be adjusted by using the **Move Parameter Up** and **Move Parameter Down** commands held underneath the **Scheduled fields...** window).

- TSDI_Part_Mark : (TSD Integrator parameter group)
- **Type** : (Revit parameter should already be available to select)
- TSDI_Matl : (TSD Integrator parameter group)
- Base Level : (Revit parameter should already be available to select)
- Base Offset
 : (Revit parameter should already be available to select)
- **Top Level** : (Revit parameter should already be available to select)
- **Top Offset** : (Revit parameter should already be available to select)
- Length : (Revit parameter should already be available to select)
- TSDI_RC_Bars : (TSD RC Information parameter group)
- TSDI_RC_Links : (TSD RC Information parameter group)
- TSDI_RC_Cover : (TSD RC Information parameter group)
- TSDI_Type : (TSD Integrator parameter group)

With the fields now set, we can set the filters so that only Concrete Columns are included in our schedule. Click on the **Filter** tab.

Run through the dialog to set the following filters:-

- Filter 1
 - Filter by : TSDI_Matl
 - Action : contains
 - Search term : C
- Filter 2
 - Filter by : **TSDI_Type**
 - Action : does not contain
 - Search term : PILE
- Filter 3
 - Filter by : **TSDI_Matl**
 - Action : does not contain
 - Search term : **Tbr**
- Filter 4
 - Filter by : TSDI_Matl
 - Action : does not contain
 - o Search term : A

Schedule Prope	rties					×
Fields Filter	Sorting/Grouping	Formatting	Appearance			
Filter by:	TSDI_Matl	\sim	contains	\sim	С	
And:	TSDI_Type	\sim	does not contain	~	PILE	
And:	TSDI_Matl	\sim	does not contain	~	Tbr	
And:	TSDI_Matl	\sim	does not contain	~	A	
And:	(none)	~		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
				~	Consul	U-h
			O	K	Cancel	Help

After generating the filters, click on the Sorting/Grouping tab so that we can sort the data into order. Apply the following action: • Sort by : **TSDI_Part_Mark**

- - Ascending order

Do not select the Grand totals option Keep the Itemize every instance option enabled.

Schedule Properties							\times
Fields Filter Sortin	g/Grouping	Formatting	Appearance				
Sort by:	TSDI_Part	_Mark	~	Ascending		ODescending	
Header	Footer:			-	\sim	Blank line	
Then by:	(none)		~	Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Grand totals:			~				
	Custom gra	nd total title		1			
	Grand tota	al					
Itemize every insta	ance						
			[OK	Car	ncel Help	

Access the Formatting tab and make the following changes:

- TSDI_Part_Mark
 - Heading : Part Mark
 - Alignment : Center
- Type
 - Heading : Size
 - Alignment : Center
- TSDI_Matl
 - Heading : Material
 - Alignment : Center
- Base Level
 - Alignment : Center
- Base Offset
 - Alignment : Center
- Top Level
 - Alignment : Center
- Top Offset
 - Alignment : Center
- Length
 - Alignment : Center
- TSDI_Note
 - Heading : Notes
 - Alignment : Center
- TSDI_RC_Bars
 - Heading : Rebar
 - Alignment : Center
- TSDI_RC_Links
 - Heading : Rebar Links
 - Alignment : Center
- TSDI_RC_Cover
 - Heading : Designed Cover
 - Alignment : Center
- TSDI_Type
 - Hidden Field: Enabled

Schedule Properties		×
Fields Filter Sorting/Grouping Fields: TSDI_Matl Base Level Base Offset Top Offset Length TSDI_RC_Bars TSDI_RC_Links TSDI_RC_Cover TSDI_Type		
	OK Cancel Help	

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

Once you are happy with the contents and the format of the schedule, click **OK**.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

8.5 Creating a Concrete Column Schedule (English: United States option)

(Please use these instructions if your Tekla Structural Designer software is set to use English: United States language format)

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).

													-		
					Autoo	desk Revit 2	019.2 - N	ot For Kesa	le Version ·	· Project1 - S	chedule: I	SD Composite	Floor So	hedule	
Ana	alyze M	Massing 8	Site	Collabora	te View	Manag	e Add-	-Ins Qua	ntification	Site Desig	ner BIN	1 Interoperabil	ity Tools	Tekl	a Integr
	\bigcirc	Ż		\mathbf{i}	9	0°	G		L)	G.			°₽	<u>^</u>	
Cut Profile	Render	Render in Cloud		-	Section	Callout •	Plan Views	Elevation •	Drafting View	Duplicate View	Legends •	Schedules T	Scope Box	Sheet	View
ы	P	resentatio	n						Create	Sche	:dule/Quar	ntities			
				_											
					lule/Quan						hical Colu	mn Schedule			
						nedule or a	schedule	of building	componer		erial Takeof	ff			
				Press	F1 for mo	re help									
										L Shee	t List				
										Note	Block				
										View	List				

After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Structural Columns** from the **Category** list and set the name as being **TSD Concrete Column Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule	×
Filter list: <show all=""></show>	Names TSD Concrete Column Schedule
Security Devices Site Spaces Specialty Equipment Sprinklers Stairs Structural Area Reinforcem	Schedule building components Schedule keys Key name:
Structural Roam Systems Structural Columns	Phase: New Construction
ОК	Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedule Pro	operties						×
Fields Filte	er Sorting/Grouping	Formatting	Appearance				
Select avai	able fields from:	~					
Available fi Assembly Assembly Coating Column Lo Comments Cost Count Description	elds: Code Description Name cation Mark Reinforcement Volume		÷	Scheduled f		der):	
/ *ì				/ *b	tE ∔E	-	
Include	elements in links						
			[ОК	Ca	ancel	Help

On the Parameter Properties dialog, choose to use a Shared Parameter and then click on Select.

Parameter Properties	×
Parameter Type Project parameter (Can appear in schedules but not in ta	gs)
 Shared parameter (Can be shared by multiple projects ar appear in schedules and tags) 	nd families, exported to ODBC, and
	Select. Export
Parameter Data Name:	
<no parameter="" selected=""></no>	ОТуре
Discipline:	○ Instance
Type of Parameter:	 Values are aligned per group type
\sim	O Values can vary by group instance
Group parameter under:	
Dimensions \checkmark	
Tooltip Description: <no description,="" edit="" paramete<="" td="" this="" tooltip=""><td>er to write a custom tooltip, Custom tooltips hav</td></no>	er to write a custom tooltip, Custom tooltips hav
Add to all elements in the category	OK Cancel Help

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters		×
Choose a parameter group, and a parameter.		
Parameter group:		
TSD Integrator	\sim	
Parameters:		
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_Integration_Status TSDI_Manufacturer TSDI_Matl TSDI_Matl TSDI_Not_Converted TSDI_Part_Mark TSDI_Part_Mark TSDI_Size TSDI_Size TSDI_StartConn TSDI_Trans_Reinf TSDI_Type	~	Edit
OK Cancel		Help

With the **TSDI_Part_Mark** parameter now loaded into the schedule and listed in the **Available Fields** window, click to highlight and then use the **Add parameter(s)** command to place it into the **Scheduled fields (in order)** window.

Schedu	le Prope	rties					×
Fields	Filter	Sorting/Grouping	Formatting	Appearance	2		
Select	t availabl	e fields from:					
Struc	tural Col	umns	~				
Availa	ble fields				Scheduled fields (ir	n order):	
	e Demolis on Shape		^	₩			^
	tural Ma			Ad	d parameter(s)		
Top	Part Ma	ark					
مبريتها ا	Commer						
Туре	IfcGUID Image			* ``			
	Mark			fr			
Volun W	ne						
			*				*
Ø	×1				🥒 造 🛛 🕇 🗄	ŧE	
Inc	dude elei	ments in links					
					ОК	Cancel	Help

Repeat the same commands to add the following parameters in the following order:

(NB. Positions of parameters can be adjusted by using the Move Parameter Up and Move Parameter Down commands held underneath the Scheduled fields... window).

- **TSDI Part Mark**
- Type •
- **TSDI Matl** •
- **Base Level** •
- Base Offset
- **Top Level** •
- **Top Offset** •
- Length •
- TSDI_RC_Bars •
- •
- TSDI RC Cover •
- TSDI_Type

- : (TSD Integrator parameter group)
- : (Revit parameter should already be available to select)
- : (TSD Integrator parameter group)
- : (Revit parameter should already be available to select)
- : (Revit parameter should already be available to select)
- : (Revit parameter should already be available to select)
- : (Revit parameter should already be available to select)
- : (Revit parameter should already be available to select)
 - : (TSD RC Information parameter group)
- TSDI RC Stirrups : (TSD RC Information parameter group)
 - : (TSD RC Information parameter group)

: (TSD Integrator parameter group)

With the fields now set, we can set the filters so that only Concrete Columns are included in our schedule. Click on the Filter tab.

Run through the dialog to set the following filters:-

- Filter 1 •
 - Filter by : TSDI_Matl
 - Action : contains 0
 - Search term : C 0
- Filter 2
 - Filter by : **TSDI Type**
 - Action : does not contain 0
 - Search term : PILE
- Filter 3
 - Filter by : TSDI_Matl
 - Action : does not contain 0
 - Search term : Tbr
- Filter 4
 - Filter by : **TSDI_Matl**
 - Action : does not contain
 - Search term : A 0

Schedule Prope	rties				×
Fields Filter	Sorting/Grouping	Formatting	Appearance		
Filter by:	TSDI_Matl	~	contains	~	С
And:	TSDI_Type	~	does not contain	\sim	PILE
And:	TSDI_Matl	\sim	does not contain	\sim	Tbr
And:	TSDI_Matl	\sim	does not contain	\sim	Α
And:	(none)	\sim		\sim	~
And:	(none)	\sim		\sim	~
And:	(none)	\sim		\sim	~
And:	(none)	\sim		\sim	~
			_	OK	Cancel Help
				OK	Cancel Help

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following action:

- Sort by : TSDI_Part_Mark
 - Ascending order

Do not select the **Grand totals** option Keep the **Itemize every instance** option enabled.

Schedule Proper	ties						×
Fields Filter	Sorting/Grouping Fo	ormatting	Appearance				
Sort by:	TSDI_Part_Ma	ark	~	Ascending			g
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		ODescending	9
Header	Footer:				\sim	Blank line	
Then by:	(none)		\sim	Ascending			9
Header	Footer:				\sim	Blank line	
Then by:	(none)		\sim	Ascending		ODescending	9
Header	Footer:				\sim	Blank line	
Grand totals			\sim				
	Custom grand	total title:					
	Grand total						
Itemize eve	ry instance						
				OK	Ca	ncel H	Help

Access the Formatting tab and make the following changes:

- TSDI_Part_Mark
 - Heading : Part Mark
 - Alignment : Center
- Type
 - Heading : Size
 - Alignment : Center
- TSDI_Matl
 - Heading : Material
 - Alignment : Center
- Base Level
 - Alignment : Center
- Base Offset
 - Alignment : Center
- Top Level
 - Alignment : Center
- Top Offset
 - Alignment : Center
- Length
 - Alignment : Center
- TSDI_Note
 - Heading : Notes
 - Alignment : Center
- TSDI_RC_Bars
 - Heading : Rebar
 - Alignment : Center
- TSDI_RC_Stirrups
 - Heading : Rebar Stirrups
 - Alignment : Center
- TSDI_RC_Cover
 - Heading : Designed Cover
 - Alignment : Center
- TSDI_Type
 - Hidden Field: Enabled

Schedule Properties	×
Fields Filter Sorting/Grouping Formatting Appearance Fields: TSDI_Part_Mark Heading: Part Mark Type TSDI_Mail Base Offset Part Mark Top Level Base Offset Heading orientation: Top Offset Heading orientation: Horizontal TSDI_RC_Bars TSDI_RC_Cover TSDI_Type TSDI_Type Field formatting: Field Format Hidden field Conditional Format Moreature format on sheets No calculation No calculation Moreature format on sheets	
OK Cancel Hel	D

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

Once you are happy with the contents and the format of the schedule, click **OK**.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

8.6 Creating a (General) Floor Schedule

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).

