User Manual

for the

Conversion Functions between

openBIM Model and Structural Analysis Model

in

BIM Structure Tool

by

Buildings Department

Version 1.0

Dec 2025

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	Amendment History				
Change Number	Revision Description	Pages Affected on Respective Version	Revision / Version Number	Date	Approval Reference
1	First Draft		0.1	25 Nov 2025	
2	First Issue		1.0	23 Dec 2025	

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1. Introduction

1.1   The BIM Structure Tool (BST) of Buildings Department is a web-based platform which has the following features:

1.1.1   Overlay 2D structural framing plans in pdf format with openBIM model/openBIM data model converted from a structural analysis model (SAM) to enable user to perform compatibility check;

1.1.2   Provide supplementary information through keyword searches from the plans assisting user in checking the structural plans and verifying information against commonly used design standards and specifications in preparing/checking the structural plans;

1.1.3   Convert Autodesk Revit, Trimble Teckla, CSI ETABS, CSI SAP2000 and CSI SAFE[1] into openBIM model.

1.1.4   Provide an openBIM viewer to visualize openBIM model and openBIM data model[2] in 3D view; and

1.1.5   Convert openBIM data model to structural analysis model in e2k format and reverse back[3].

1.2   The BIM Structure Tool can be accessed through Electronic Submission Hub (ESH) of BD and relevant video guides for the tool (features in paragraph 1.1.1 to 1.1.4 above) can be viewed via the following link. [https://www.bd.gov.hk/en/resources/online-tools/building-information-modelling/index_videos.html]

1.3   This document describes the operation steps of the conversion function in BST (feature in paragraph 1.1.5 above).

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[1] BST supports Autodesk Revit 2025, Tekla Structure 2024, ETABS version 22, SAP2000 version 25, SAFE version 22 and IFC version 4x0.

[2] openBIM data model is an openBIM model containing the structural parameters values. Detailed structural parameters and sample of the input values for beam, column, wall and slab are in Appendices I to IV.

[3] The conversion function currently supports IFC version 4x3 only and ETABS version 21 or above.

2. Preparation of openBIM Data Model

2.1   Before using conversion function of openBIM model to SAM in e2k format, an openBIM data model should be prepared by following the steps below:

   2.1.1   Prepare BIM Model in Revit;
   2.1.2   Use BST Plug in Tool[4] for Revit model:
   - (i)   Download BST Plug in Tool in BD website;
   - (ii)   Install BST Plug in Tool;
   - (iii)   Generate schedules for input structural parameters values;
   - (iv)   Input structural parameters values in Revit / Input structural parameters values by using BST Plug in Tool;
   - (v)   Check the structural parameters values input via BST Plug in Tool;

   2.1.3   Modify Objects' Configuration; and
   2.1.4   Export to openBIM data file, IFC version 4x3.

2.2   Create BIM model in Revit

A BIM model in Revit should be created with assigned Beam, Column, Wall and Slab objects.

2.3   Use BST Plug in Tool for Revit model

2.3.1   The BST Plug in Tool provided by BD can be downloaded from BD's BIM webpage [Link] to facilitate parameter input of BIM Model in Revit.

2.3.2   Install BST Plug in Tool

   - (i)   Double click the BST Setup.exe file to install the BST Plug in Tool.

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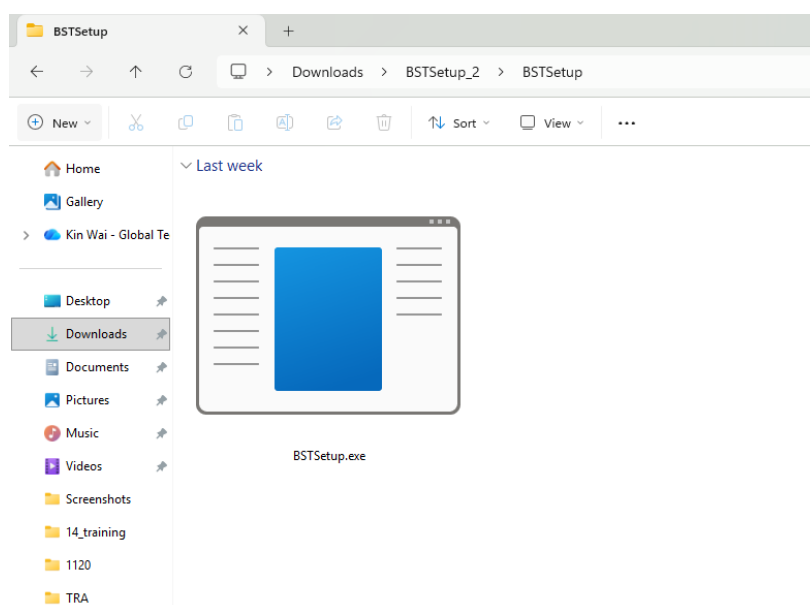
[4] The use of BST Plug in Tool is not mandatory for the conversion function. BST currently supports IFC version 4x3, and user can utilise other BIM software to input structural parameter values as per Appendices I to IV in BIM model and export to openBIM data model.
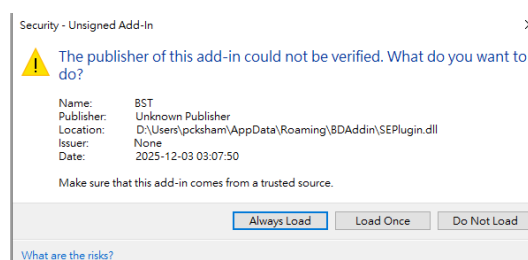
(ii)   Accept the terms and conditions.
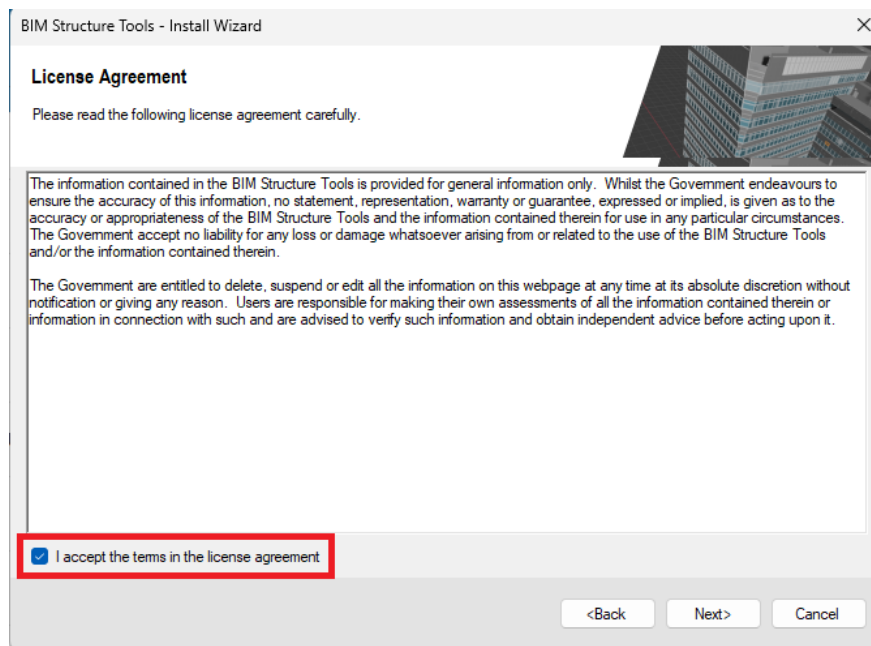
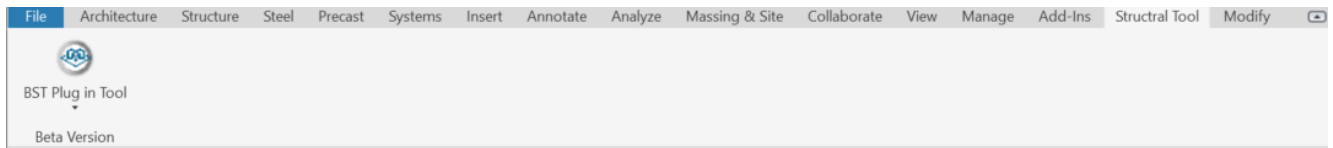(iii)   Select versioning of Revit and install.
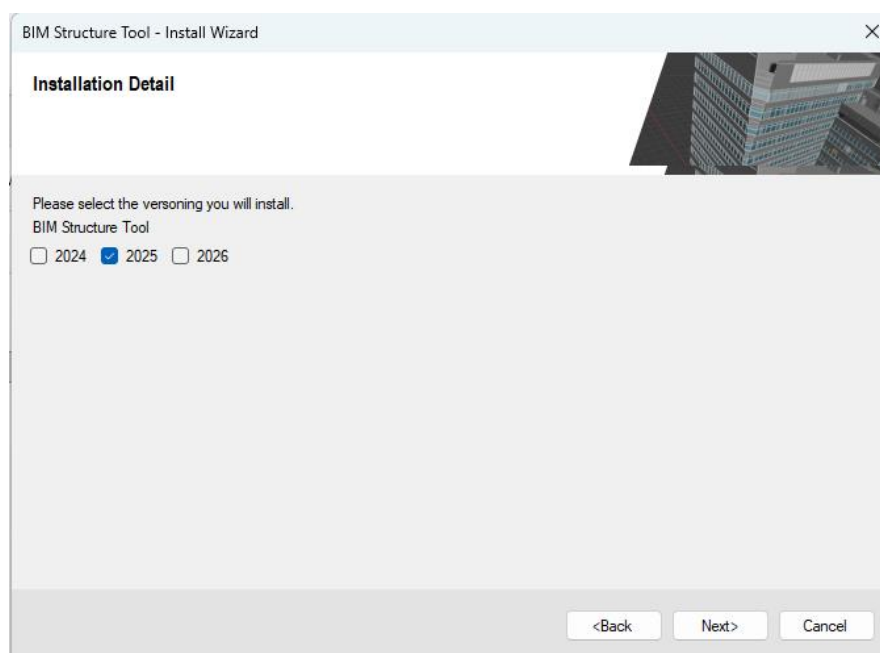
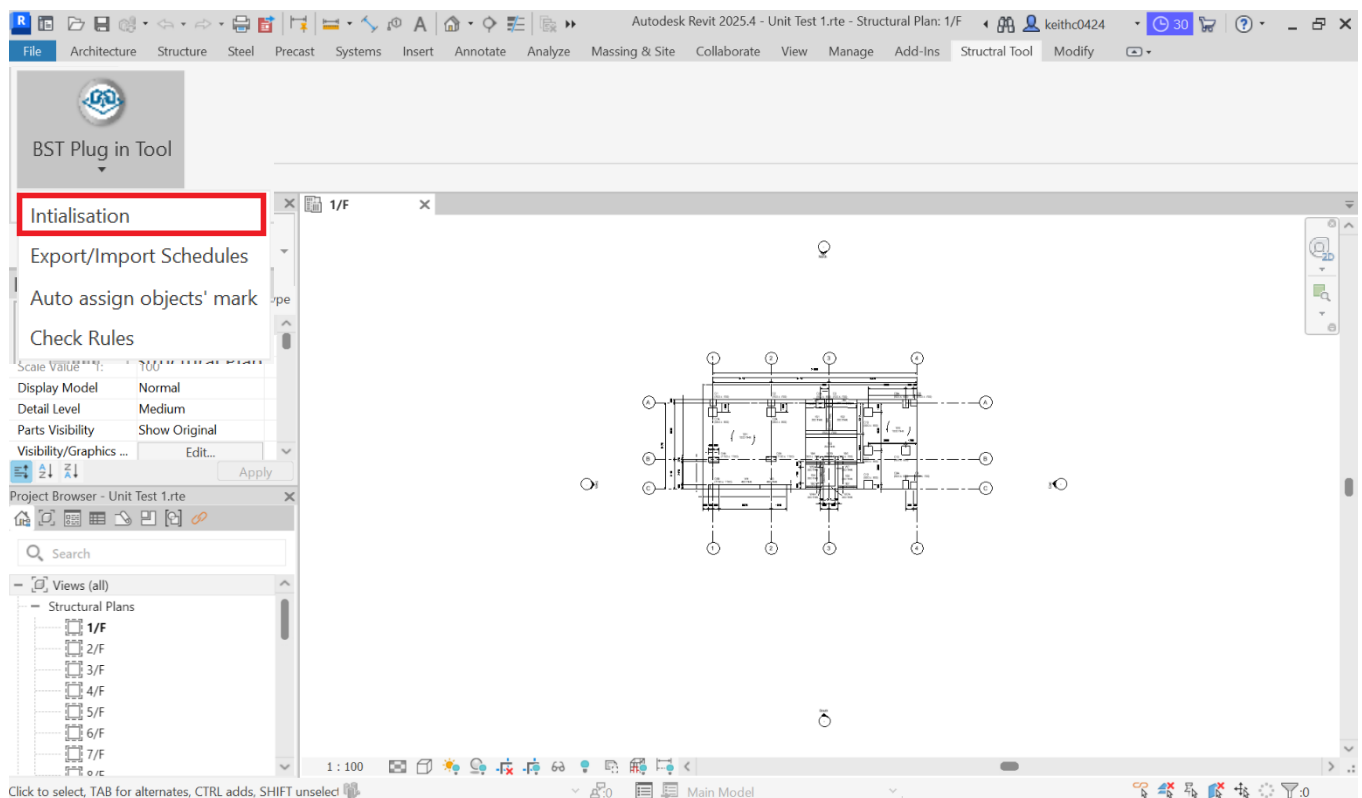(iv)   Open Autodesk Revit and select "Always Load".