<u>/</u>	Autode	sk Revit 2019.2 - N	lot For Resale Version	- Project1 - Schedu	le: TSD Composite	Floor Sc	hedule	
Analyze Massing & Site	Collaborate View	Manage Add	-Ins Quantification	Site Designer	BIM Interoperabil	ity Tools	Tekla	Integ
🖳 👉 🖄 🔛		° B	\frown	9		•∄	<u>^</u>	
Cut Render Render Render Profile in Cloud Gallery		allout Plan Views	Elevation Drafting * View	Duplicate Lege View	nds Schedules	Scope Box	Sheet \	/iew
			Create	Schedule/O	Quantities			
	Schedule/Quantit Creates a key sche Press F1 for more	dule or a schedule	of building compone					

After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Floors** from the **Category** list and set the name as being **TSD Floor Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule	×
Filter list: <show all=""> <</show>	2
Category:	Name:
Electrical Circuits	TSD Floor Schedule
Electrical Equipment Electrical Fixtures Entourage Fire Alarm Devices Flex Ducts Flex Ducts Flex Theorem 1	Schedule building components Schedule keys Key name: Phase:
Furniture Systems	New Construction \checkmark
Generic Models	
Grids ✓	
ОК	3 Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedule Properties					×
Fields Filter Sorting/Grouping	Formatting	Appearance			
Select available fields from:					
Floors	\sim				
Available fields:		5	Scheduled fi	ields (in order):	
Absorptance Area Assembly Code Assembly Description Assembly Name Comments Core Thickness Cost Count Default Thickness Description Elevation at Bottom Core Elevation at Bottom Survey Elevation at Top Core Elevation at Top Survey	~	↓ ↓ New	parameter]	
2 °			/ *b	↑E ↓E	
Include elements in links					
		[ОК	Cancel	Help

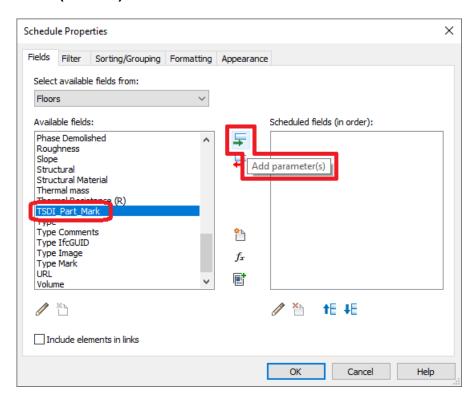
On the **Parameter Properties** dialog, choose to use a **Shared Parameter** and then click on **Select**.

arameter Properties		×
Parameter Type O Project parameter (Can appear in schedules but not in	i tags)	
 Shared parameter (Can be shared by multiple projects appear in schedules and tags) 	and families, exported to ODBC, and	
	Select. Export	
Parameter Data		
Name:		
<no parameter="" selected=""></no>	 Туре 	
Discipline:	○ Instance	
Type of Parameter:	 Values are aligned per group type 	
· · · · · · · · · · · · · · · · · · ·	Values can vary by group instance	
Group parameter under:		
Dimensions		
Tooltip Description: <no description,="" edit="" param<="" td="" this="" tooltip=""><td>eter to write a custom tooltip, Custom tooltips hav</td><td></td></no>	eter to write a custom tooltip, Custom tooltips hav	
Add to all elements in the category		
	OK Cancel Help	

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters		×
Choose a parameter group, and a parameter.		
Parameter group:		
TSD Integrator	\sim	
Parameters:		
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_ID TSDI_Integration_Status TSDI_Manufacturer TSDI_Matl	^	Edit
TSDI_Not_Converted		
TSDI_Part_Mark TSDI_Size TSDI_StartConn TSDI_Trans_Reinf TSDI_Type	*	
OK Cancel		Help

With the **TSDI_Part_Mark** parameter now loaded into the schedule and listed in the **Available Fields** window, click to highlight and then use the **Add parameter(s)** command to place it into the **Scheduled fields (in order)** window.



Repeat the same commands to add the following parameters in the following order:

(NB. Positions of parameters can be adjusted by using the **Move Parameter Up** and **Move Parameter Down** commands held underneath the **Scheduled fields...** window).

• TSDI_Part_Mark

Elevation at Bottom

- k : (TSD Integrator parameter group)
- Elevation at TopLevel

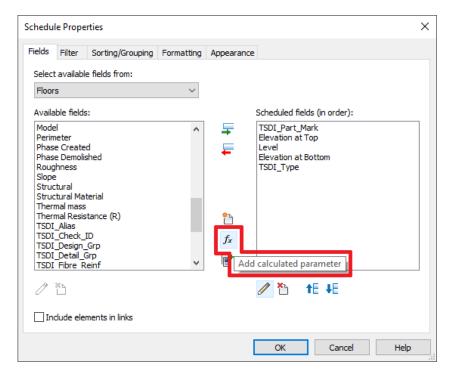
•

- : (Revit parameter should already be available to select)
- : (Revit parameter should already be available to select)
- : (Revit parameter should already be available to select)
- TSDI_Type

: (**TSD Integrator** parameter group)

The next parameter to be included is the **Thickness** of the floor element. As this parameter is not available from either the default Revit content or the imported data from Tekla Structural Designer we will calculate the value.

Click on the Add calculated parameter command.



Set the **Calculated Value** as following (keep values at default unless noted below):

- Name : Thickness
- Formula: Elevation at Top-Elevation at Bottom.
 - (NB: Using the ... button will allow the quick selection of the two Elevation parameters, rather than manually typing the name)

Calculate	d Value $ imes$
Name:	Thickness
For	mula O Percentage
Discipline:	Common ~
Type:	Number ~
Formula:	ration at Top-Elevation at Bottom
ОК	Cancel Help

Click **OK** when the information has been set up and it will then be added to the list of **Scheduled fields**.

Complete the **Scheduled fields** window by adding another 2 parameters:

- TSDI Matl : (TSD Integrator parameter group)
- Volume •

•

: (Revit parameter - should already be available to select)

hedu	le Prope	rties				>
ields	Filter	Sorting/Grouping	Formatting	Appearance		
Floor Availa Abso Area Asse Asse Com Core Cost Cour Defa Desc Eleva Eleva Eleva	able fields orptance mbly Coor mbly Des mbly Nar ments Thicknes t tult Thickres atton at E ation at E ation at T	de scription ne ss ness lottom Core lottom Survey	×	► ► ► ► ► ►	Scheduled fields (in order): TSD_Part_Mark Elevation at Top Level Elevation at Bottom TSDI_Type Thickness TSDI_Matl Volume Volume TEDI_Matl Volume	
In	clude ele	ments in <mark>l</mark> inks				
					OK Cancel H	elp

With the fields now set, we can set the filters so that only Floor slabs (and not Composite Floors) are included in our schedule. Click on the Filter tab.

Run through the dialog to set the following filters:-

- Filter 1
 - Filter by : **TSDI_Type**
 - Action : equals
 - Search term : SLAB
- Filter 2 •
 - Filter by : TSDI_Type
 Action : does not equal

 - Search term : COMP_SLAB

Schedule Prope	erties					×
Fields Filter	Sorting/Grouping	Formatting	Appearance			
Filter by:	TSDI_Type	\sim	contains	~	SLAB	
And:	TSDI_Type	\sim	does not equal	~	COMP_SLAB	\sim
And:	(none)	~		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
				C ¹		
				ОК	Cancel	Help

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following actions:

- Sort by : **TSDI_Type**
 - Ascending order
- Then by : Level
 - Ascending order
- Then by : TSDI_Part_Mark

 Ascending order
- Do not select the Grand totals option

Keep the Itemize every instance option enabled.

Schedule Properties						×
Fields Filter Sortin	g/Grouping Formattir	ng Appearance				
Sort by:	TSDI_Type	~	Ascending		ODescending	
Header	Footer:			\sim	Blank line	
Then by:	Level	~	Ascending		ODescending	
Header	Footer:			\sim	Blank line	
Then by:	TSDI_Part_Mark	~	Ascending		ODescending	
Header	Footer:			\sim	Blank line	
Then by:	(none)	~	Ascending		ODescending	
Header	Footer:			\sim	Blank line	
Grand totals:		~				
	Custom grand total tit	:le:				
	Grand total					
Itemize every insta	ance					
		[OK	Car	ncel Help	

Access the Formatting tab and make the following changes:

- TSDI_Part_Mark
 - Heading : Part Mark
 - Alignment : Center
 - Elevation at Top
 - Hidden Field: Enabled
- Level

•

•

•

- Alignment : Center
- Elevation at Bottom
 - Hidden Field: Enabled
- TSDI_Type
 - Heading : Slab Type
 - Alignment : Center
- Thickness
 - Alignment : Center
 - TSDI_Matl
 - Heading : Material
 - Alignment : Center
- Volume
 - Alignment : Center

Schedu	le Prope	rties		>	×
Fields Fields Eleva Leve Eleva TSDI Thick	Filter Part Ma ation at T ation at B _Type ness _Matl	Sorting/Grouping ark op	P2 Hei Alig E Fiel	Appearance eading: Part Mark eading orientation: forizontal ignment: Center eld formatting: Field Format Field Format Show conditional format on sheets to calculation	
				OK Cancel Help	

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

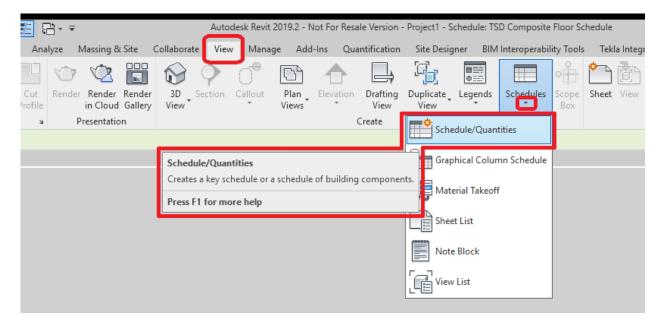
Once you are happy with the contents and the format of the schedule, click **OK**.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

8.7 Creating a Foundation Schedule

Foundations are imported into Revit from Tekla Structural Designer using Floor object elements. This is done to preserve the merge process whilst ensuring that changes to shape can be accommodated. For this reason, we will be creating our Foundation Schedule from a Floor Category.

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).



After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Floors** from the **Category** list and set the name as being **TSD Foundation Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule	×
Filter list: <show all=""> ~</show>	2
Category: Bectrical Circuits Bectrical Equipment Bectrical Fixtures Entourage Fire Alarm Devices Rex Ducts Floors Further Systems	Name: TSD Floor Schedule Schedule building components Schedule keys Key name: Phase: New Construction
Generic Models	
ОК	Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedu	e Prope	rties						×
Fields	Filter	Sorting/Grouping	Formatting	Appearance				
		e fields from:						
Abso	- ble fields rptance	:	~	F	Scheduled 1	fields (ir	n order):	
Asser Asser Com Core Cost	mbly Cod mbly Des mbly Nam nents Thicknes	cription ne		4				
Desci Eleva Eleva Eleva	ult Thickn ription ation at B ation at B ation at T	ottom Core ottom Survey	*	P New	paramete	r		
ð	×~				/ *D	t E	ΨE	
Inc	clude eler	ments in links						
				[ОК		Cancel	Help

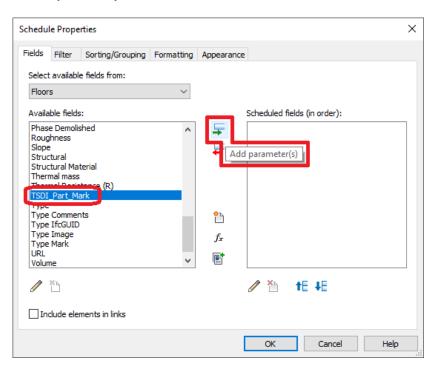
On the **Parameter Properties** dialog, choose to use a **Shared Parameter** and then click on **Select**.

arameter Properties Parameter Type Project parameter (Can appear in schedules but not Shared parameter (Can be shared by multiple project)	in tags) ts and families, exported to ODBC, and
appear in schedules and tags)	Select. Export
Parameter Data	
Name:	
<no parameter="" selected=""></no>	О Туре
Discipline:	○ Instance
	\sim
Type of Parameter:	Values are aligned per group type
	Values can vary by group instance
Group parameter under:	
Dimensions	\checkmark
Tooltip Description: <no description.="" edit="" para<="" td="" this="" tooltip=""><td>meter to write a custom tooltip, Custom tooltips hav</td></no>	meter to write a custom tooltip, Custom tooltips hav
Add to all elements in the category	
	OK Cancel Help

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters			×
Choose a parameter group, and a parameter.			
Parameter group:			
TSD Integrator	\sim		
Parameters:			
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_ID TSDI_Integration_Status TSDI_Manufacturer TSDI_Matd TSDI_Not_Converted TSDI_Not_Converted TSDI_Not_ TSDI_Part_Mark TSDI_Size TSDI_Size TSDI_Size TSDI_Size TSDI_StartConn TSDI_Trans_Reinf TSDI_Type	*	Edit	
OK Cancel		Help	

With the **TSDI_Part_Mark** parameter now loaded into the schedule and listed in the **Available Fields** window, click to highlight and then use the **Add parameter(s)** command to place it into the **Scheduled fields (in order)** window.



Repeat the same commands to add the following parameters in the following order:

(NB. Positions of parameters can be adjusted by using the Move Parameter Up and Move Parameter Down commands held underneath the Scheduled fields... window).

: (TSD Integrator parameter group)

- TSDI_Part_Mark •
- Type •
- **TSDI Matl** •
- TSDI_Type •
- Level •

•

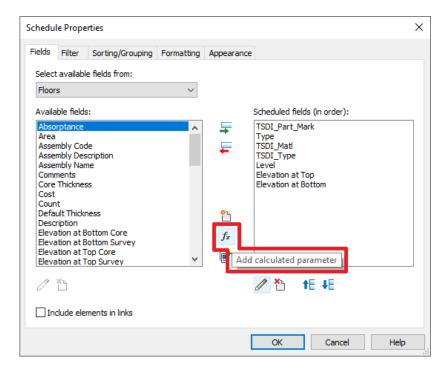
- **Elevation at Top** • **Elevation at Bottom**
- : (TSD Integrator parameter group) : (TSD Integrator parameter group)
- : (Revit parameter should already be available to select)

: (Revit parameter - should already be available to select)

- : (Revit parameter should already be available to select)
- : (Revit parameter should already be available to select)

The next parameter to be included is the **Thickness** of the floor element. As this parameter is not available from either the default Revit content or the imported data from Tekla Structural Designer we will calculate the value.

Click on the Add calculated parameter command.



Set the **Calculated Value** as following (keep values at default unless noted below):

- Name : Thickness
- Formula: Elevation at Top-Elevation at Bottom.
 - (NB: Using the ... button will allow the quick selection of the two **Elevation** parameters, rather than manually 0 typing the name)

Calculated Value						
Name:	Thickness					
• For	nula O Percentage					
Discipline:	Common ~					
Type:	Number ~					
Formula:	'ation at Top-Elevation at Bottom					
ОК	Cancel Help					

Click OK when the information has been set up and it will then be added to the list of Scheduled fields.

Complete the Scheduled fields window by adding one more parameter:

• Volume : (Revit parameter - should already be available to select)

Select available fields from: Floors Available fields: Scheduled fields (in order): Available fields: Scheduled fields (in order): Available fields: Scheduled fields (in order): Assembly Code Assembly Description Assembly Name Core Thickness Core Thickness Cost Cont Default Thickness Description Elevation at Bottom Thickness Description Elevation at Bottom Thickness Volume Fr	elds	Filter	Sorting/Grouping	Formatting	Appearance		
Absorptance Area Arrea Type Assembly Code TSDI_Mail Assembly Name TSDI_Mail Comments Evel Cont Elevation at Top Description Fr Default Thickness Fr Description Fr Description Fr Default Thickness Fr Description Elevation at Bottom Core Elevation at Bottom Core Fr Elevation at Top Core Elevation at Top Survey			e fields from:	~			
Elevation at Top Survey	Absorp Area Assem Assem Come Core T Cost Count Defaul Descrij Elevati	bly Coc bly Des bly Nar ents 'hicknes t Thickr ption ion at E	le cription ne is ness ness lottom Core	^	F F	TSDI_Part_Mark Type TSDI_Matl TSDI_Type Level Elevation at Top Elevation at Bottom Thickness	
	Elevat	ion at T ion at T	op Core	*	e t		

With the fields now set, we can set the filters so that only Foundation items imported from Tekla Structural Designer are included in our schedule. Click on the **Filter** tab.

Run through the dialog to set the following filters:-

- Filter 1
 - Filter by : **TSDI_Type**
 - Action : does not contain
 - Search term : SLAB

Fields Filter	Sorting/Grouping	Formatting	Appearance			
Filter by:	TSDI_Type	\sim	does not contain	~	SLAB	
And:	(none)	~		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following actions:

- Sort by : **TSDI_Type**
 - Ascending order
- Then by : Level
- Ascending order
 Then by : TSDI_Part_Mark
 - Ascending order

Do not select the **Grand totals** option Keep the **Itemize every instance** option enabled.

Schedule Properties						×
Fields Filter Sortin	g/Grouping Formatti	ng Appearance				
Sort by:	TSDI_Type	~	Ascending		ODescending	
Header	Footer:			\sim	Blank line	
Then by:	Level	~	Ascending		ODescending	
Header	Footer:			\sim	Blank line	
Then by:	TSDI_Part_Mark	~	Ascending		ODescending	
Header	Footer:			\sim	Blank line	
Then by:	(none)	~	Ascending		Oescending	
Header	Footer:			\sim	Blank line	
Grand totals:		\sim				
	Custom grand total ti	tle:				
	Grand total					
Itemize every inst	ance					
		[OK	Car	ncel Help	

Access the Formatting tab and make the following changes:

- TSDI_Part_Mark
 - Heading : Part Mark
 - Alignment : Center
- Type
 - Alignment : Center
- TSDI_Matl
 - Heading : Material
 - Alignment : Center
- TSDI_Type
 - Heading : Foundation Type
 - Alignment : Center
- Level
 - Alignment : Center
- Elevation at Top
 - Hidden Field: Enabled
- Elevation at Bottom
 - Hidden Field: Enabled
 - Thickness
 - Alignment : Center
- Volume

•

• Alignment : Center

Schedule Properties	>	×
Fields Filter Sorting/Grouping Formatt Fields: Image: Sorting / Grouping Formatt Type Type Type TSDI_Matl TSDI_Type Level Elevation at Top Elevation at Bottom Thickness Volume	Heading: Part Mark Heading orientation: Horizontal Mignment: Center Field formatting: Field formatting: Hidden field Conditional Format Show conditional format on sheets No calculation	
	OK Cancel Help	

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

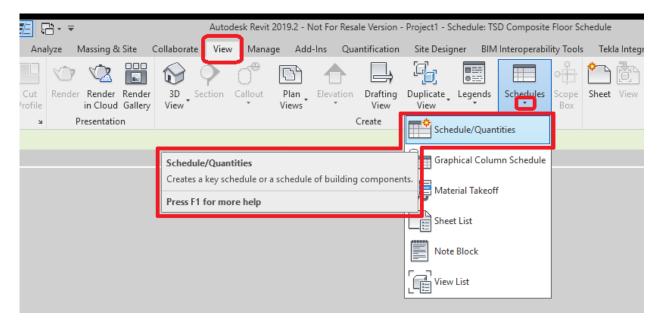
Once you are happy with the contents and the format of the schedule, click **OK**.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

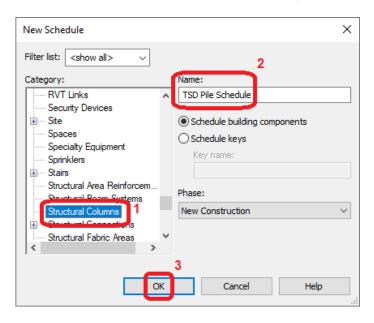
8.8 Creating a Pile Schedule

Foundation piles are imported into Revit from Tekla Structural Designer using Structural Column object elements. This is done to preserve the merge process whilst ensuring that changes to shape can be accommodated. For this reason, we will be creating our Pile Schedule from a Structural Column Category.

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).



After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Structural Columns** from the **Category** list and set the name as being **TSD Pile Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.