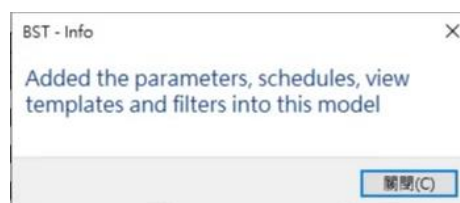2.3.3   Generate schedules for input structural parameters values

(i)   Select the "Structural Tool" in the navigation bar and then click "BST Plug in Tool".

(ii)   Select "Initialisation" and then a pop-up window will appear. The required parameters and schedules will be imported to the BIM model as shown below.

(iii)   Click "Close" once the parameters and schedules area added.

(iv) Double click the schedules to view objects' parameters and schedules in "Schedules/Quantities". The schedules would assist user to input required parameter.
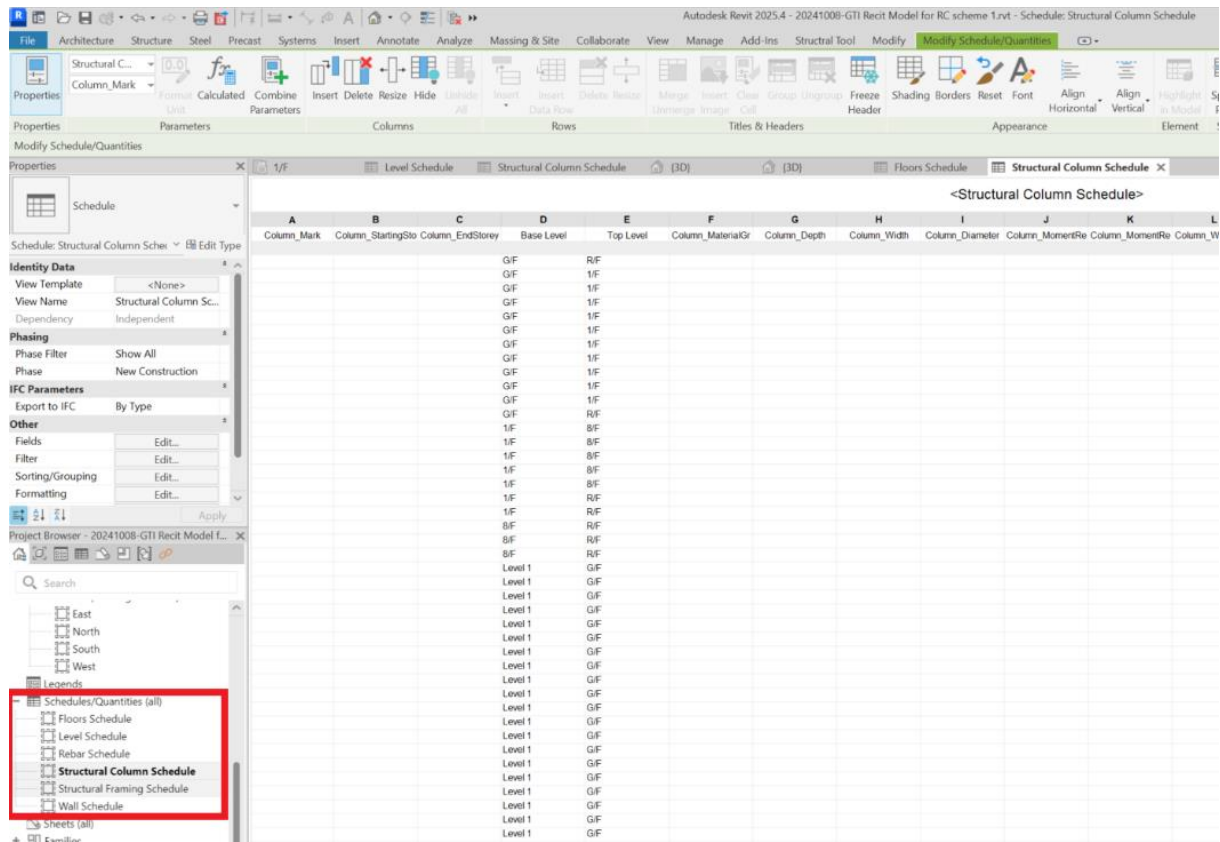
(v) In order to assist the user to input the structural parameters values, the BST Plug in Tool has a function to assign object marks automatically. The auto-assign function is to assign values to the following parameters: Beam_Mark, Column_Mark, Wall_Mark, and Slab_Mark. The assigned numbers of these marks (Column_Mark, Slab_Mark, and Wall_Mark) are determined by the objects' center coordinates. The counting of the assigned numbers begins from the bottom left-hand corner and increases first along the X coordinate and then along the Y coordinate. For Beam_Mark, the BST Plug in Tool follows the similar logic and includes prioritizing the assignment of horizontal objects before proceeding to vertical objects.

(vi) Select "Auto assign objects' mark" for assigning members' mark automatically.
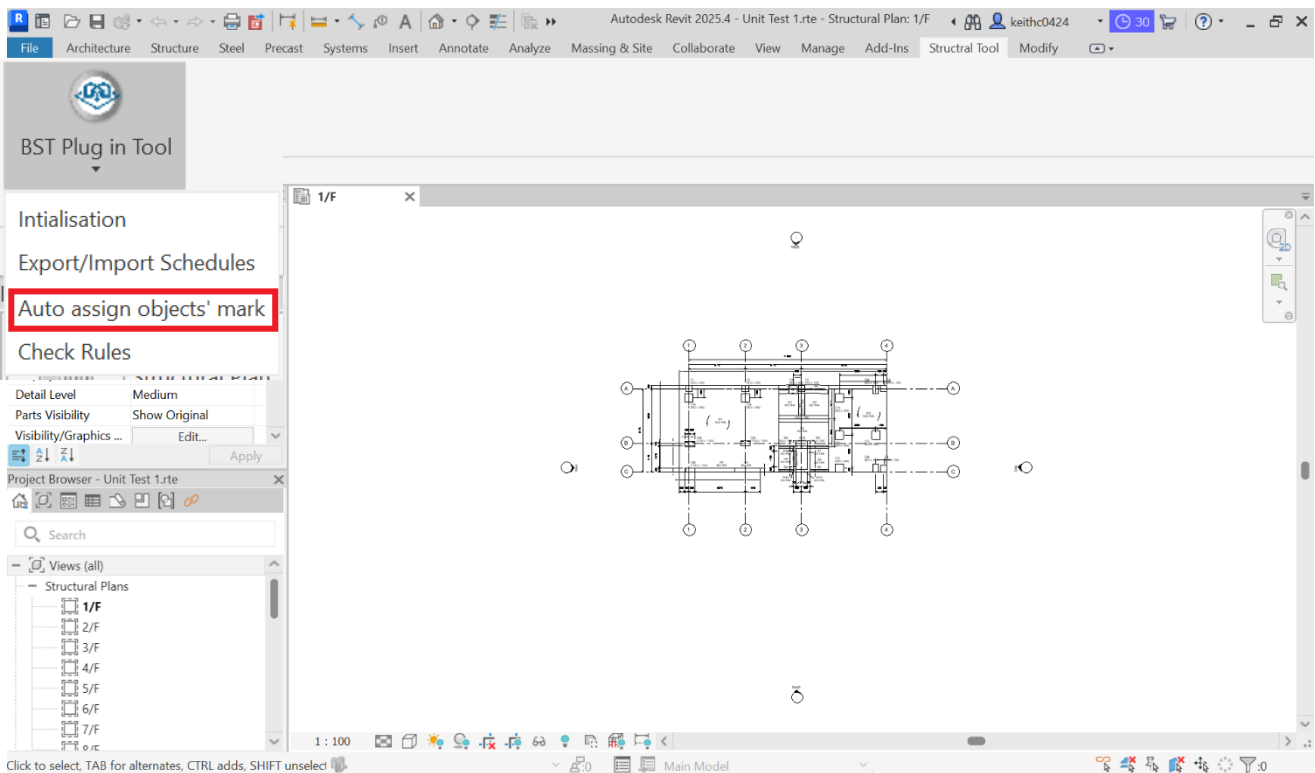
(vii) Select "Override all mark", all assigned mark in the parameter Beam_Mark, Column_Mark, Wall_Mark and Slab_Mark will be overridden. Also, user can choose "Input blank mark" to fill in the null value only.
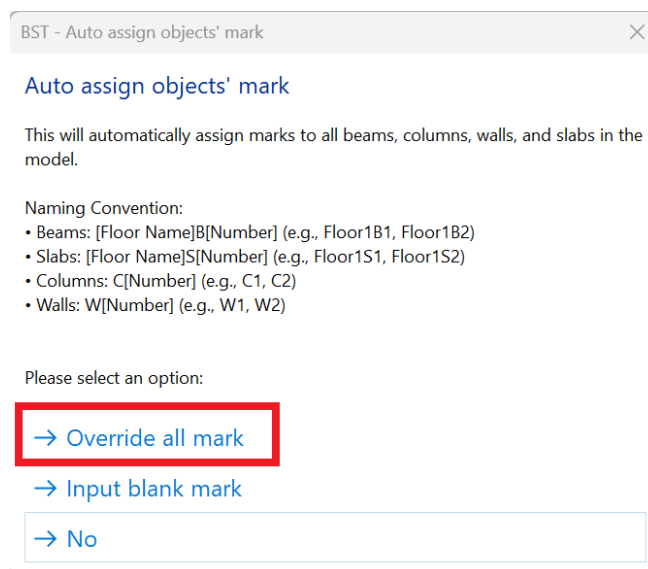
(viii) A pop up screen will appear after successfully assigned mark. For example, the parameter "Column_Mark" will filled with value automatically
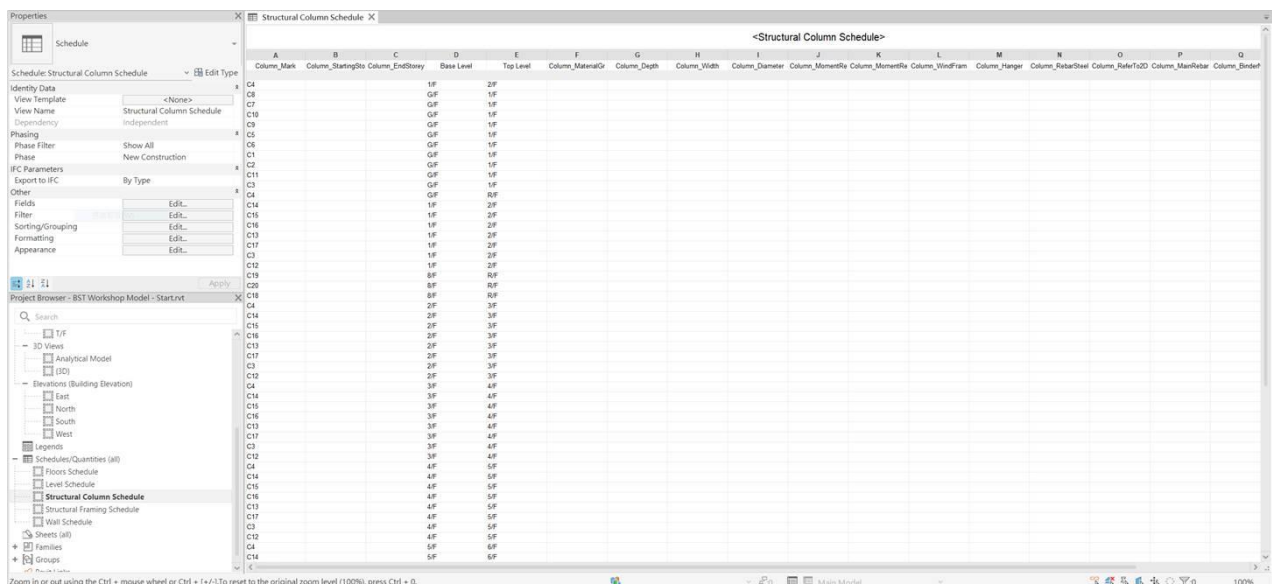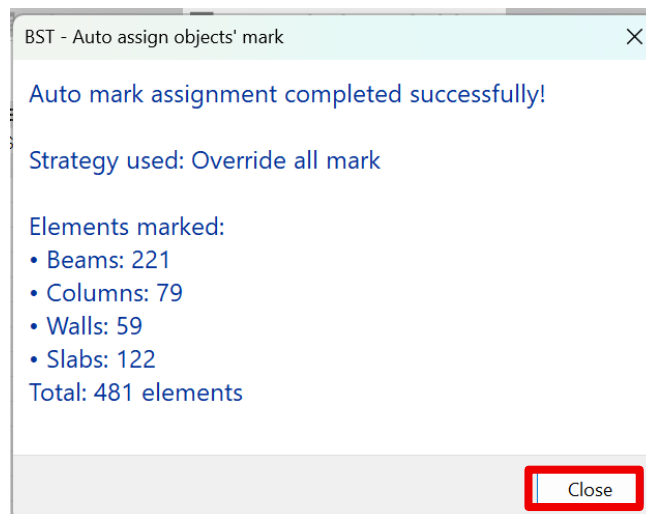
2.3.4 Input structural parameters values in Revit

(i) If user would like to assign the required parameters manually, begin by selecting the object type (e.g., beam_windframe) and entering the corresponding value in the blank field next to the parameter.
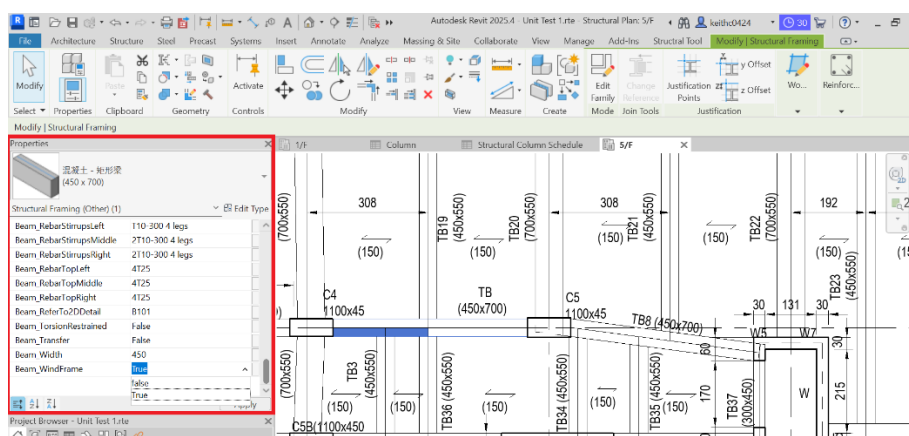
(ii)   The conversion function in BST is designed to convert specific structural objects defined in openBIM data model to SAM. The tool will identify the objects with structural parameters Beam_WindFrame, Column_WindFrame, Wall_WindFrame, or Slab_WindFrame filled with value "True" and convert those objects to SAM. That means if other objects such as beams, columns, walls, or slabs not meeting the above condition will not be converted to SAM.

(iii)   The mandatory data and their required values are tabulated below for clarity. Detailed structural parameters and sample of the input values for each object type—Beam, Column, Slab, and Wall—can be found in Appendix I, II, III, and IV, respectively.

(iv)   Beam Object

Item	Required parameter	Sample value
1	Beam_WindFrame	True / False
2	Beam_Mark	1FB1
3	Beam_Width	300
4	Beam_Depth	500
5	Beam_MaterialGrade	C45/20

(v)   Column Object

Item	Required parameter	Sample value
1	Column_WindFrame	True / False
2	Column_EndStorey	1/F
3	Column_Mark	C1
4	Column_Width	500
5	Column_Depth	500
6	Column_Diameter	500
7	Column_MaterialGrade	C45/20

(vi)   Wall Object

Item	Required parameter	Sample value
1	Wall_WindFrame	True / False
2	Wall_Mark	W1
3	Wall_EndStorey	1/F
4	Wall_Thickness	200
5	Wall_MaterialGrade	C45

(vii)   Slab Object

Item	Required parameter	Sample value
1	Slab_WindFrame	True / False
2	Slab_Mark	1S1
3	Slab_Thickness	150
4	Slab_MaterialGrade	C45

2.3.5   Alternatively, the user can use the BST Plug in Tool to input structural parameters values data via excel or .csv file and import into BIM model with the following steps:

(i)   Select the above "Structural Tool" in the navigation bar and then click "BST Plug in Tool".
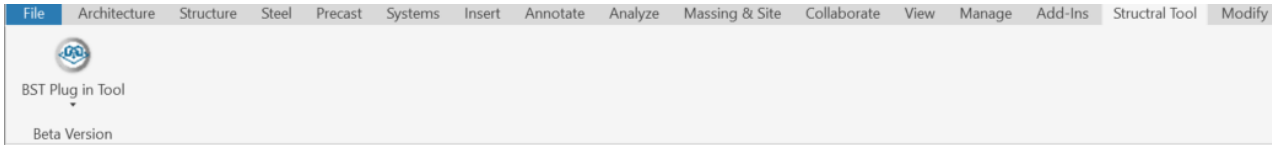
(ii)   Select Export/Import Schedules
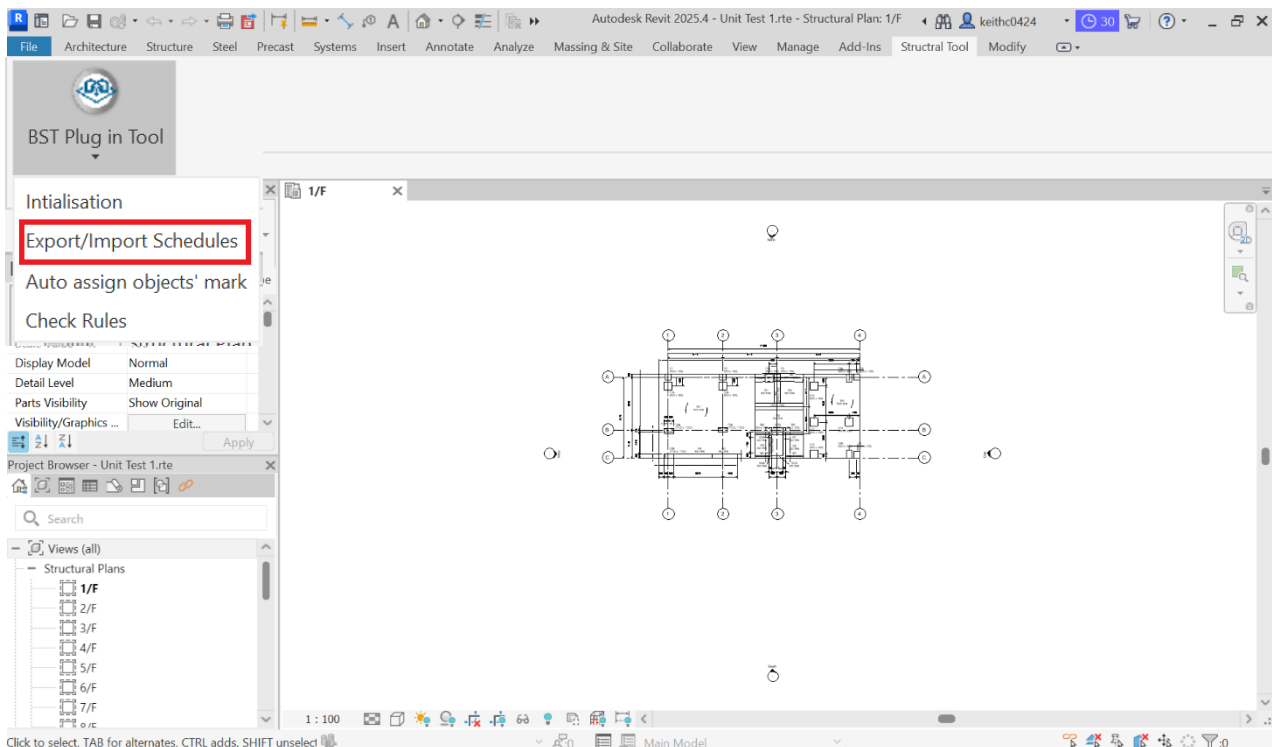
(iii)   Select which schedule you want to edit. It is suggested to select "Structural Column Schedule", "Structural Framing Schedule", "Wall Schedule" and "Floors Schedule". Then select "Export to Excel".
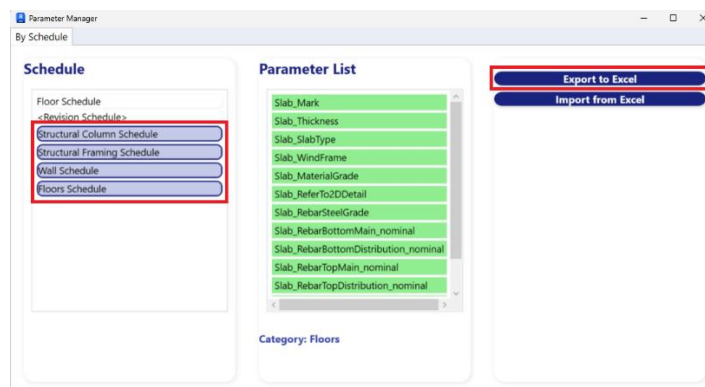
(iv)   The BST plug in Tool can export the schedules in both excel or csv file format for user selection. Select excel/csv file format and location where the file will be exported.
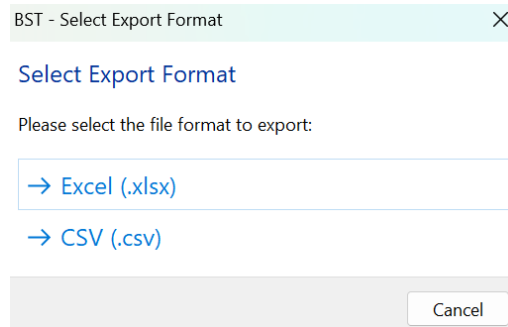
(v)   "Schedule export completed" will be shown in the window after exporting the file.
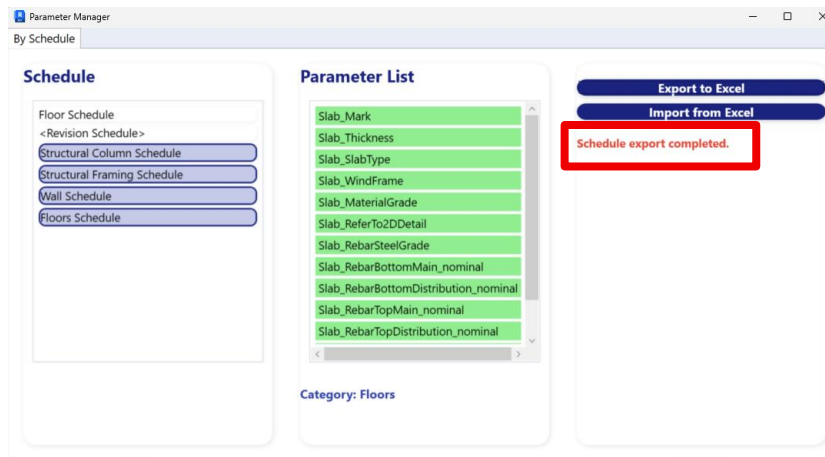
(vi)   Open the exported excel/csv file, input the structural parameters values in the excel/csv file and save the excel/csv file after filled in the required values.

(vii) Select the above "Structural Tool" in the navigation bar and then select "BST Plug in Tool" and Select "Export/import Schedules".
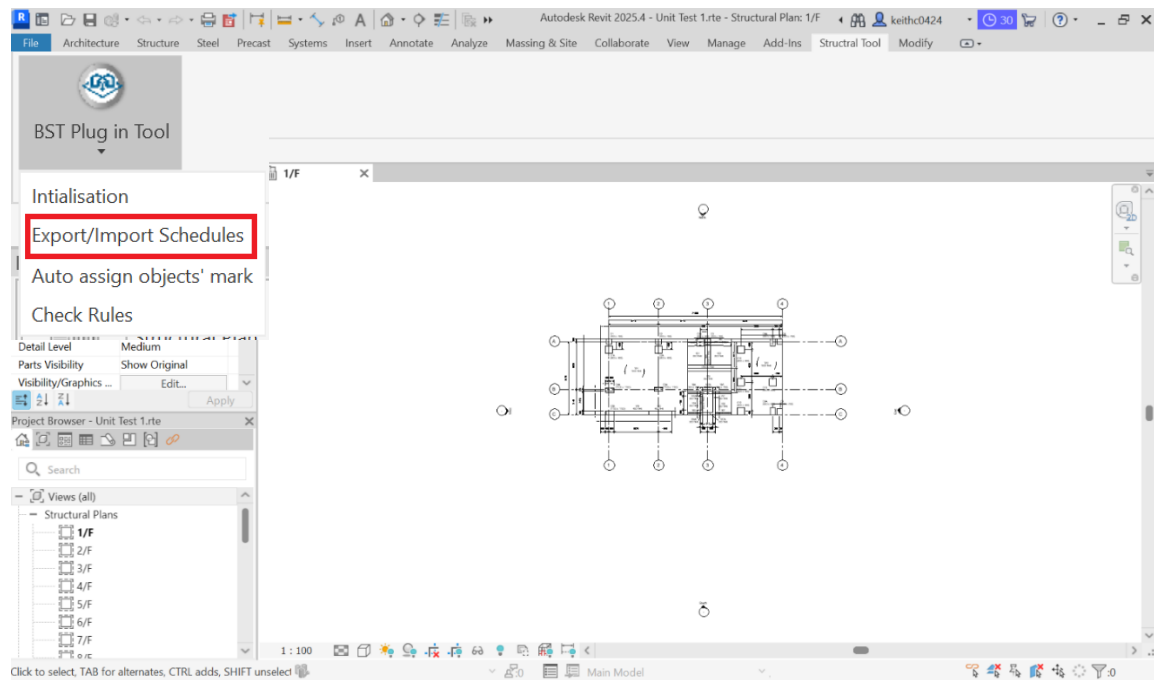
(viii) Select which schedule you want to import the values. It is suggested to select "Structural Column Schedule", "Structural Framing Schedule", "Wall Schedule" and "Floors Schedule" for model conversion. Then select "Import from Excel".
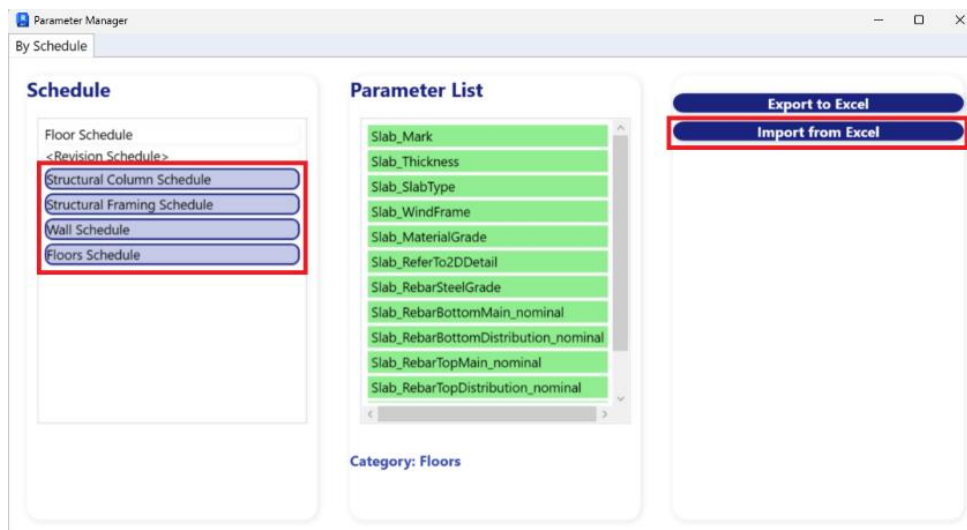
(ix) "Schedule export completed" will be shown in the window after importing the selected file. Only structural parameters values would be updated.