You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedule Properties		×
Fields Filter Sorting/Grouping Form	atting Appearance	
Select available fields from: Structural Columns	~	
Available fields:		Scheduled fields (in order):
Assembly Code Assembly Description Assembly Name Coating Column Location Mark	+	
Comments Cost Count Description Estimated Reinforcement Volume	* <u>`</u>	
Family Family and Type IfcGUID Image) New	parameter
/ *b		∥ *b tE ↓E
Include elements in links		
	I	OK Cancel Help

On the **Parameter Properties** dialog, choose to use a **Shared Parameter** and then click on **Select**.

arameter Properties		×
Parameter Type O Project parameter (Can appear in schedules but not i	n tags)	
 Shared parameter (Can be shared by multiple project appear in schedules and tags) 	is and families, exported to ODBC, and	
	Select. Export	
Parameter Data Name:		
<no parameter="" selected=""></no>	ОТуре	
Discipline:	◯ Instance	
Type of Parameter:	 Values are aligned per group type 	
	Values can vary by group instance	
Group parameter under:		
Dimensions	~	
Tooltip Description: <no description.="" edit="" parar<="" td="" this="" tooltip=""><td>neter to write a custom tooltip, Custom tooltips hav.,</td><td></td></no>	neter to write a custom tooltip, Custom tooltips hav.,	
Add to all elements in the category	OK Cancel Help	

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters	×
Choose a parameter group, and a parameter.	
Parameter group:	
TSD Integrator \checkmark	
Parameters:	
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_Ibre_Reinf TSDI_Integration_Status TSDI_Manufacturer TSDI_Matu TSDI_Matu TSDI_Not_Converted TSDI_Not_Converted TSDI_Part_Mark TSDI_Size TSDI_Size TSDI_StartConn TSDI_Trans_Reinf TSDI_Trans_Reinf TSDI_Type v	Edit
OK Cancel	Help

With the **TSDI_Part_Mark** parameter now loaded into the schedule and listed in the **Available Fields** window, click to highlight and then use the **Add parameter(s)** command to place it into the **Scheduled fields (in order)** window.

Schedu	le Prope	erties			×
Fields	Filter	Sorting/Grouping	Formatting	Appearance	
Select	t availabl	e fields from:			
Struc	tural Col	lumns	\sim		
Availa	ble fields	s:		Scheduled fields (in order):	
	e Demoli: on Shape		^	5	^
	tural Ma			Add parameter(s)	
100	office t		_	Add parameter(3)	
	Part_M				
Type	Commer IfcGUID				
Type	Image Mark			<u> </u>	
URL Volur	ne			f_x	
w			*	R	~
Ø	×ъ			🥒 造 🕇 🗄 🖊	
	dude ele	ments in links			
				OK Cancel	Help

Repeat the same commands to add the following parameters in the following order:

(NB. Positions of parameters can be adjusted by using the **Move Parameter Up** and **Move Parameter Down** commands held underneath the **Scheduled fields...** window).

- TSDI_Part_Mark : (TSD Integrator parameter group)
- TSDI_Matl
- : (**TSD Integrator** parameter group)
- Type
- Base Level
- Base OffsetTop Level

- : (Revit parameter should already be available to select) : (Revit parameter - should already be available to select)
- : (Revit parameter should already be available to select)

: (Revit parameter - should already be available to select)

: (Revit parameter - should already be available to select)

: (Revit parameter - should already be available to select)

- Top Offset
- Length
- TSDI_Type

: (TSD Integrator parameter group)

With the fields now set, we can set the filters so that only Tekla Structural Designer Pile objects are included in our schedule. Click on the **Filter** tab.

Run through the dialog to set the following filters:-

- Filter 1
 - Filter by : TSDI_Matl
 - Action : contains
 - Search term : C
- Filter 2
 - Filter by : TSDI_Type
 - Action : contains
 - Search term : PILE
- Filter 3
 - Filter by : TSDI_Matl
 - Action : does not contain
 - Search term : Conc
- Filter 4
 - Filter by : **TSDI_Matl**
 - Action : does not contain
 - Search term : A

Schedule Prope	erties					×
Fields Filter	Sorting/Grouping	Formatting	Appearance			
Filter by:	TSDI_Matl	\sim	contains	\sim	С	
And:	TSDI_Type	\sim	contains	~	PILE	
And:	TSDI_Matl	\sim	does not contain	\sim	Conc	
And:	TSDI_Matl	\sim	does not contain	\sim	A	
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
			(OK	Cancel	Help

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following action:

- Sort by : TSDI_Part_Mark
 - Ascending order

Do not select the **Grand totals** option Keep the **Itemize every instance** option enabled.

Schedule Properties							×
Fields Filter Sortin	ig/Grouping	Formatting	Appearance				
Sort by:	TSDI_Part	_Mark	~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Grand totals:			\sim				
	Custom gra	nd total title:					
	Grand tota	al					
Itemize every inst	ance						
			[ОК	Car	ncel Help	

Access the Formatting tab and make the following changes:

- TSDI_Part_Mark
 - Heading : Part Mark
 - Alignment : Center
- TSDI_Matl
 - Heading : Material
 - Alignment : Center
- Type
 - Alignment : Center
- Base Level
 - Alignment : Center
- Base Offset
 - Alignment : Center
- Top Level
 - Alignment : Center
- Top Offset
 - Alignment : Center
- Length
 - Alignment : Center
- TSDI_Type
 - Hidden Field: Enabled

Schedule Prope	ties		×
Fields Filter Fields: TSDI_Part_Ma TSDI_Mati Type Base Offset Top Level Top Offset Length TSDI_Type	20. a.i.g/ a. a apr.i.g	Formatting Appearance	Field Format Sonditional Format
		No calculation	Cancel Help

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

Once you are happy with the contents and the format of the schedule, click **OK**.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

8.9 Creating a Steel Beam End Forces Schedule

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).

<u>/</u> 5	<u> </u>				Autoo	lesk Revit 2	019.2 - N	lot For Resa	ale Version	- Project1 - S	chedule: TS	SD Composite	Floor So	hedule	
Ana	lyze M	/lassing &	Site	Collaborat	te View	Manage	e Add	-Ins Qua	antification	Site Desig	ner BIN	1 Interoperabil	ity Tools	Tek	la Integr
	\bigcirc	Ż		\mathbf{i}	9	0°	G		L)	F			•∰	<u>^</u>	
Cut Profile	Render	Render in Cloud		-	Section	Callout	Plan Views	Elevation •	Drafting View	Duplicate View	Legends *	Schedules	Scope Box	Sheet	View
к	P	resentatio	n						Create	Sche	edule/Quan	ntities			
				Sched	ule/Quan	tities				Grap	phical Colu	mn Schedule			
				Create	s a key scł	nedule or a	schedule	of building	j componer		enial Talaané				
				Press	F1 for mo	re help					erial Takeof	П			
											et List				
										Not	e Block				
										View	/ List				
													1		

After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Structural Framing** from the **Category** list and set the name as being **TSD Steel Beam End Forces Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule		×
Filter list: <show all=""> <</show>		2
Category:	1	Name:
 Sprinklers Stairs Structural Area Reinforcem Structural Beam Systems Structural Columns Structural Connections Structural Fabric Areas Structural Fabric Reinforcem. Structural Framing Structural Framing Structural Loads 	~	TSD Steel Beam End Forces Schedule Schedule building components Schedule keys Key name: Phase: New Construction
	<	Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedule Prop	erties					×
Fields Filter	Sorting/Grouping	Formatting	Appearance			
Select availab	ole fields from:					
Structural Fr	aming	\sim				
Available field	ds:			Scheduled f	fields (in order):	
A Assembly Cc Assembly Na Camber Size Coating Comments Cost Count Cross-Sectio Description Elevation at Elevation at Elevation at End Join Cut	escription ime in Rotation Bottom Top an	~	+ ↓	parameter		
n 🖉 🖉				/ *b	tE ∔E	
Include el	ements in links					
			[OK	Cancel	Help

On the Parameter Properties dialog, choose to use a Shared Parameter and then click on Select.

Parameter Properties	×							
Parameter Type O Project parameter (Can appear in schedules but not in tags)								
 Shared parameter (Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags) 								
Select. Export								
Parameter Data Name:								
<no parameter="" selected=""> O Type</no>								
Discipline: O Instance								
Type of Parameter: Values are aligned per group type								
Values can vary by group instance								
Group parameter under:								
Dimensions 🗸								
Tooltip Description: <no a="" custom="" description.="" edit="" h<="" parameter="" td="" this="" to="" tooltip="" tooltip.="" tooltips="" write=""><td>av</td></no>	av							
Add to all elements in the category								
OK Cancel Help								

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters	×
Choose a parameter group, and a parameter.	
Parameter group:	
TSD Integrator \checkmark	
Parameters:	
TSDI_Detail_Grp Edit	
OK Cancel Help	

With the **TSDI_Part_Mark** parameter now loaded into the schedule and listed in the **Available Fields** window, click to highlight and then use the **Add parameter(s)** command to place it into the **Scheduled fields (in order)** window.

Schedu	le Prope	rties					×
Fields	Filter	Sorting/Grouping	Formatting	Appearance			
Select Struc Availa Start Start Start Start Start Start Start Start Start Start Start Start Start Start	t available tural Fra able fields Extensic Join Cut Level Of z Justific z Justific z Justific tural Ma Part Mi Part Mi IfcGUID Image Mark	e fields from: ming :: on back ffset cation t Value cation : Value terial ark	Formatting	Ę	Scheduled fields (ir parameter(s)		~
In	clude ele	ments in links					
					ОК	Cancel	Help

Repeat the same commands to add the following parameters in the following order: (NB. Positions of parameters can be adjusted by using the Move Parameter Up and Move Parameter Down commands held underneath the Scheduled fields... window).

TSDI Part Mark •

Type

•

: (TSD Integrator parameter group)

- : (Revit parameter should already be available to select)
- **TSDI Matl** : (TSD Integrator parameter group) •
- TSDI_StartConn •
 - : (TSD Integrator parameter group) **Result StartVShearMax** : (TSD Integrator parameter group)
- Result StartVShearMaxNeg : (TSD Integrator parameter group) •
- **Result StartAxialMax** •
- Result_StartAxialMaxNeg •
- Result StartMomentMax •
- **Result_StartMomentMaxNeg** : (TSD Integrator parameter group) •
- **TSDI EndConn**
- **Result EndVShearMax** •
- Result_EndVShearMaxNeg •
- **Result EndAxialMax** •
- : (TSD Integrator parameter group) Result EndAxialMaxNeg : (TSD Integrator parameter group) •
- Result EndMomentMax : (TSD Integrator parameter group) •
- Result_EndMomentMaxNeg •
- TSDI_Type •
- TSDI_Detail_Grp •

: (TSD Integrator parameter group) : (TSD Integrator parameter group)

: (TSD Integrator parameter group)

With the fields now set, we can set the filters so that only Concrete Beams are included in our schedule. Click on the Filter tab.

Run through the dialog to set the following filters:-

- Filter 1
 - 0 Filter by : TSDI Detail Grp
 - Action : does not contain 0
 - Search term : <empty cell> 0
- Filter 2
 - Filter by : TSDI_Type 0
 - Action : does not equal 0
 - Search term : BRACE 0
- Filter 3
 - 0 Filter by : TSDI_Type
 - Action : does not contain 0
 - Search term : Truss 0

Schedule Prope	erties					×
Fields Filter	Sorting/Grouping	Formatting	Appearance			
Filter by:	TSDI_Detail_Grp	~	does not contain	\sim		
And:	TSDI_Type	\sim	does not equal	~	BRACE	~
And:	TSDI_Type	\sim	does not contain	~	TRUSS	
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
				ОК	Cancel	Help

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following action: • Sort by : **TSDI_Part_Mark**

• Ascending order

Do not select the Grand totals option Keep the **Itemize every instance** option enabled.