2.3.6 Check the structural parameters values input via BST Plug in Tool
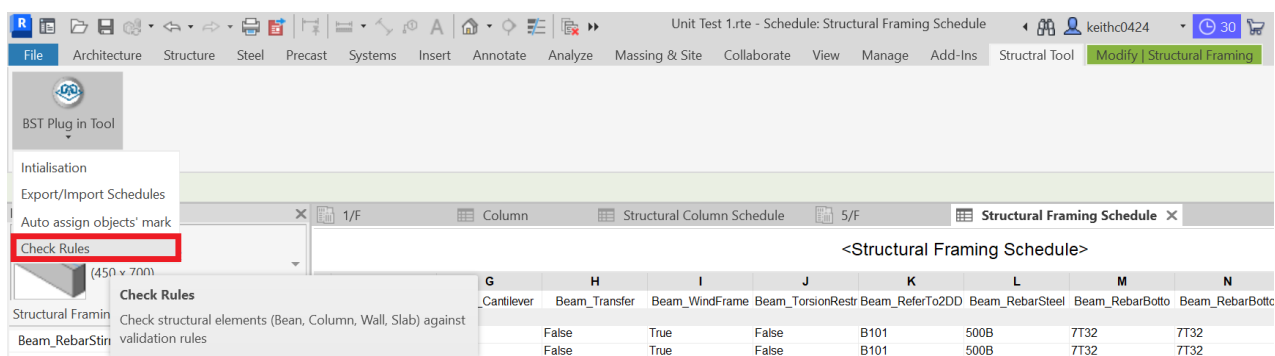
(i) Select the "Structural Tool" in the navigation bar and then click "BST Plug in Tool".

(ii)   Select "Check Rules". A popup window will appear and the irregularity can be identified in the "remark" column with corresponding data entry highlighted in Red.

(iii) Double click the highlighted red cell, Revit will automatically select the corresponding object, user would revise the data value accordingly.

(iv)   User could also export the checking result to excel/csv format by clicking "Export".

2.3.7   Modify Objects' Configuration

(i)   Conversion function in BST only accepts particular openBIM data model configuration. The following steps are essential to secure the objects in openBIM data model converted to ETABS.

(ii)   Steps in (iv) and (v) below are crucial to ensure that the end point of beam is connected to the column center and the vertical objects are floor to floor and connected to the beam objects.

(iii) Steps in (vi) and (vii) are mandatory step in using the conversion function in BST by exporting openBIM data model with a model line for conversion to e2k format. The limitations of conversion function in BST are tabulated in Appendix V.

(iv)   Disjoint all objects

Step 1: Select the "Modify" in the navigation bar and then click "▼" beside "Join", then select "Unjoin Geometry".
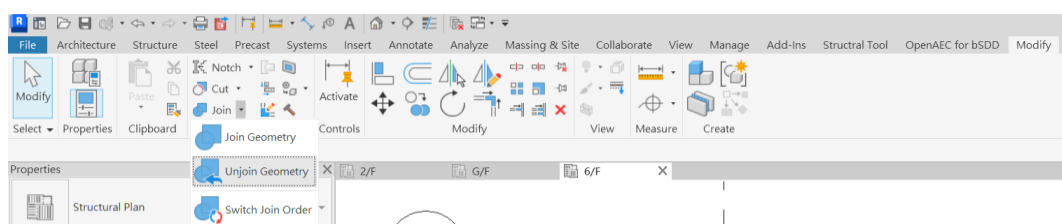
Step 2: Select the object to unjoin.

(v)   Detach all objects

Step 1: Open 3D view and select all element, then click the "Filter" in the navigation bar.
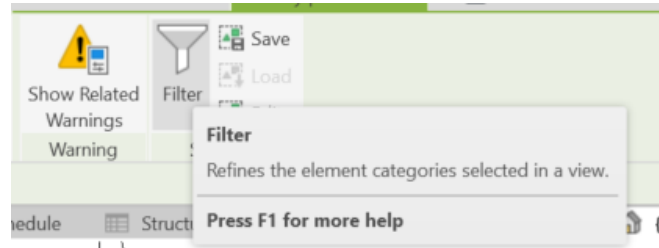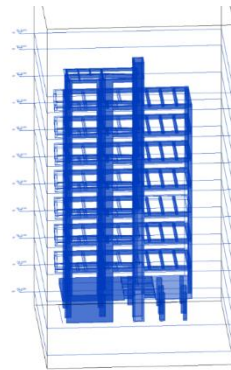
Step 2: Select "Structural Columns" and then press "OK".
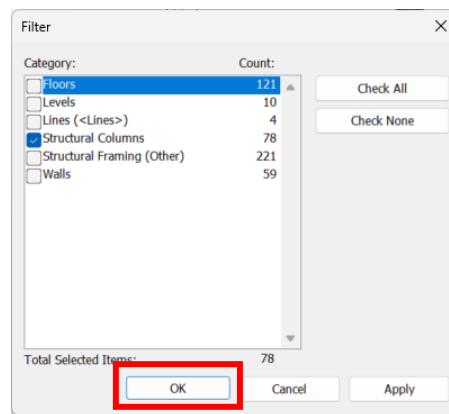
Step 3: Select Detach Top/Base in the navigation bar and then click "Detach All".
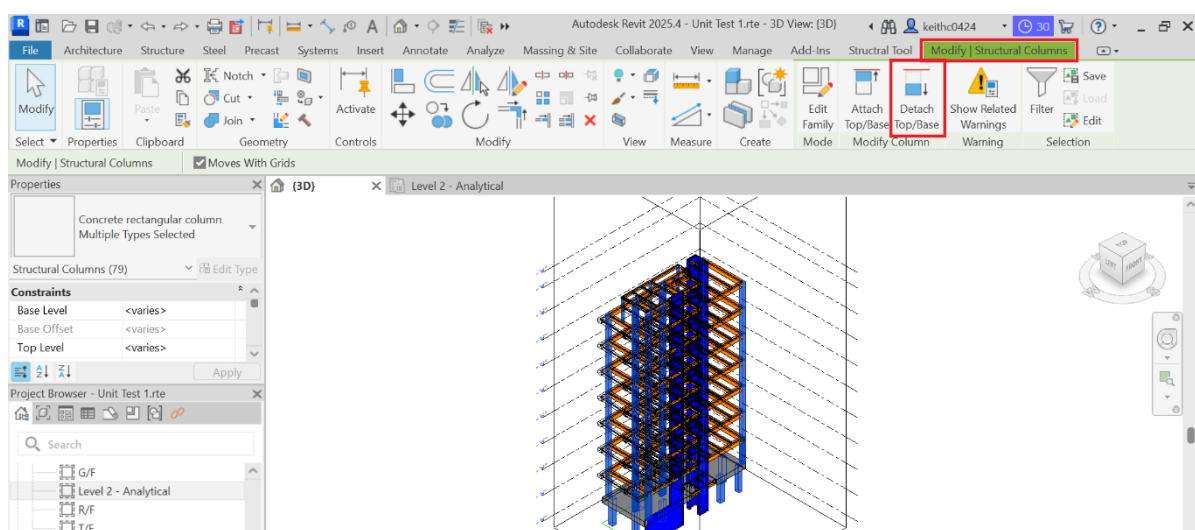
Step 4: To detach all wall objects, following Step 1 to 2 above and then select Walls. Then, select Detach Top/Base in the navigation bar and then click "Detach All".

(vi)   Change "y Justification" of Beam Objects

Step 1: Open 3D view and select all element, then click the "Filter" in the navigation bar above.
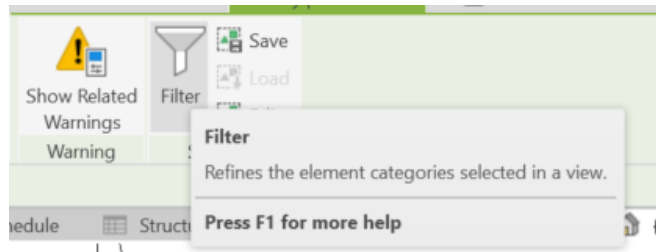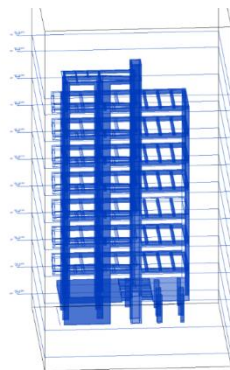
Step 2: Select "Structural framing (Others)" and then press "OK".
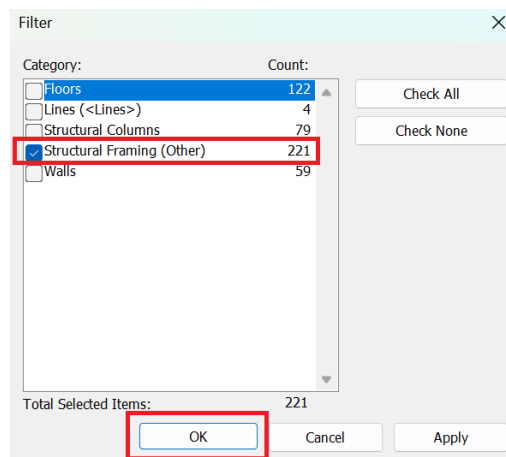
Step 3: In the properties panel, fine the "Geometric Position". Change the "y Justification" of Beam objects from "Origin" to "Center".
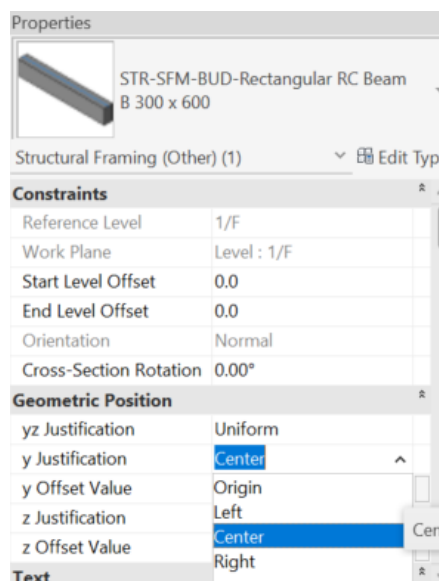
(vii) Change "Column Style" of Column Objects

Step 1: Open 3D view and select all element, then click the "Filter" in the navigation bar.
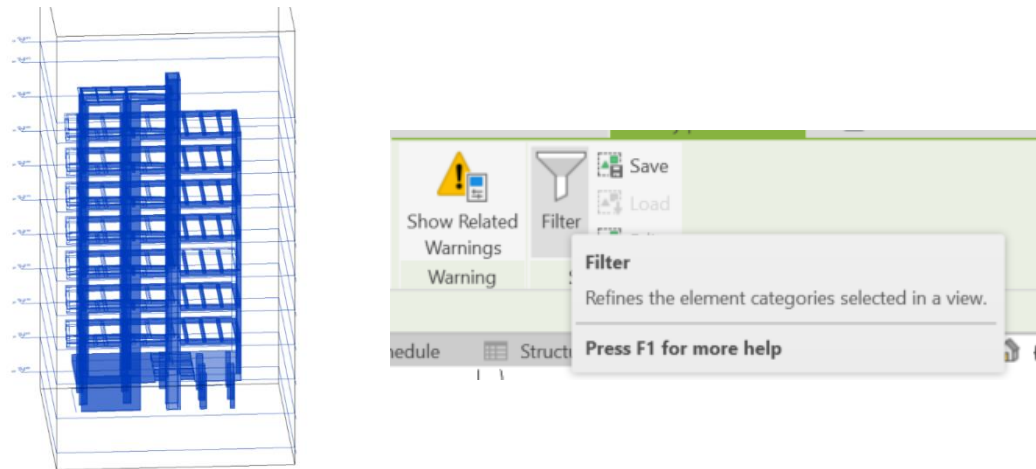
Step 2: Select "Structural Column" and then press "OK".
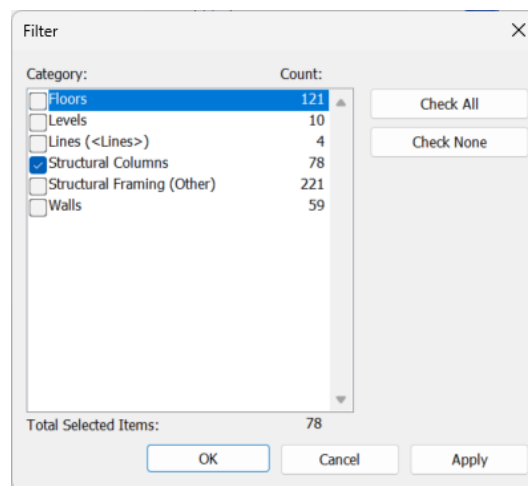
Step 3: In the properties panel, find the "Column Style". Change the "Column Style" from "Vertical" to "Slanted – End Point Driven".
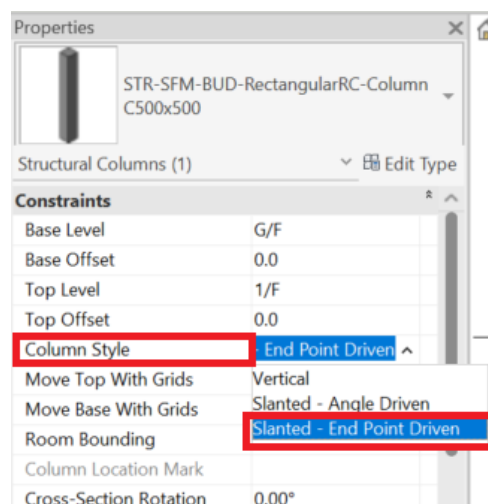
2.3.8   Export to openBIM data model[5], IFC version 4x3

(i)   Select the "File" in the navigation bar and then select "IFC" under "Export".
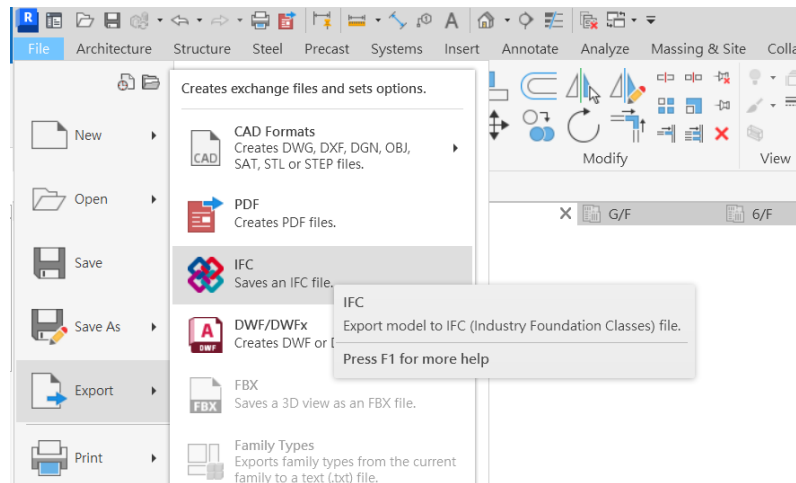
(ii)   In the popup window named "Export IFC", select "Modify Setup".
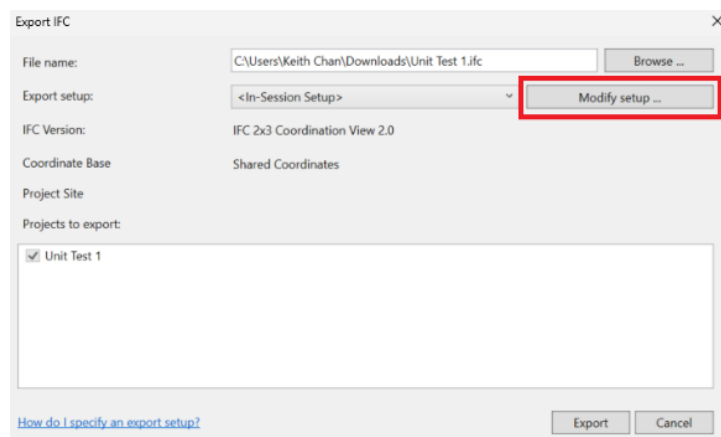
(iii)   In "Modify Setup", select "IFC version" and choose "IFC 4x3" or "IFC4x3 [Experimental]"

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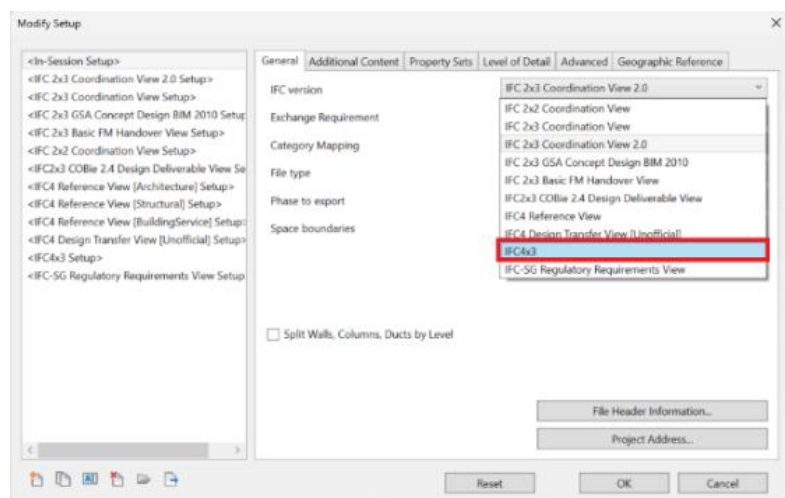
[5] All steps in clause 2.3.8 should be strictly followed in ensuring the proper use of conversion function in BST.

(iv) Select "Property Set" above and click "Export IFC common property sets" and "Export user defined property sets".

(v) Select "Browse" and choose the IFC PropertySet - BUD Str_v1.0 (Revit to IFC).txt. The text file would be downloaded from BD BIM website.
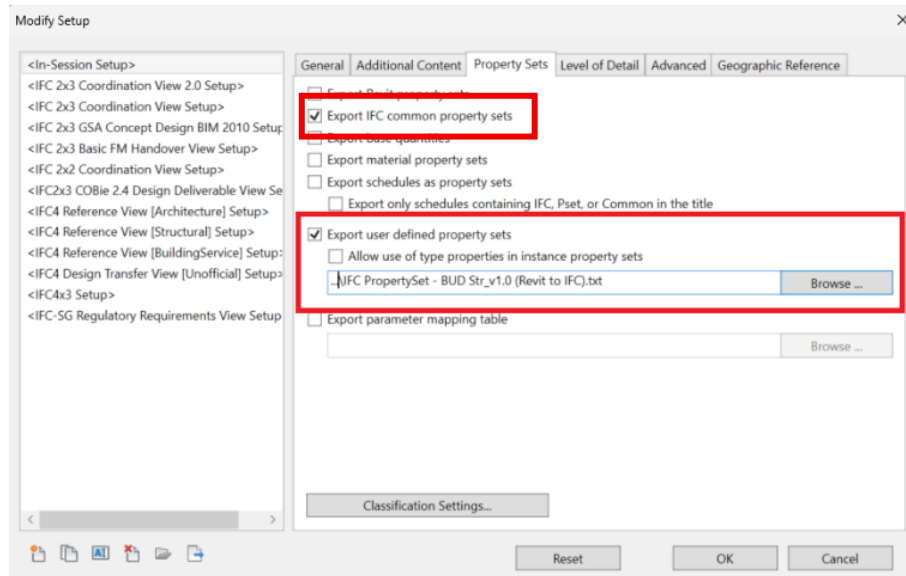
(vi) Press "OK" and then press "Export" in "Export IFC".

3. Convert openBIM data file to Structural Analysis Model

3.1 Upload file to BST for conversion

(i) Select "Upload file from local drive" on top of the file list.
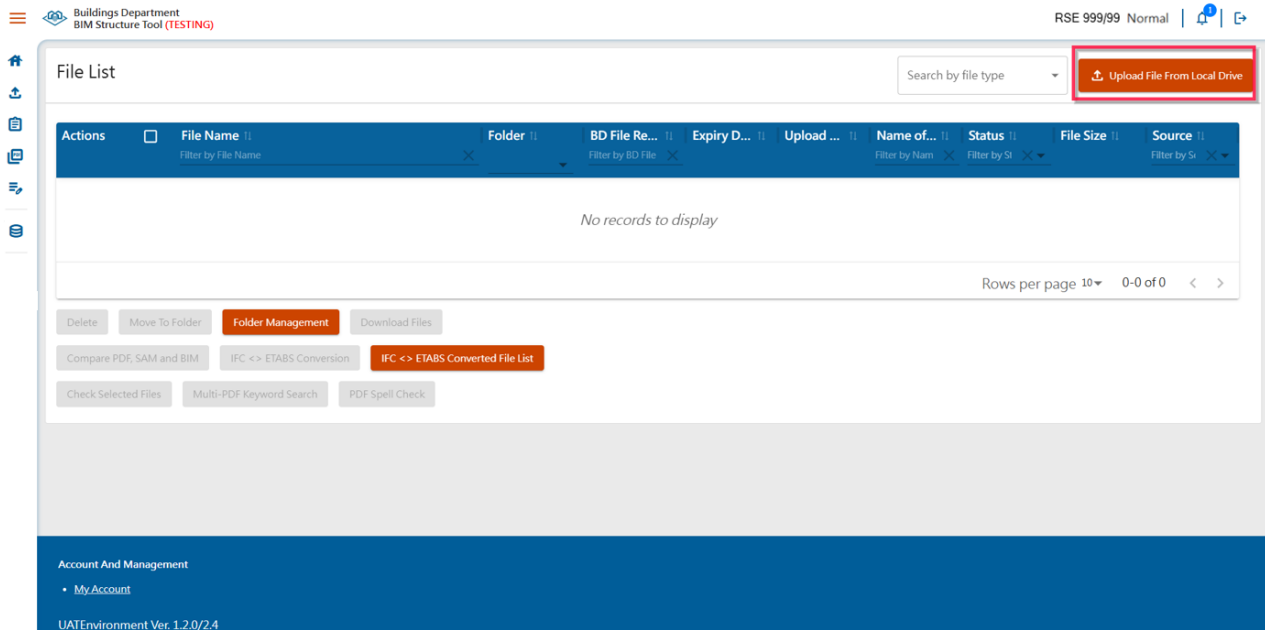
(ii) Select Folder for uploaded File(s).

(iii) For first time Upload, select "Create new folder" and provide file name inside "New Folder" and "BD reference number" and then select "Confirm". User can select "Select Existing Folder" and choose the folder to save, then choose "Confirm".
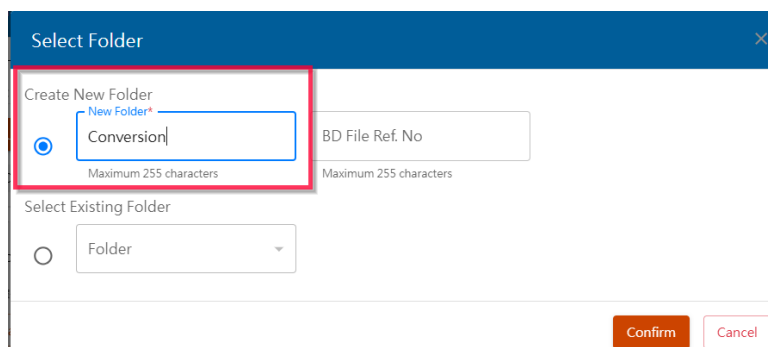
(iv)   Select "Choose file" and choose the exported openBIM data file in IFC format. Click "Start upload" afterwards.
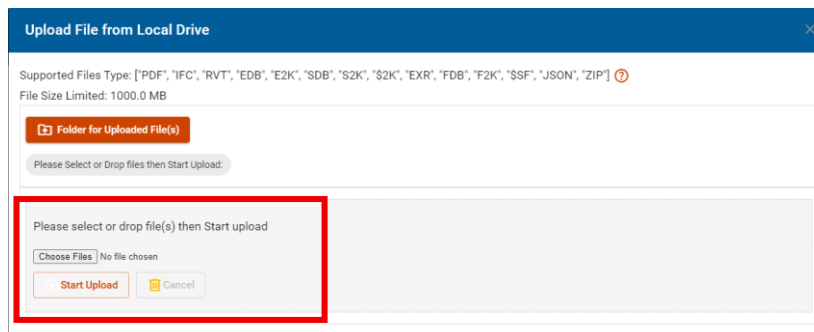
(v)   Click "No"
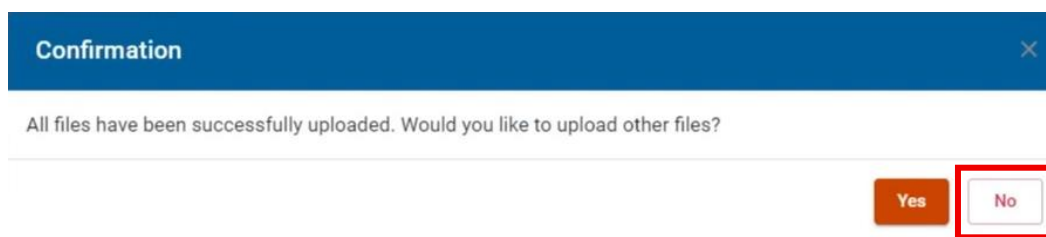
(vi)   The openBIM data file will be uploaded to the BST Platform with status "Converting".
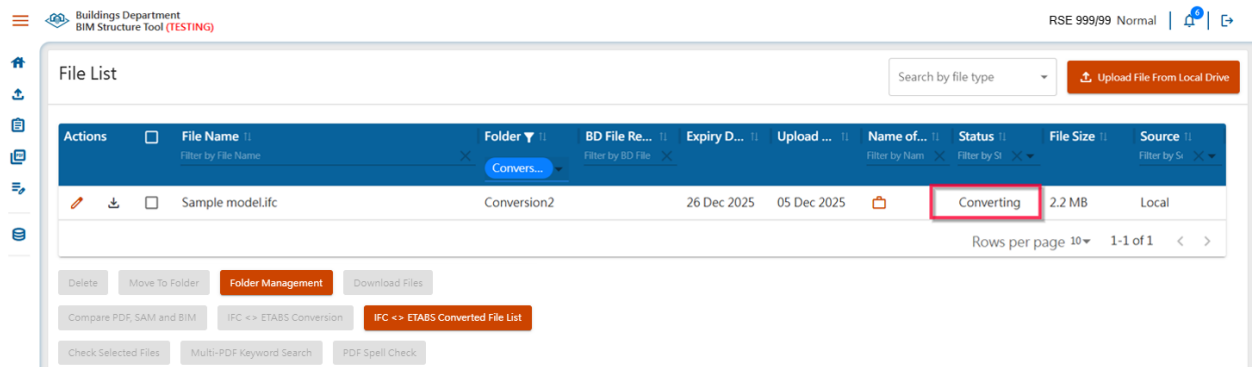
(vii)   BST will process the e2k file conversion in back end. After file conversion, a notification will show in the top right-hand corner.
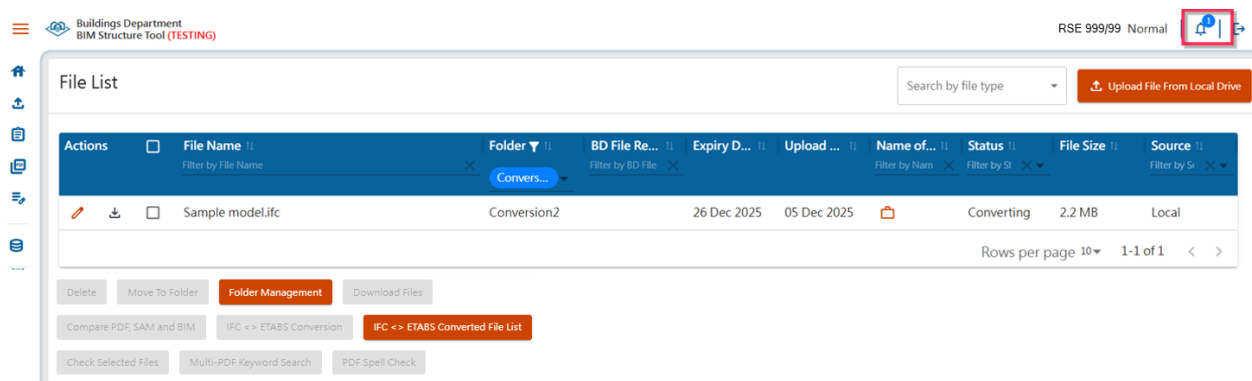
(viii) Refresh the browser and the status will change to "Uploaded".
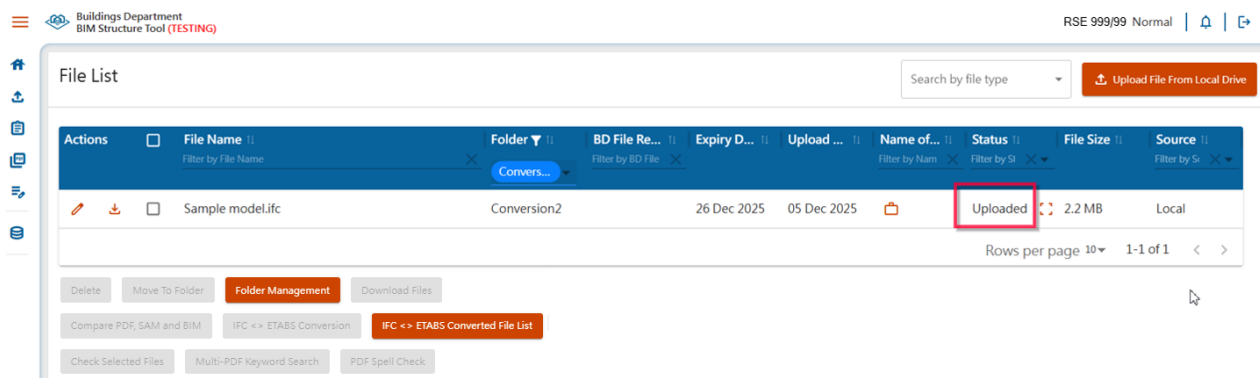
3.2 Download files from BST after conversion