Schedule Properti	es			×
Fields Filter S	orting/Grouping Forma	tting Appearance		
Sort by:	TSDI_Part_Mark	~	Ascending	Opescending
Header	Footer:			Blank line
Then by:	(none)	~	Ascending	Obescending
Header	Footer:			Blank line
Then by:	(none)	~	Ascending	Obescending
Header	Footer:		\ \	Blank line
Then by:	(none)	\sim	Ascending	Oescending
Header	Footer:		\ \	Blank line
Grand totals:		~		
	Custom grand tota	l title:		
	Grand total			
☑ Itemize every	instance			
		[OK	Cancel Help

Access the **Formatting** tab and make the following changes:

- TSDI_Part_Mark • • Heading : Part Mark Alignment : Center 0 Туре Heading : **Section Size** 0 • Alignment : Center TSDI Matl • Heading : Material • Alignment : Center **TSDI StartConn** Heading : Start Co
 Alignment : Center Start Conn **Result StartVShearMax** • Heading : Start Vert Shear Max • Alignment : Center Result_StartVShearMaxNeg Heading : Start Vert Shear Neg
 Alignment : Center **Result StartAxialMax** Heading : Start Axial Max
 Alignment : Center **Result StartAxialMaxNeg** • Heading : Start Axial Neg • Alignment : Center Result_StartMomentMax Heading : Start Mom Max
 Alignment : Center Result StartMomentMaxNeg Heading : Start Mom Neg
 Alignment : Center TSDI EndConn • Heading : End Conn • Alignment : Center **Result EndVShearMax** • Heading : End Vert Shear Max • Alignment : Center Result_EndVShearMaxNeg Heading : End Vert Shear Neg
 Alignment : Center **Result EndAxialMax** • Heading : End Axial Max • Alignment : Center Result EndAxialMaxNeg Heading : End Axial Neg
 Alignment : Center **Result EndMomentMax** Heading : End Mom Max
 Alignment : Center Result EndMomentMaxNeg • Heading : End Mom Neg
 - Alignment : Center
- TSDI_Type
 - Hidden Field: Enabled
 - TSDI_Detail_Grp
 - $\circ \quad \text{Hidden Field: \textbf{Enabled}}$

Schedule Properties		×
Fields Filter Sorting/Grouping Fields: TSDI_Part_Mark Type TSDI_Matl TSDI_StartConn Result_StartVShearMaxNeg Result_StartVShearMaxNeg Result_StartAxialMaxNeg Result_StartAxialMaxNeg Result_StartMomentMaxNeg TSDI_EndConn Result_EndVShearMax Result_EndVShearMax Result_EndVShearMax Result_EndVShearMax Result_EndVShearMaxNeg Result_EndAxialMaxNeg Result_EndAxialMaxNeg Result_EndAxialMaxNeg Result_EndAxialMaxNeg Result_EndAxialMaxNeg Result_EndMomentMax Result_EndMomentMaxNeg TSDI_Type TSDI_Detail_Grp	Formatting Appearance	 Field Format Conditional Format heets
	ОК	Cancel Help

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

Once you are happy with the contents and the format of the schedule, click **OK**.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

8.10 Creating a Steel Beam Schedule

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).

<u>/</u> 5	<u> </u>				Autoo	lesk Revit 20	019.2 - N	lot For Res	ale Version	- Project1 - S	chedule: TS	D Composite	Floor So	hedule	
Ana	lyze M	/lassing &	ι Site	Collaborat	te View	Manage	e Add	-Ins Qu	antification	Site Desig	iner BIN	l Interoperabil	ity Tools	Tek	la Integi
	\bigcirc	Ż		\mathbf{i}	9	\bigcirc°	G		L)	F			•∰	<u>^</u>	
Cut Profile	Render	Render in Cloud		-	Section	Callout •	Plan Views	Elevation	Drafting View	Duplicate View	Legends •	Schedules T	Scope Box	Sheet	View
к	P	resentatio	n						Create	Sche	edule/Quan	tities			
					ule/Quants a key sch	t ities nedule or a s	schedule	of building	j componer	ata 📕	hical Colur	mn Schedule			
				Press	F1 for mo	re help				Mate	erial Takeof	f			
										L Shee	et List				
										Note	Block				
										View	/ List				
													1		

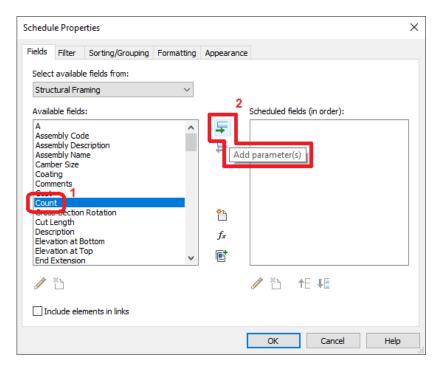
After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Structural Framing** from the **Category** list and set the name as being **TSD Steel Beam Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule	×
Filter list: <pre> <show all=""> </show></pre>	2
Category:	Name:
Structural Beam Systems Structural Columns Structural Connections Structural Fabric Areas Structural Fabric Reinforcem. Structural Framing Structural Framing Structural Framing Structural Loads	TSD Steel Beam Schedule Schedule building components Schedule keys Key name: Phase:
Structural Path Reinforcem	New Construction \checkmark
 Structural Rebar Structural Rebar Couplers 	
СК	3 Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

Before we load the Tekla Structural Designer shared parameters into the dialog, we will add two of the default Revit parameters into the **Scheduled Fields** window.

Click to highlight the entry **Count** from the **Available Fields** window, click on **Add parameter(s)** and it will move the entry across to the **Scheduled Fields** window.



Repeat the same process with the Revit parameter **Type**.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedu	le Prope	rties				×
Fields	Filter	Sorting/Grouping	Formatting	Appearance		
Selec	t availabl	e fields from:				
Stru	ctural Fra	ming	~			
Availa	able fields	:			Scheduled fields (in order):	
Asse Asse Cam Coat Com Cost Cros Cut I Desc Elev Elev Elev End	ments	cription ne Rotation ottom op	~	← ← 7 New ®	Count Type	
	11				∥ te te	
In	dude elei	ments in links				
				[OK Cancel	Help

On the **Parameter Properties** dialog, choose to use a **Shared Parameter** and then click on **Select**.

Parameter Properties	×
Parameter Type O Project parameter (Can appear in schedules but not in tags)	
 Shared parameter (Can be shared by multiple projects and families, exporter appear in schedules and tags) 	ed to ODBC, and
Se	lect
Parameter Data Name:	
<no parameter="" selected=""> O Type</no>	
Discipline: O Instance	
Type of Parameter: Values are a	ligned per group type
Values can v	vary by group instance
Group parameter under:	
Dimensions ~	
Tooltip Description: <no a="" custor<="" description,="" edit="" parameter="" th="" this="" to="" tooltip="" write=""><th>n tooltip, Custom tooltips hav,,</th></no>	n tooltip, Custom tooltips hav,,
Add to all elements in the category	
OK	Cancel Help

Select the shared parameter **TSDI_Matl** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters		×
Choose a parameter group, and a parameter.		
Parameter group:		
TSD Integrator	\sim	
Parameters:		
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_ID TSDI_Integration_Status TSDI_Matl TSDI_Matl TSDI_Note TSDI_Note TSDI_Part_Mark TSDI_Part_Mark TSDI_Reference TSDI_Size TSDI_Size TSDI_StartConn TSDI_Trans_Reinf TSDI_Type	~	Edit
OK Cancel		Help

The TSDI_Matl parameter can now be added into the Scheduled fields (in order) window as per the previous two entries.

Repeat the same commands to add the following parameters in the following order: (NB. Positions of parameters can be adjusted by using the Move Parameter Up and Move Parameter Down commands held underneath the Scheduled fields... window).

• Count

•

- : (Revit parameter should already be available to select)
- : (Revit parameter should already be available to select)
- Type **TSDI Mati** •
- TSDI_Type •
- **TSDI Trans Reinf** •
- : (TSD Integrator parameter group) : (**TSD Integrator** parameter group)
- : (TSD Integrator parameter group)
- Length • TSDI_Detail_Grp
- : (Revit parameter should already be available to select) : (TSD Integrator parameter group)

With the fields now set, we can set the filters so that only Steel Beams are included in our schedule. Click on the Filter tab.

Run through the dialog to set the following filters:-

- Filter 1 •
 - Filter by : **TSDI_Detail_Grp** 0
 - Action : does not contain
 - Search term : <blank cell>
- Filter 2
 - Filter by : **TSDI_Type**
 - Action : does not equal
 - Search term : **BRACE** 0

Schedule Prope	rties					×
Fields Filter	Sorting/Grouping	Formatting	Appearance			
Filter by:	TSDI_Detail_Grp	\sim	does not contain	\sim		
And:	TSDI_Type	\sim	does not equal	\sim	BRACE	~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
			C	Ж	Cancel	Help

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following actions:

- Sort by : **TSDI_Type**
 - Ascending order
- Sort by : **Type**
 - Ascending order
- Sort by : Length
 - Ascending order
- Sort by : TSDI_Matl
 Asconding order
 - Ascending order

Ensure the **Grand totals** is enabled (**Title, count, and totals** option) Deselect the **Itemize every instance** option.

Schedule Propertie	s						\times
Fields Filter So	orting/Grouping Form	atting	Appearance				
Sort by:	TSDI_Type		~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	Туре		~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	Length		~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	TSDI_Matl		~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Grand totals:	Title, count, and	totals	~				
	Custom grand tot	al title:					
	Grand total						
Itemize every i	instance						
			[OK	Ca	ncel Help	

Access the **Formatting** tab and make the following changes:

- Count
 - Alignment : Center
- Type
 - \circ Heading : Section Size
 - Alignment : Center
- TSDI_Matl
 - Heading : Material
 - Alignment : Center
- TSDI_Type
 - Heading : Beam Type
 - Alignment : Center
- TSDI_Trans_Reinf
 - Heading : Additional Transverse Reinforc.
 - Alignment : Center
- Length
 - Alignment : Center
- TSDI_Detail_Grp
 - Hidden Field: Enabled

Schedule Properties	>	<
Fields Filter Sorting/Grouping Forma	natting Appearance	
Fields: Count Type TSDI_Matl TSDI_Trans_Reinf Length TSDI_Detail_Grp	Heading: Count Heading orientation: Horizontal Alignment: Center Field formatting: Field Format Hidden field Conditional Format Show conditional format on sheets No calculation	
	OK Cancel Help	

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

Once you are happy with the contents and the format of the schedule, click OK.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

8.11 Creating a Steel Brace Schedule

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).