(i) Click " ⬇ " to download the converted file.
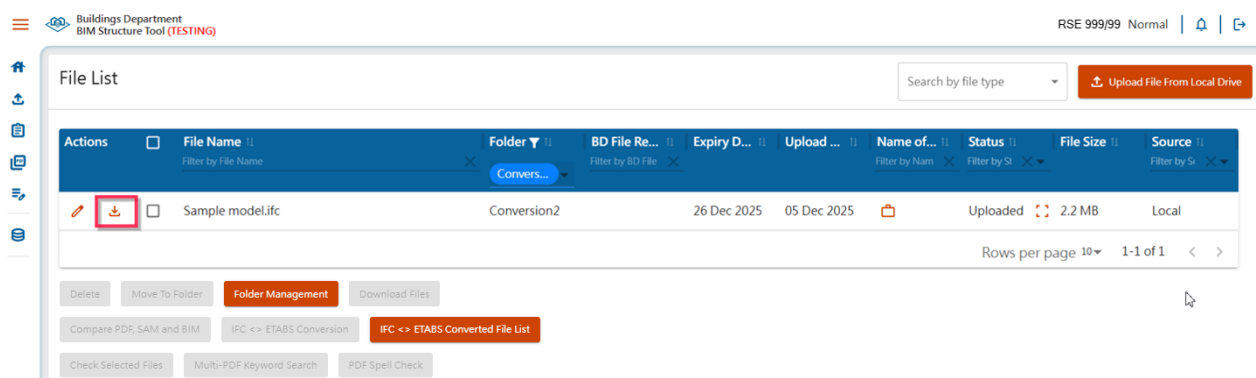
(ii) Unzip the zip file to find the e2k file.

(iii) The zip file contained four files with following use.

File extension	Use
e2k	The converted ETABS Database Tables in text file format.
ifc	The original uploaded openBIM data model.
log	The file contains data log during file conversion. User could check the conversion status of each object.
json	The file saves the information in openBIM data model and SAM in table format. This file can be used for future development.

(iv) The e2k file can be opened in ETABS by following the procedure in Section 5 below.

4. Visualize openBIM model and openBIM data model in openBIM viewer of BST

4.1 General functions in openBIM viewer of BST

(i) Click " ⌞⌝ " next to Uploaded to visualize the openBIM data model in 3D view.
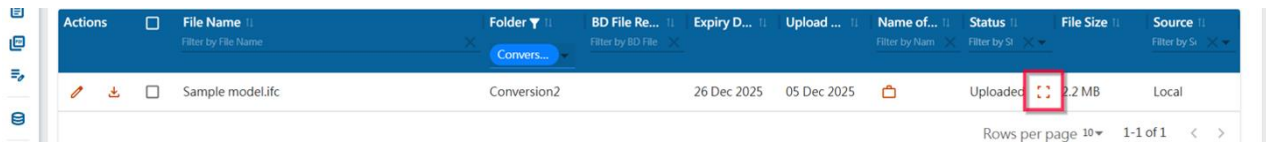
(ii) Select " 🏢▾ " to select "6/F" to view objects in 6/F, for example.
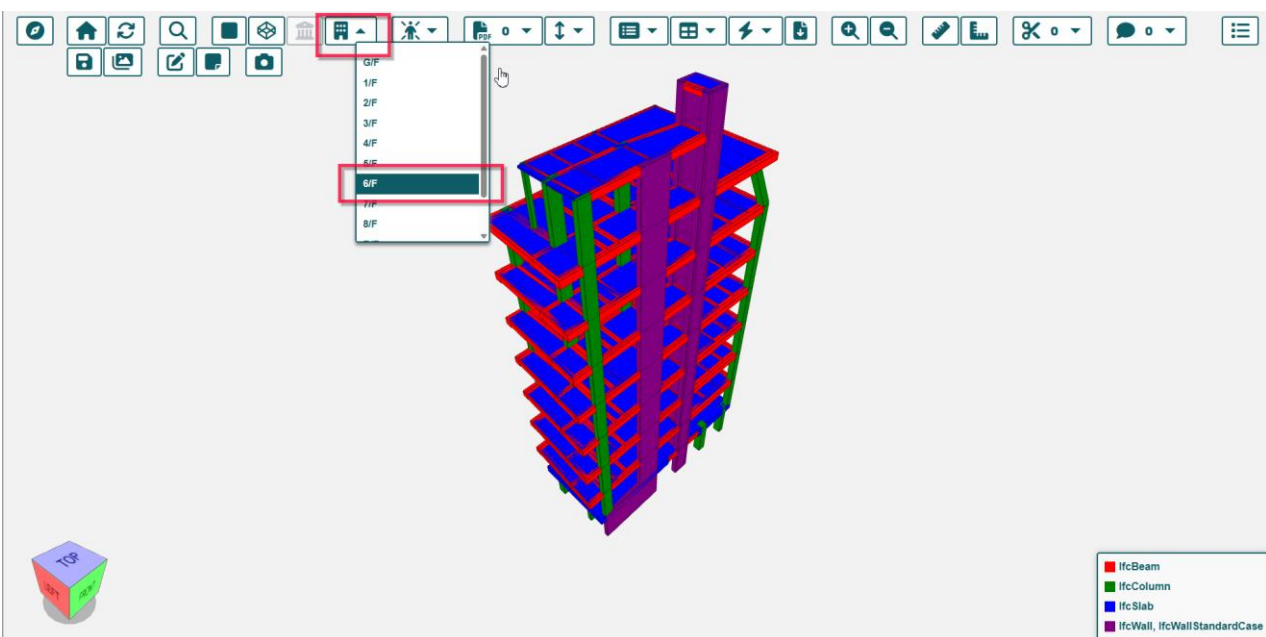
(iii) Click " ◼ " change to 2D plan view.
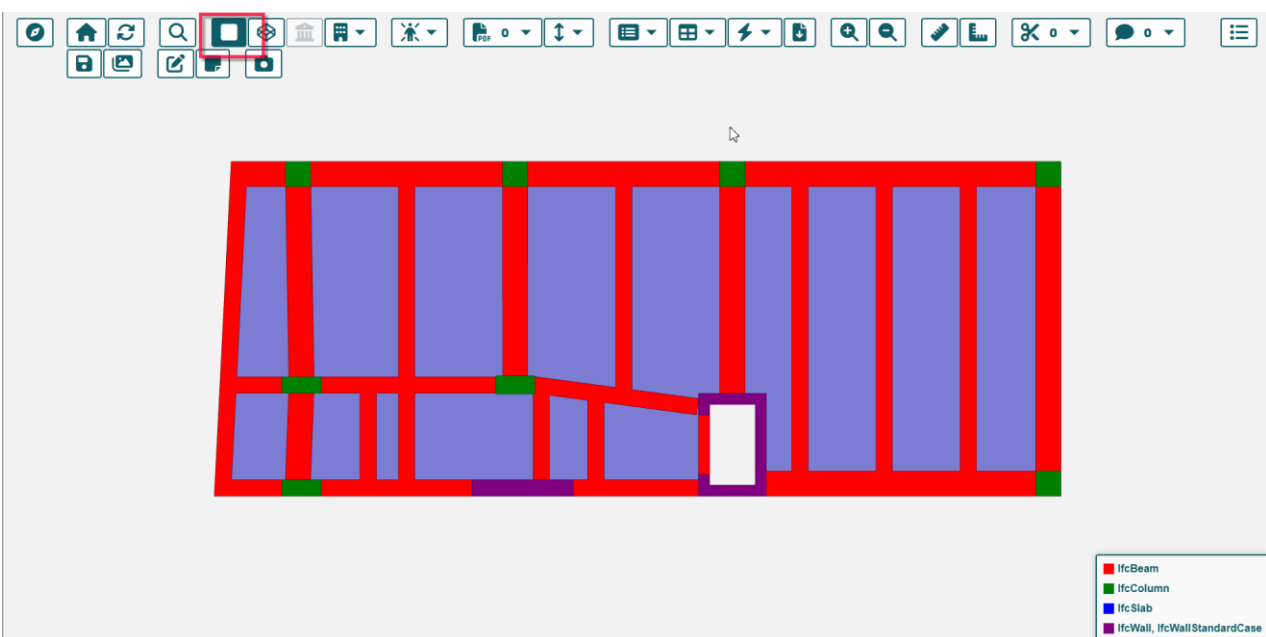
(iv)   Click" ▦▾ " and select "Show all" to view the objects' mark and section size. The BST will display the structural parameters values stored in the objects. Please refer to Appendix I to IV for the details.
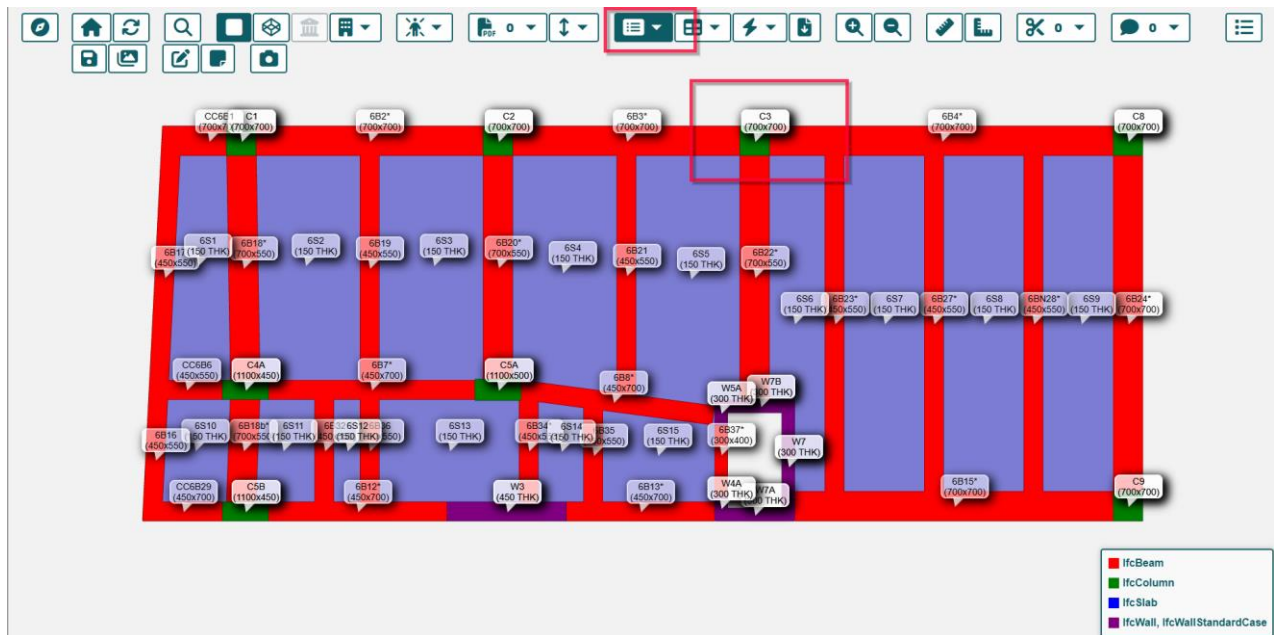
(v)   Click" ▦▾ " and select "Show on Hover" to switch mouse over mode to view particular object's mark and section size.

(vi)   Select " " to choose particular schedule to display in the web browser.

(vii)   Select the corresponding storey to view particular objects' information in a particular level.
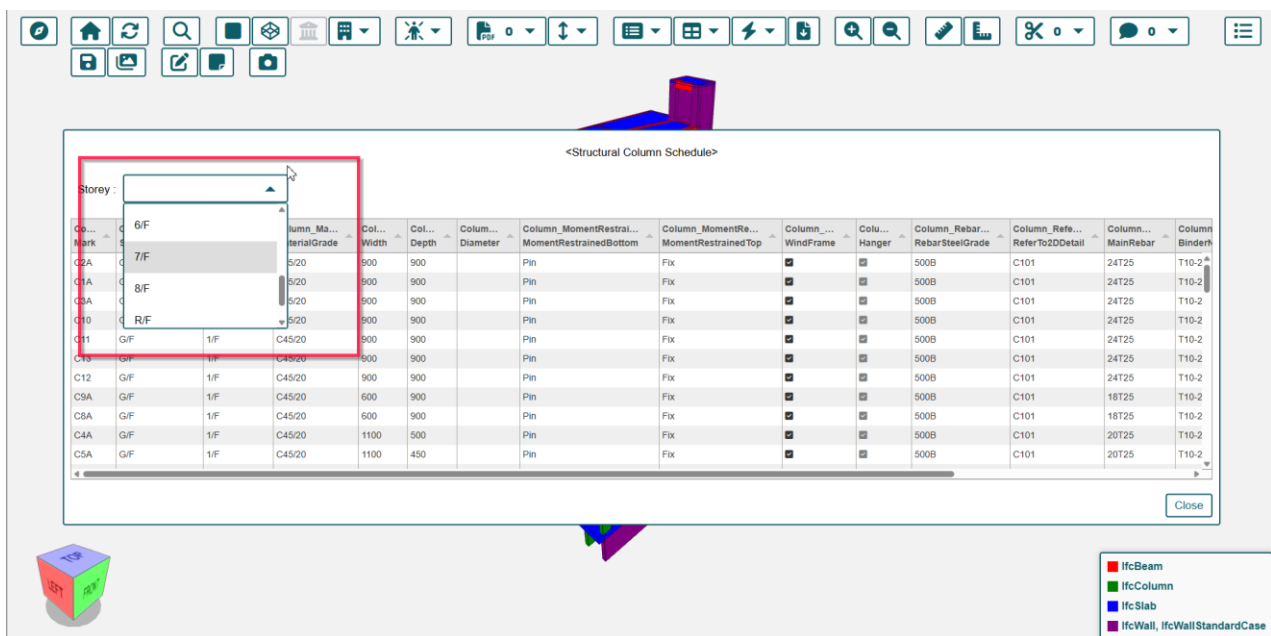
(viii)   User could download the schedule in excel by clicking "⬇".
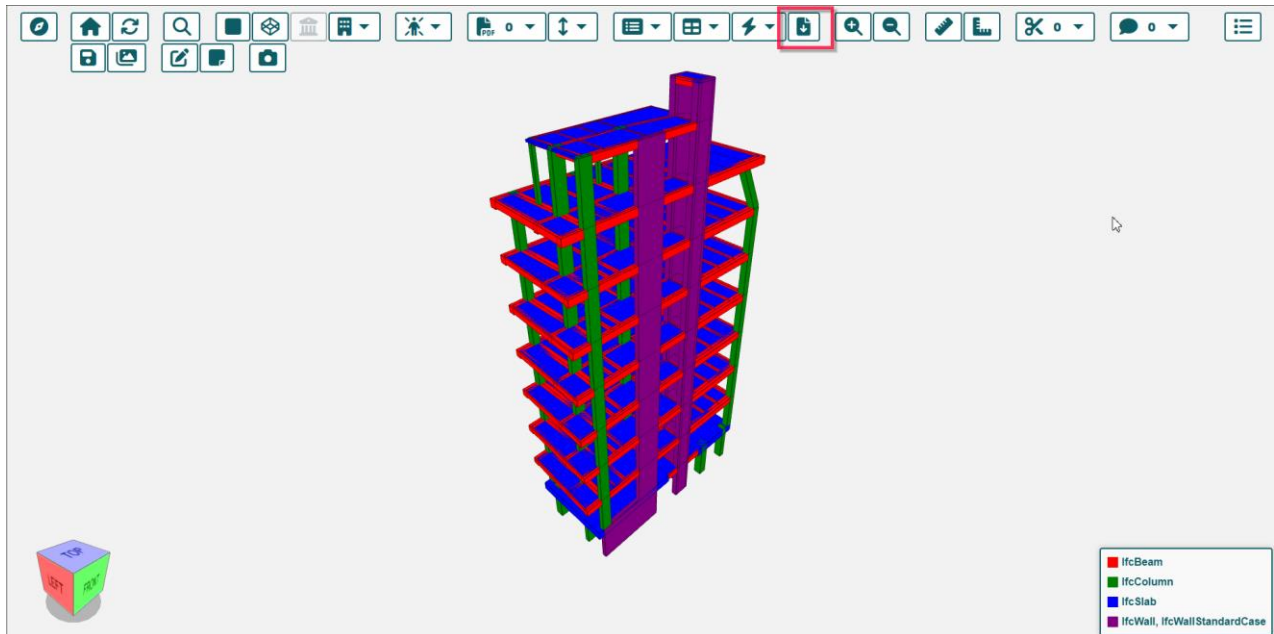
(ix)   To highlight the wind frame, transfer, cantilever object, click "⚡▾" and select corresponding structural parameters.
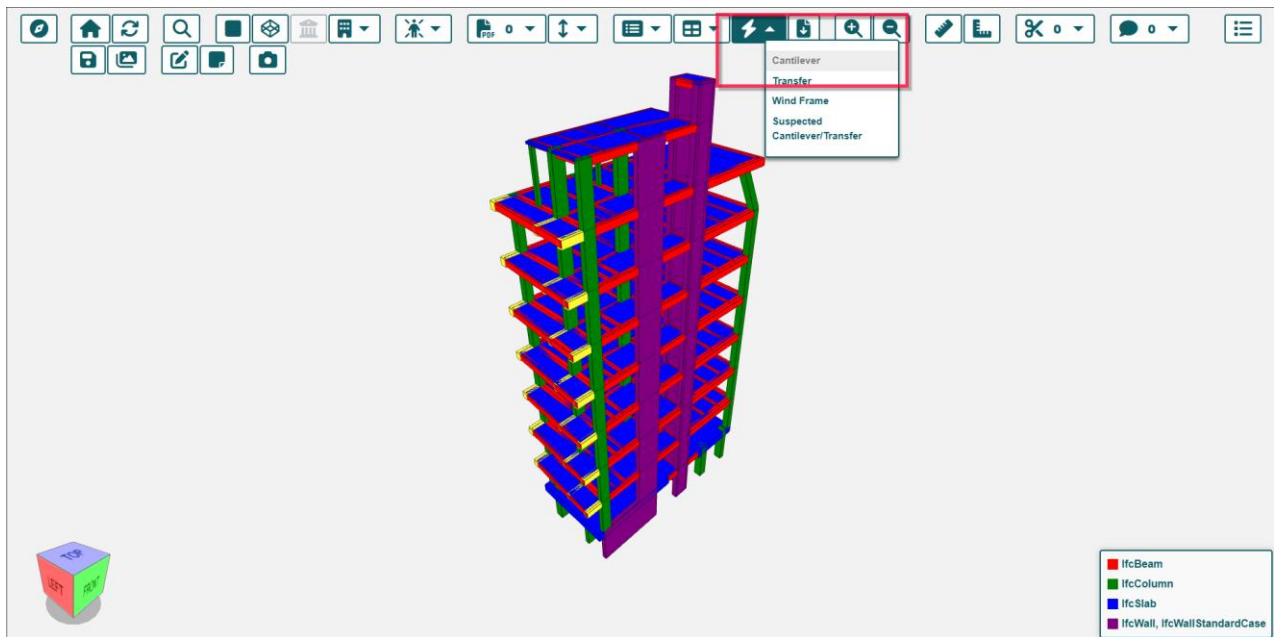
For example:

(a) Taking Wind Frame, BST will flash all objects with structural parameters either "Beam_WindFrame", "Column_WindFrame", "Wind_WindFram" or "Slab_WindFrame" filled with value "True".
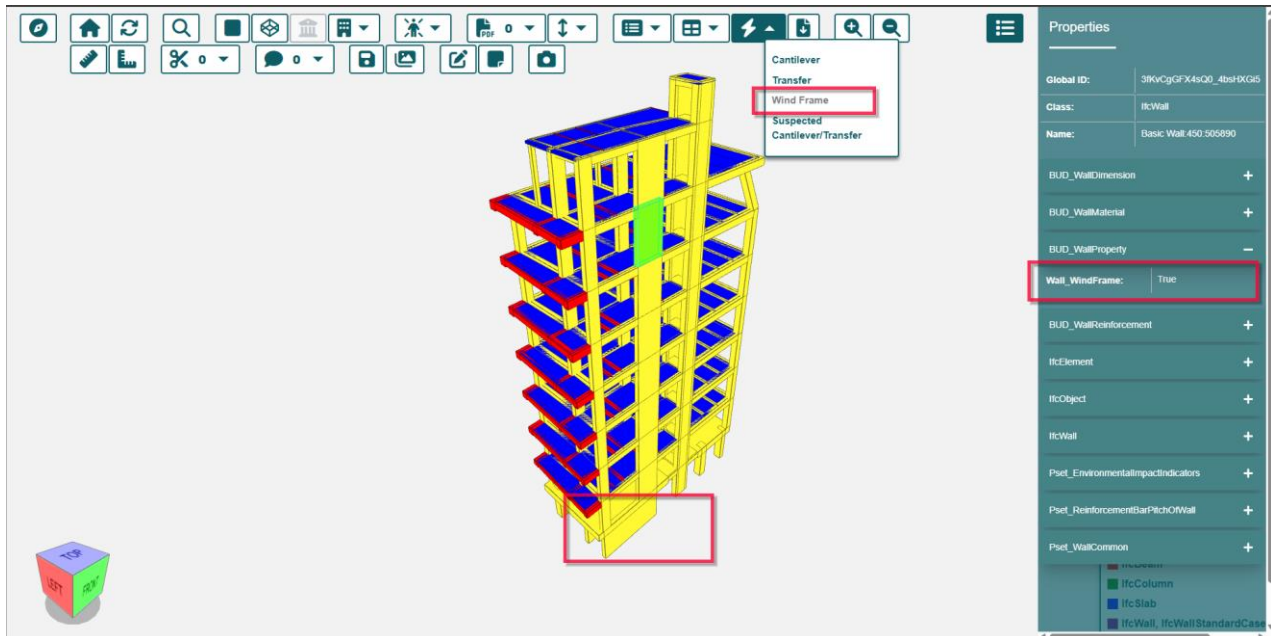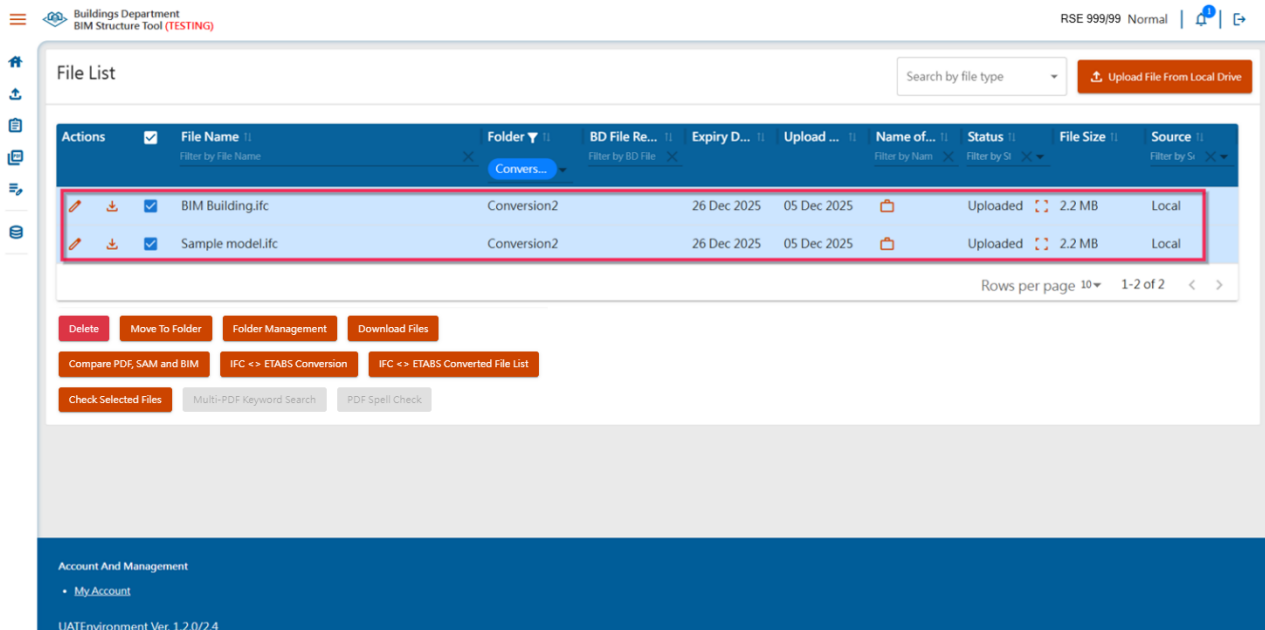
(b) Taking "Cantilever", BST will flash all objects with structural parameters "Beam_Cantilever" filled with value "True".
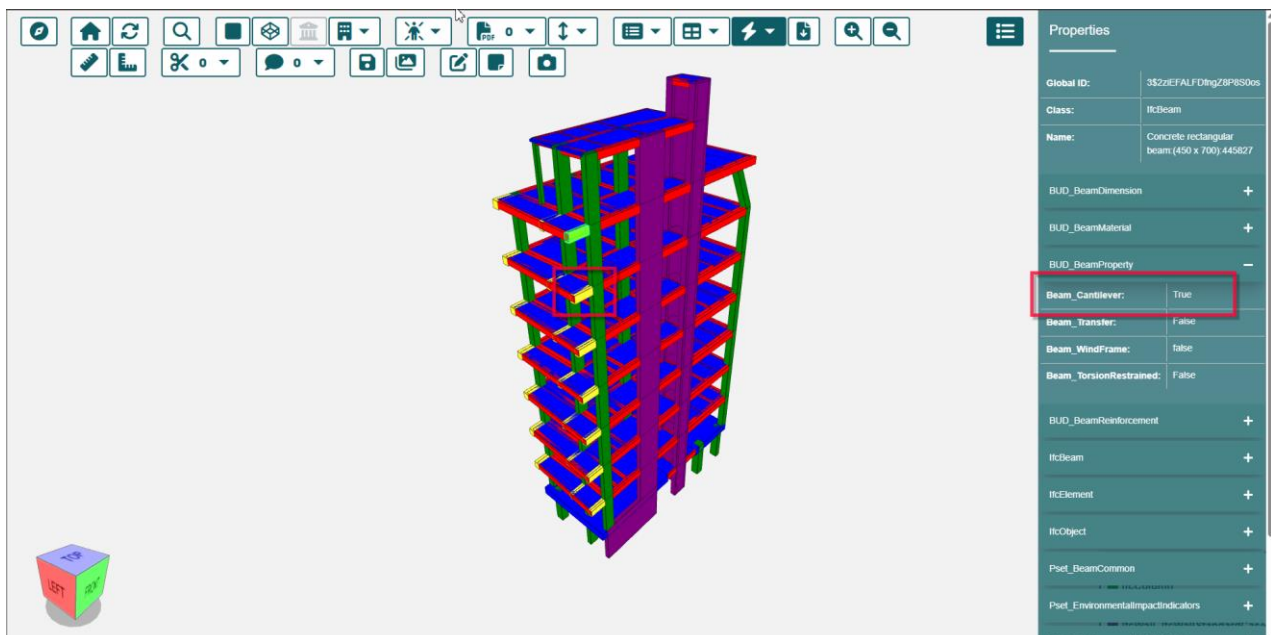
4.2   Overlaying BIM/SAM for compatibility check