<u>/</u> 5	<u> </u>				Autoo	lesk Revit 20	019.2 - N	lot For Res	ale Version	- Project1 - S	chedule: TS	D Composite	Floor So	hedule	
Ana	lyze M	/lassing &	ι Site	Collaborat	te View	Manage	e Add	-Ins Qu	antification	Site Desig	iner BIN	l Interoperabil	ity Tools	Tek	la Integi
	\bigcirc	Ż		\mathbf{i}	9	\bigcirc°	G		L)	F			•∰	<u>^</u>	
Cut Profile	Render	Render in Cloud		-	Section	Callout •	Plan Views	Elevation	Drafting View	Duplicate View	Legends •	Schedules T	Scope Box	Sheet	View
к	P	resentatio	n						Create	Sche	edule/Quan	tities			
					ule/Quants a key sch	t ities nedule or a s	schedule	of building	j componer	ata 📕	hical Colur	mn Schedule			
				Press	F1 for mo	re help				Mate	erial Takeof	f			
										L Shee	et List				
										Note	Block				
										View	/ List				
													1		

After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Structural Framing** from the **Category** list and set the name as being **TSD Steel Brace Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule	×
Filter list: <show all=""> ~</show>	2
Category: Structural Beam Systems Structural Columns U: Structural Connections	Name: TSD Steel Brace Schedule
Structural Fabric Areas Structural Fabric Reinforcem. Saccord Foundations Structural Framing Structural Framing	Schedule keys Key name:
Structural Loads	Phase:
 Structural Path Reinforcem Structural Rebar Structural Rebar Couplers 	New Construction V
ОК	Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedul	e Prope	rties						×
Fields	Filter	Sorting/Grouping	Formatting	Appearance				
Select	availabl	e fields from:						
Struc	tural Fra	ming	~					
Availa	ble fields				Scheduled	fields (in order)):	
Asser Camb Coati Comn Cost Coun Cross Descr Eleva Eleva End E	nents t	cription ne Rotation ottom op	~	+ + New	parameter	3		
Ø	×~				/ "D	↑E ∔E		
	lude ele	ments in links						
				[OK	Cance	el Help	

On the Parameter Properties dialog, choose to use a Shared Parameter and then click on Select.

 Project parameter (Can appear in schedules bu Shared parameter (Can be shared by multiple p appear in schedules and tage 	rojects and families, exported to ODBC, and
	Select. Export
Parameter Data	
Name: <no parameter="" selected=""></no>	○ Type
Discipline:	
Type of Parameter:	Values are aligned per group type
Group parameter under:	Values can vary by group instance
Dimensions	~
Tooltip Description: <no description,="" edit="" td="" this<="" tooltip=""><td>parameter to write a custom tooltip, Custom tooltips hav,</td></no>	parameter to write a custom tooltip, Custom tooltips hav,

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters	×
Choose a parameter group, and a parameter.	
Parameter group:	
TSD Integrator \checkmark	
Parameters:	
TSDI_Detail_Grp Edit TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_ID TSDI_Integration_Status TSDI_Maufacturer TSDI_Matl TSDI_Not_Converted TSDI_Not_Converted TSDI_Size TSDI_Size TSDI_Size TSDI_StartConn TSDI_Trans_Reinf TSDI_Type	
OK Cancel Help	

With the **TSDI_Part_Mark** parameter now loaded into the schedule and listed in the **Available Fields** window, click to highlight and then use the **Add parameter(s)** command to place it into the **Scheduled fields (in order)** window.

Schedu	le Prope	rties				×
Fields	Filter	Sorting/Grouping	Formatting	Appearance		
	t availabl ctural Fra	e fields from:	~			
Availa Stari Stari Stari Stari Stari Stari Stari Stari	able fields t Extension t Join Cut t Level Of t y Justifi t y Offset t z Justifio t z Offset ctural Ma	on back ffset cation t Value cation Value terial	^	Ę	Scheduled fields (in order):	^
Туре Туре Туре Туре	Commer IfcGUID Image Mark	nts	~	°⊡ <i>f</i> ∡ ₪		~
In	د dude ele	ments in links			✓ [™] tE FE	
					OK Cancel	Help

Repeat the same commands to add the following parameters in the following order:

(NB. Positions of parameters can be adjusted by using the **Move Parameter Up** and **Move Parameter Down** commands held underneath the **Scheduled fields...** window).

- TSDI_Part_Mark : (TSD Integrator parameter group)
- **Type** : (Revit parameter should already be available to select)
- TSDI_Matl : (TSD Integrator parameter group)
- Length : (Revit parameter should already be available to select)
- **Result_AxialMax** : (TSD Integrator parameter group)
- TSDI_Type : (TSD Integrator parameter group)
- TSDI_Detail_Grp : (TSD Integrator parameter group)

With the fields now set, we can set the filters so that only Steel Bracing members are included in our schedule. Click on the **Filter** tab.

Run through the dialog to set the following filters:-

- Filter 1
 - Filter by : TSDI_Detail_Grp
 - Action : does not contain
 - Search term : <blank cell>
- Filter 2
 - Filter by : **TSDI_Type**
 - Action : equals
 - Search term : BRACE

Schedule Prope	rties					×
Fields Filter	Sorting/Grouping	Formatting	Appearance			
Filter by:	TSDI_Detail_Grp	~	does not contain	\sim		
And:	TSDI_Type	~	equals	~	BRACE	~
And:	(none)	~		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
			C	Ж	Cancel	Help

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following action:

- Sort by : **TSDI_Part_Mark**
 - Ascending order

Do not select the Grand totals option Keep the Itemize every instance option enabled.

Schedule Prope	rties						×
Fields Filter	Sorting/Grouping	Formatting	Appearance				
Sort by:	TSDI_Part	_Mark	~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		Opescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		\sim	Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Grand total	ls:		\sim				
	Custom gra	nd total title:					
	Grand tota	al					
🗹 Itemize eve	ery instance						
			[OK	Car	ncel Hel	p

Access the **Formatting** tab and make the following changes:

- TSDI_Part_Mark •
 - Heading : Part Mark
 - Alignment : Center
- Type •
 - Heading : Section Size
 - Alignment : Center
- **TSDI Matl**
 - Heading : Material
 Alignment : Center
- Length •
 - Alignment : Center
- Result AxialMax •
 - Heading : Axial Max
 - Alignment : Center
- TSDI_Type •
 - Hidden Field: Enabled
- TSDI_Detail_Grp
 - Hidden Field: Enabled

elds Filter	Sorting/Grouping	Formatting	Appearance		
Tields: Type TSDI_Part_N Type TSDI_Matl Length Result_Axial TSDI_Type TSDI_Detail_	lark Max	Hea Pa Hea Ho Field	Appearance ading: art Mark ading orientation: prizontal gnment: enter Id formatting: Hidden field	Field Format Conditional Forma	-
			Show conditional form	at on sheets	~

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

Once you are happy with the contents and the format of the schedule, click **OK**.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

8.12 Creating a Steel Column Base Forces Schedule

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).

<u>/</u>	₹			Autoo	lesk Revit 2	2019.2 - N	lot For Resa	le Version	- Project1 - S	chedule: TS	SD Composite	Floor Sc	hedule	
Analyze	Massing &	Site	Collaborat	e View	Manag	e Add	-Ins Qua	ntification	Site Desig	ner BIN	1 Interoperabil	ity Tools	Tekl	a Integr
) 🗘		\mathbf{i}	9	\bigcirc	G		L)	F			•∰	<u>^</u>	
Cut Rer Profile	nder Render in Cloud		-	Section	Callout •	Plan Views	Elevation •	Drafting View	Duplicate View	Legends •	Schedules T	Scope Box	Sheet	View
к	Presentatio	n						Create	Sche	edule/Quan	tities			
			Creates	ule/Quani a key sch 1 for mo	nedule or a	schedule	of buildin <u>c</u>	componer	nts. Matu	ohical Colur erial Takeof et List e Block / List	mn Schedule f			

After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Structural Columns** from the **Category** list and set the name as being **TSD Steel Column Base Forces Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule		×
Filter list: <show all=""> <</show>		2
Category:		Name:
Stairs	^	TSD Steel Column Base Forces Schedule
Structural Area Reinforcem		
Structural Roam Sustems		Schedule building components
		○ Schedule keys
Orrectard ConnectorIS		Key name;
Structural Fabric Areas		
Structural Foundations		
Structural Framing		Phase:
		New Construction V
Structural Loads		
Structural Path Reinforcem	Υ.	
< >		_
		3
	к	Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedule	Proper	ties					×
Fields f	Filter	Sorting/Grouping	Formatting	Appearance			
	available ural Colu	fields from:	~				
Availabl Assemt Assemt Coating Column Comme Cost Count Descrip Estimat Family	le fields: bly Code bly Desc bly Nam g n Locatio ents otion ted Reir and Typ D	e on Mark nforcement Volume	~	F F	parameter	fields (in order): ∎ T T T T L ↓E	
🗌 Indu	ude elen	nents in links					
				[OK	Cancel	Help

On the **Parameter Properties** dialog, choose to use a **Shared Parameter** and then click on **Select**.

Parameter Properties	:	Х
Parameter Type O Project parameter (Can appear in schedules but n	ot in tags)	
 Shared parameter (Can be shared by multiple proj appear in schedules and tags) 	ects and families, exported to ODBC, and	
	Select. Export	
Parameter Data Name:		
<no parameter="" selected=""></no>	ОТуре	
Discipline:	○ Instance	
Type of Parameter:	 Values are aligned per group type 	
	○ Values can vary by group instance	
Group parameter under:		
Dimensions	\sim	
Tooltip Description: <no description,="" edit="" pa<="" td="" this="" tooltip=""><td>rameter to write a custom tooltip, Custom tooltips hav</td><td></td></no>	rameter to write a custom tooltip, Custom tooltips hav	
Add to all elements in the categor	y OK Cancel Help	

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters	Х
Choose a parameter group, and a parameter.	
Parameter group:	
TSD Integrator \checkmark	
Parameters:	
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_Integration_Status TSDI_Integration_Status TSDI_Maufacturer TSDI_Maufacturer TSDI_Maufacturer TSDI_Maufacturer TSDI_Maufacturer TSDI_Part_Mark TSDI_Part_Mark TSDI_Size TSDI_StartConn TSDI_Trans_Reinf TSDI_Trans_Reinf	
OK Cancel Help	

With the **TSDI_Part_Mark** parameter now loaded into the schedule and listed in the **Available Fields** window, click to highlight and then use the **Add parameter(s)** command to place it into the **Scheduled fields (in order)** window.

Schedule	Proper	ties					×
Fields F	ilter	Sorting/Grouping	Formatting	Appearance			
Select a		: fields from: umns	~				
Available Phase I Section Structu Top Lev TSDL P Type C Type If	Demolis Shape ral Mat /el art_Ma	hed erial rk	^	F	Scheduled fields (i	in order):	^
Type In Type M URL Volume W	ark		~	*`` <i>f±</i> ®*			*
/ E		nents in links			🥒 造 🕇 🕇 🕇	ŧΕ	
					OK	Cancel	Help

Repeat the same commands to add the following parameters in the following order:

(NB. Positions of parameters can be adjusted by using the Move Parameter Up and Move Parameter Down commands held underneath the Scheduled fields... window).

- TSDI_Part_Mark • : (TSD Integrator parameter group)
- Type •

- : (Revit parameter should already be available to select)
- **Result_ColMajorMomentMax** : (TSD Integrator parameter group) •
 - Result ColMajorMomentMin : (TSD Integrator parameter group) •
 - **Result ColMajorShearMax** : (TSD Integrator parameter group)
- Result ColMaiorShearMin : (TSD Integrator parameter group) •
- **Result _ColMinorMomentMax** : (**TSD Integrator** parameter group) •
- Result ColMinorMomentMin : (TSD Integrator parameter group) •
- Result_ColMinorShearMax : (TSD Integrator parameter group) •
- **Result ColMinorShearMin** : (TSD Integrator parameter group) •
- **Result ColVShearMax**
- : (TSD Integrator parameter group)
- Result ColVShearMin •
 - : (TSD Integrator parameter group) : (TSD Integrator parameter group)
- **TSDI Mati TSDI Detail Grp** : (TSD Integrator parameter group) •

With the fields now set, we can set the filters so that only Steel Columns are included in our schedule. Click on the Filter tab.

Run through the dialog to set the following filters:-

- Filter 1 •
 - Filter by : TSDI_Detail_Grp 0
 - Action : does not contain 0
 - Search term : <blank cell> 0
- Filter 2
 - Filter by : **Result ColVShearMax**
 - Action : is greater than 0
 - Search term : 0.22 kip (1.00 kN for metric templates) 0

Schedule Prope	rties					×
Fields Filter	Sorting/Grouping	Formatting	Appearance			
Filter by:	TSDI_Detail_Grp	\sim	does not contain	\sim		
And:	Result_ColVShearM	ax 🗸	is greater than	~	0.22 kip	~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
And:	(none)	\sim		\sim		~
				ОК	Cancel	Help

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following action:

- Sort by : TSDI_Part_Mark
 - Ascending order

Do not select the **Grand totals** option Keep the **Itemize every instance** option enabled.

Schedule Properties							×
Fields Filter Sortin	g/Grouping Form	natting Appea	arance				
Sort by:	TSDI_Part_Mark		~ @	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		Opescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~ (Ascending		Obescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~ (Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Grand totals:			\sim				
	Custom grand total title:						
	Grand total						
Itemize every instance							
				OK	Can	cel Help	

Access the **Formatting** tab and make the following changes:

- TSDI_Part_Mark •
 - Heading : Part Mark
 - Alignment : Center 0
- Type
 - Heading : Section Size
 - Alignment : Center
- Result_ColMajorMomentMax
 - Heading : Max Major Moment
 - Alignment : Center
- Result ColMajorMomentMin
 - Heading : Min Major Moment
 - Alignment : Center
- Result_ColMajorShearMax
 - Heading : Max Major Shear
 - Alignment : Center
- Result_ColMajorShearMin
 - Heading : Min Major Shear
 Alignment : Center
- Result_ColMinorMomentMax
 - Heading : Max Minor Moment
 - Alignment : Center
 - Result_ColMinorMomentMin
 - Heading : Min Minor Moment
 - Alignment : Center
 - **Result ColMinorShearMax**
 - Heading : Max Minor Shear
 - Alignment : Center
- Result_ColMinorShearMin
 - Heading : Min Minor Shear
 - Alignment : Center
- **Result ColVShearMax**
 - Heading : Max Axial
 - Alignment : Center
- Result ColVShearMin
 - Heading : Min Axial
 - Alignment : Center
- **TSDI Matl**
 - Hidden Field: Enabled
- **TSDI Detail Grp**
 - Hidden Field: Enabled

Schedule Properties	\times
Fields Filter Sorting/Grouping Formatting Appearance Fields:	
OK Cancel Hel;	

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

Once you are happy with the contents and the format of the schedule, click **OK**.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

8.12.1 Variants

This schedule will include all columns including upper stacks of spliced columns, columns sat directly onto supporting beams and truss vertical struts.

Additional filters can be added to help reduce the amount of information:

- Ensuring that parameter: **TSDI_Part_Mark**, action: **contains**, search term: **SC** will remove Truss Struts from the list.
- Similarly adding a filter that parameter: TSDI_Part_Mark, action: contains, search term: -1 will ensure that upper stacks of splice columns are omitted from the schedule.
- Alternatively a filter of parameter: TSDI_Part_Mark, action: does not contain, search term: -1 will ensure that only upper stacks of splice columns are included in the schedule.

Additional schedules can also be created using these or similar filters.

8.13 Creating a Steel Column Schedule

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).

<u>/</u> 5	<u> </u>				Autoo	lesk Revit 20	019.2 - N	lot For Res	ale Version	- Project1 - S	chedule: TS	SD Composite	Floor Sc	hedule	
Ana	lyze I	/lassing 8	ι Site	Collaborat	te View	Manage	e Add	-Ins Qu	antification	Site Desig	ner BIN	1 Interoperabil	ity Tools	Tek	la Integ
	\bigcirc	VZ		\mathbf{i}	9	\bigcirc°	G		L)	F			o∰	<u>^</u>	
Cut Profile	Render	Render in Cloud		-	Section	Callout •	Plan Views	Elevation	Drafting View	Duplicate View	Legends •	Schedules	Scope Box	Sheet	View
к	P	resentatio	n						Create	Sche	edule/Quan	tities			
				-											
				Sched	ule/Quan	tities				Grap	phical Colu	mn Schedule			
				Create	s a key scł	nedule or a s	schedule	of building	g componei		erial Takeof	Ŧ			
				Press	F1 for mo	re help				a line					
											et List				
										Note	e Block				
										View	/ List				
]		

After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Structural Columns** from the **Category** list and set the name as being **TSD Steel Column Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule	×
Filter list: <show all=""> <</show>	2
Category:	Name:
🗄 Stairs 🔺	TSD Steel Column Schedule
Structural Area Reinforcem Structural Roam Systems	Schedule building components
Structural Columns	○ Schedule keys
Structural Fabric Areas	Key name:
Structural Fabric Reinforcem.	
Structural Foundations Structural Framing	Phase:
Structural Internal Loads	New Construction \sim
€ Structural Loads	
	3
Ск	Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.

Schedu	le Prope	rties					×	(
Fields	Filter	Sorting/Grouping	Formatting	Appearance				
Select	t available	e fields from:						
Struc	tural Col	umns	\sim					
Availa	ble fields	:		1	Scheduled fi	ields (in order):		
Asse Asse Coat Colur Com Cost Cour Desc Estim Fami	mn Locati ments niption nated Rein ly ly and Ty JID	cription le on Mark nforcement Volume	~	↓	parameter] ↑E ↓E		
□ In	clude eler	nents in links				• - • -		
						_		
					OK	Cancel	Help	

On the Parameter Properties dialog, choose to use a Shared Parameter and then click on Select.

Parameter Properties	\times					
Parameter Type O Project parameter (Can appear in schedules but not in tags)						
 Shared parameter (Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags) 						
Select. Export						
Parameter Data Name:						
<no parameter="" selected=""> O Type</no>						
Discipline:						
Type of Parameter: Values are aligned per group type						
Values can vary by group instance						
Group parameter under:						
Dimensions 🗸						
Tooltip Description: <no a="" custom="" description.="" edit="" hav<="" parameter="" td="" this="" to="" tooltip="" tooltip.="" tooltips="" write=""><td></td></no>						
Add to all elements in the category OK Cancel Help						

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters	×
Choose a parameter group, and a parameter.	
Parameter group:	
TSD Integrator \checkmark	
Parameters:	
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_Integration_Status TSDI_Manufacturer TSDI_Maturer TSDI_Maturer TSDI_Not_Converted TSDI_Not_Converted TSDI_Netr TSDI_Size TSDI_StartConn TSDI_StartConn TSDI_Trans_Reinf TSDI_Type V	
OK Cancel Help	

With the **TSDI_Part_Mark** parameter now loaded into the schedule and listed in the **Available Fields** window, click to highlight and then use the **Add parameter(s)** command to place it into the **Scheduled fields (in order)** window.

Schedu	le Prope	erties					×
Fields	Filter	Sorting/Grouping	Formatting	Appearance			
Selec Strui Availa Phas Sect Strui Top Top Top Type Type Type	t availabl ctural Col able fields to Demolision Shap ctural Ma Level Part M Part M Commer 1fcGUID Image Mark	e fields from: lumns s: shed e terial ark	←ormatung	F	Scheduled fields]	~
🗌 In	dude ele	ments in links					
					OK	Cancel	Help

Repeat the same commands to add the following parameters in the following order:

(NB. Positions of parameters can be adjusted by using the **Move Parameter Up** and **Move Parameter Down** commands held underneath the **Scheduled fields...** window).

- TSDI_Part_Mark : (TSD Integrator parameter group)
- **Type** : (Revit parameter should already be available to select)
- TSDI_Matl : (TSD Integrator parameter group)
- TSDI_Type : (TSD Integrator parameter group)
- Base Level : (Revit parameter should already be available to select)
- Base Offset
 : (Revit parameter should already be available to select)
- **Top Level** : (Revit parameter should already be available to select)
- Top Offset : (Revit parameter should already be available to select)
- Length : (Revit parameter should already be available to select)
- TSDI_Detail_Grp : (TSD Integrator parameter group)

With the fields now set, we can set the filters so that only Steel Columns are included in our schedule. Click on the **Filter** tab.

Run through the dialog to set the following filters:-

- Filter 1
 - Filter by : **TSDI_Detail_Grp**
 - Action : does not contain
 - Search term : <blank cell>
- Filter 2
 - Filter by : **TSDI_Type**
 - Action : does not contain
 - Search term : **PILE**

Schedule Prope	erties					>
Fields Filter	Sorting/Grouping	Formatting	Appearance			
Filter by:	TSDI_Detail_Grp	\sim	does not contain	\sim		
And:	TSDI_Type	~	does not contain	\sim	PILE	
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
And:	(none)	\sim		\sim		\sim
			C	Ж	Cancel	Help

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following action:

- Sort by : **TSDI_Part_Mark**
 - Ascending order

Enable the **Grand totals** option. Use the **Title, count, and totals** default filter Keep the **Itemize every instance** option enabled.

Schedule Propertie	25						\times
Fields Filter S	orting/Grouping For	matting	Appearance				
Sort by:	TSDI_Part_Mar	k	~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending			
Header	Footer:				\sim	Blank line	
Then by:	(none)		\sim	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		\sim	Ascending		Obescending	
Header	Footer:				\sim	Blank line	
Grand totals:	Title, count, an	nd totals	~				
	Custom grand t	otal title:					
	Grand total						
☑ Itemize every	instance						
				ОК	Ca	ncel Help	

Access the Formatting tab and make the following changes:

- TSDI_Part_Mark
 - Heading : Part Mark
 - Alignment : **Center**
- Type
 - Heading : Section Size
 - Alignment : Center
- TSDI_Matl
 - Heading : Material
 - Alignment : Center
- TSDI_Type
 - Heading : Column Type
 - Alignment : Center
- Base Level
 - Alignment : Center
- Base Offset
 - Alignment : Center
- Top Level
 - Alignment : Center
- Top Offset
 - Alignment : Center
- Length
 - \circ Alignment : Center
- TSDI_Detail_Grp
 - Hidden Field: Enabled

Schedule Properties		×
Fields Filter Sorting/Grouping Fields: TSDI_Part_Mark Type TSDI_Matl TSDI_Type Base Level Base Offset Top Level Top Offset Length TSDI_Detail_Grp	Formatting Appearance Heading: Part Mark Heading orientation: Horizontal Alignment: Center Field formatting: Field Format Field formatting: Field Format Hidden field Conditional Format Show conditional format on sheets No calculation	~
	OK Cancel I	Help

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

Once you are happy with the contents and the format of the schedule, click **OK**. The schedule is now complete and can be hosted onto drawing views or exported to comma-separated-file format.

8.13.1 Variants

This schedule will include all columns including upper stacks of spliced columns, columns sat directly onto supporting beams and truss vertical struts.

Additional filters can be added to help reduce the amount of information:

- Ensuring that parameter: **TSDI_Part_Mark**, action: **contains**, search term: **SC** will remove Truss Struts from the list.
- Similarly adding a filter that parameter: TSDI_Part_Mark, action: contains, search term: -1 will ensure that upper stacks of splice columns are omitted from the schedule.
- Alternatively a filter of parameter: TSDI_Part_Mark, action: does not contain, search term: -1 will ensure that only upper stacks of splice columns are included in the schedule.

Additional schedules can also be created using these or similar filters.

8.14 Creating a Wall Schedule

From your open Revit project or template click on the **View** tab and then the command **Schedule/Quantities** (held in the **Schedules** sub-menu).

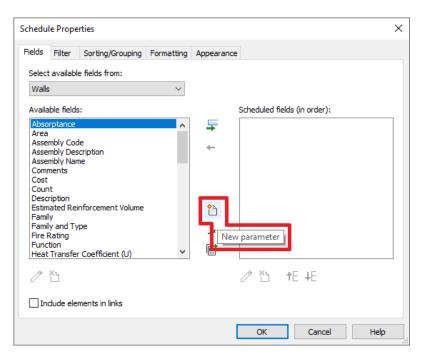
<u>/</u> 5	<u> </u>				Autoo	lesk Revit 2	019.2 - N	lot For Res	ale Version	- Project1 - S	chedule: TS	D Composite	Floor So	hedule	
Ana	lyze I	Massing &	Site	Collaborat	e View	Manage	e Add	-Ins Qu	antification	Site Desig	ner BIN	l Interoperabil	ity Tools	Tek	la Integi
	\bigcirc	V2		\mathbf{i}	9	\bigcirc	G			F			۰Ĥ		
Cut Profile	Render	Render in Cloud		-	Section	Callout •	Plan Views	Elevation	Drafting View	Duplicate View	Legends •	Schedules T	Scope Box	Sheet	View
К	F	resentatio	n						Create	Sche	dule/Quan	tities			
				Sched	ule/Quan	tities				Grap	hical Colur	nn Schedule			
				Create	s a key sch	nedule or a s	schedule	of building	g componei						
				Press	F1 for mo	re help				, Mate	erial Takeof	t			
										L Shee	t List				
										Note	Block				
										View	List				
													1		

After clicking on the command, you will be faced with a **New Schedule** dialog. Click to select **Walls** from the **Category** list and set the name as being **TSD Wall Schedule**. Click **OK** after setting this data to access the main **Schedule Properties** dialog.

New Schedule	×
Filter list: <pre><show all=""> </show></pre> Category: Output: Structural Loads Structural Path Reinforcem	2 Name: TSD Wall Schedule Schedule building components
Structural Rebar Couplers Structural Stiffeners Structural Trusses Switch System Telephone Devices Topography	O Schedule keys Key name: Phase:
	New Construction
ОК	Cancel Help

You should now be faced with a **Schedule Properties** dialog and be viewing the **Fields** tab. Within this tab, we can choose which parameters are going to be shown in the schedule. However, as many of the parameters we are wanting to use do not exist within the default Revit content, we will need to load these shared parameters into the schedule dialog so that they can then be hosted.

To load a Tekla Structural Designer shared parameter into the schedule, click on the **New Parameter** command.



On the Parameter Properties dialog, choose to use a Shared Parameter and then click on Select.

Parameter Properties		X
Parameter Type O Project parameter (Can appear in schedules but not in ta	ags)	
 Shared parameter (Can be shared by multiple projects a appear in schedules and tags) 	nd families, exported to ODBC, and	
	Select. Export	
Parameter Data Name:	0.5	
<no parameter="" selected=""></no>	O Type O Instance	
Type of Parameter:	 Values are aligned per group type Values can vary by group instance 	
Group parameter under: Dimensions ~	Values can vary by group instance	
Tooltip Description: <no description,="" edit="" paramet<="" td="" this="" tooltip=""><td>er to write a custom tooltip. Custom tooltips hav…</td><td></td></no>	er to write a custom tooltip. Custom tooltips hav…	
Add to all elements in the category	OK Cancel Help	

Select the shared parameter **TSDI_Part_Mark** (Parameter group: **TSD Integrator**) and then click **OK** to return to the **Parameter Properties** dialog. Click **OK** on the **Parameters Properties** dialog to return to the main **Schedule Properties** dialog.

Shared Parameters	×
Choose a parameter group, and a parameter.	
Parameter group:	
TSD Integrator \checkmark	
Parameters:	
TSDI_Detail_Grp TSDI_Dim TSDI_EndConn TSDI_Fibre_Reinf TSDI_ID TSDI_Integration_Status TSDI_Manufacturer TSDI_Matl TSDI_Not_Converted TSDI_Not_Converted TSDI_Size TSDI_StartConn TSDI_Trans_Reinf TSDI_Type V	it
OK Cancel H	elp

With the **TSDI_Part_Mark** parameter now loaded into the schedule and listed in the **Available Fields** window, click to highlight and then use the **Add parameter(s)** command to place it into the **Scheduled fields (in order)** window.

								_
Schedu	le Prope	rties					×	
Fields	Filter	Sorting/Grouping	Formatting	Appearance				
Select	t available	e fields from:						
Walls	3		\sim					
Availa	able fields	:		_	Scheduled fields (in	order):		
Struc	ctural Mat ctural Usa mal mass	ige	^	F				
Top (Constrain	tance (R) It		Add	parameter(s)			
TSDI Type								
Туре	Commer IfcGUID Image	its		<u>*</u>				
Type	Mark	Height		f_x				
URL Volur	ne		~	e t				
Ø	×2				🥒 🎦 🕇	ŧE		
□ In	dude eler	ments in links						
				[ОК	Cancel	Help	

Repeat the same commands to add the following parameters in the following order: (NB. Positions of parameters can be adjusted by using the **Move Parameter Up** and **Move Parameter Down** commands held underneath the **Scheduled fields...** window).

• •	TSDI_Part_Mark	: (TSD Integrator parameter group)			
• -	Туре	: (Revit parameter - should already be available to select)			
• -	TSDI_Matl	: (TSD Integrator parameter group)			
• -	TSDI_Type	: (TSD Integrator parameter group)			
•	Width	: (Revit parameter - should already be available to select)			
•	Level	: (Revit parameter - should already be available to select)			
•	Base Constraint	: (Revit parameter - should already be available to select)			
•	Base Offset	: (Revit parameter - should already be available to select)			
• -	Top Constraint	: (Revit parameter - should already be available to select)			
	Top Offset	: (Revit parameter - should already be available to select)			
•	Unconnected Height	: (Revit parameter - should already be available to select)			
•	Volume	: (Revit parameter - should already be available to select)			

With this particular schedule, there are no additional filters to set. We can therefore bypass the **Filter** tab.

After generating the filters, click on the **Sorting/Grouping** tab so that we can sort the data into order. Apply the following actions:

- Sort by : **TSDI_Type**
 - Ascending order
- Then by : TSDI_Part_Mark
 - Ascending order

Do not select the **Grand totals** option Keep the **Itemize every instance** option enabled.

Schedule Properties							×
Fields Filter Sortin	g/Grouping	Formatting	Appearance				
Sort by:	TSDI_Type		~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	TSDI_Part_N	1ark	~	Ascending		ODescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		~	Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Then by:	(none)		\sim	Ascending		Oescending	
Header	Footer:				\sim	Blank line	
Grand totals:			\sim				
	Custom grand	d total title:					
	Grand total						
☑ Itemize every instance							
			E	ОК	Car	ncel Help	

Access the **Formatting** tab and make the following changes:

TSDI_Part_Mark • • Heading : Part Mark • Alignment : Center Type • Alignment : Center TSDI_Matl • Heading : Material • Alignment : Center TSDI_Type • Heading : Wall Type • Alignment : Center Width • Alignment : Center Length . • Alignment : Center **Base Constraint** • • Alignment : Center Base Offset . • Alignment : Center **Top Constraint** • • Alignment : Center Top Offset • • Alignment : Center **Unconnected Height** • • Alignment : Center Volume • • Alignment : Center

Schedule Properties		Х
Fields Filter Sorting/Grouping Fields: TSDI_Part_Mark Type TSDI_Matl TSDI_Type Width Length Base Constraint Base Offset Top Constraint Top Constraint Unconnected Height Volume Volume	Formatting Appearance Heading: Part Mark Part Mark Heading orientation: Horizontal V Alignment: V Center V Field formatting: Field Format Hidden field Conditional Format V Show conditional format on sheets No calculation	
	OK Cancel Help	

The final changes should be to the appearance of the schedule, setting the correct text font and line thicknesses. This should be done through the **Appearance** tab.

Once you are happy with the contents and the format of the schedule, click OK.

The schedule is now complete and can be hosted onto drawing views or exported to comma-separatedfile format.

8.15 Creating additional schedules to filter contents by floor level

Within Revit, it is possible to create additional schedules that allow data to be filtered by floor. In this way, you are able to create schedules for (say) Concrete Beams on first floor, Concrete Beams on second floor etc.

To generate additional schedules, right click on the name and then use the command **Duplicate View** and the sub-command **Duplicate**.

Filter	Open	1
Sorting/Grouping	Close	
Formatting		
Appearance	Apply Template Properties	
	Create View Template From View	
	Duplicate View	Duplicate
	Convert to independent view	Duplicate with Detailing
	Apply Dependent Views	Duplicate as a Dependent
Descention halo	Save to Project as Image	
Properties help	Delete	
Project Browser - Project 2	Copy to Clipboard	
TSD Integration Status		
TSD Men be Type	Rename	
Elevations (East ing Elevation)	Select All Instances >	
East	Properties	
North	Topenes	
····· South	Save to New File	
West	Search	
Egends		
Schedules/Quartities (all) TSD Composite Floor Schedule	Expand All	
TSD Concrete Beam Schedule	Collapse All	
		·
TSD Concrete Columns Right-	click	
TSD Foundation Schedule		
TSD Pile Schedule		
TSD Steel Beam End Forces		
too over beam end forces		

The Revit parameter **Level** will need to be added to the list on **Scheduled Fields**. You will then need to add a **Filter** that uses the Level filter against a specific level. It is also possible to filter schedule data by the parameter **TSD_Part_Mark** as, by default; this will be set to reference the beam level within the part mark entry.

The Level parameter can be omitted from the schedule by accessing the Formatting tab and enabling the option Hidden Field.