(i)   Select two models from the File List.

(ii)   Press "Compare PDF, SAM and BIM" button.

(iii) Select "Model A" file from the left side and "Model B" file from the right side.
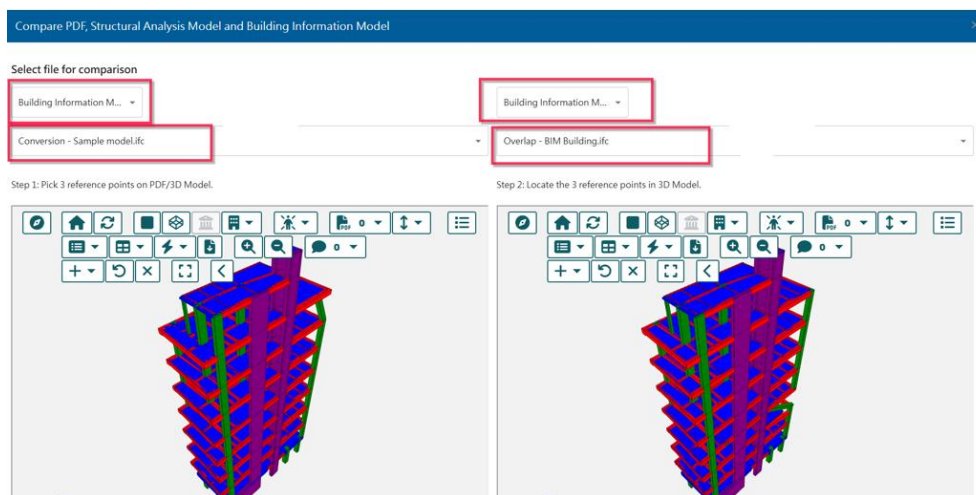
(iv) Click "Pick Overlay Reference" and select "Pick Object" from the left viewer.
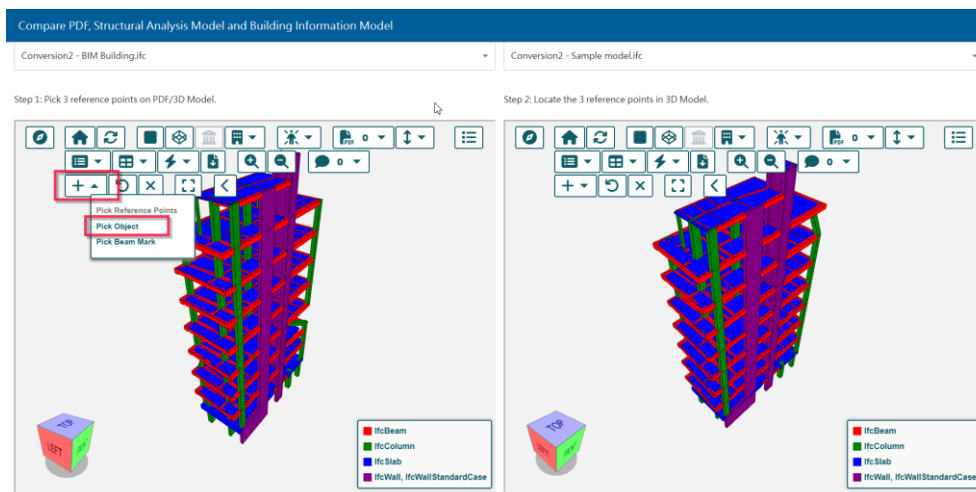
(v) Select rectangular base object on left viewer and press "OK".
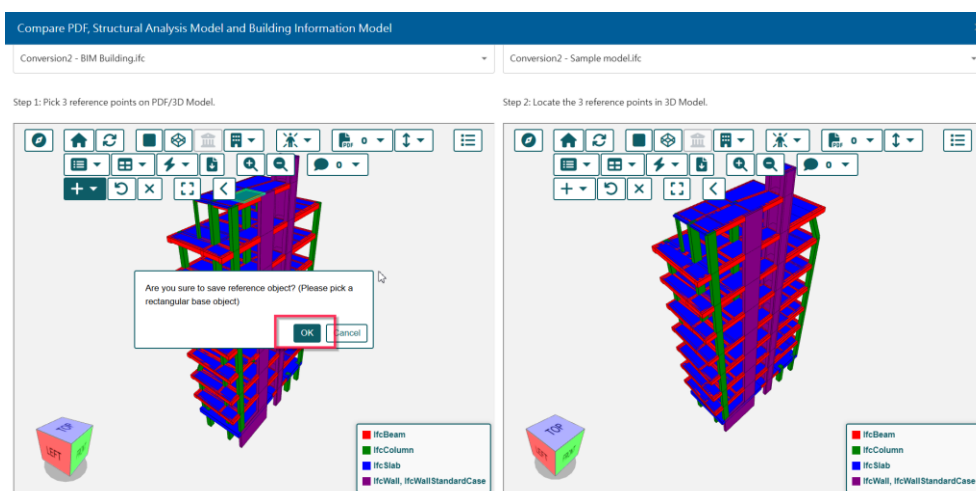
(vi) Click "Pick Overlay Reference" and select "Pick Object" from the right viewer.
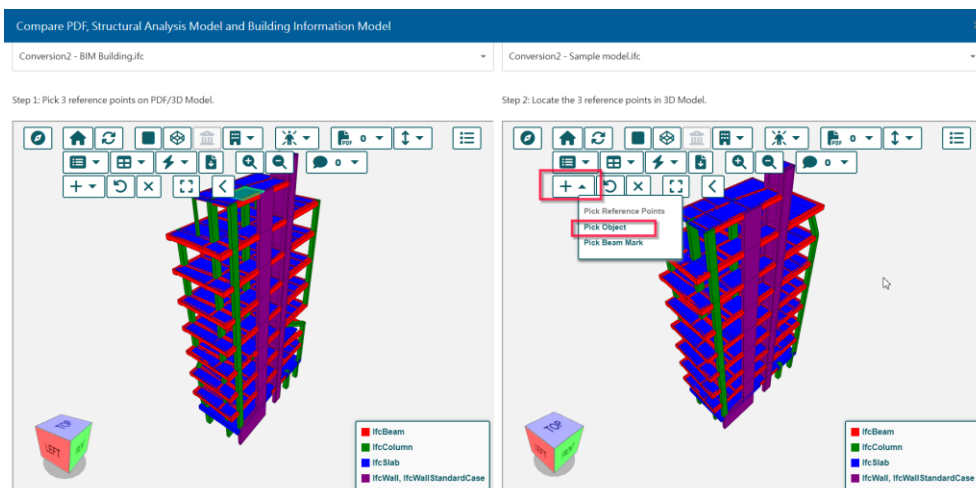
(vii) Select another similar object on right viewer and Press "OK" to start overlaying BIM functionality.
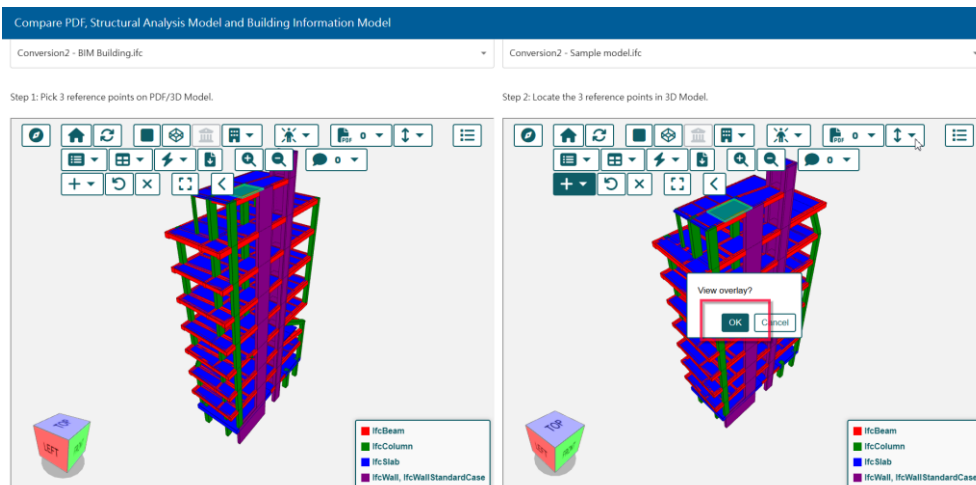
(viii) Press "Flash Inconsistent Objects".
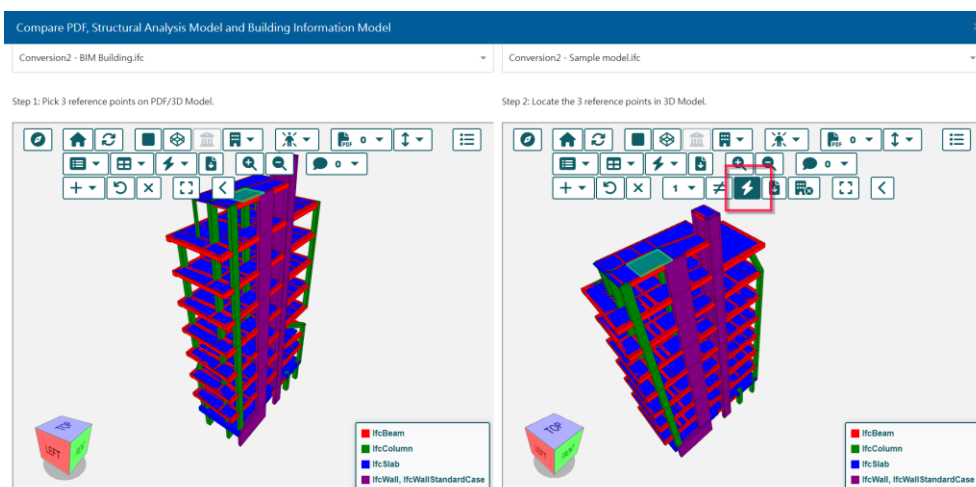
(ix)   The inconsistent object will flash.
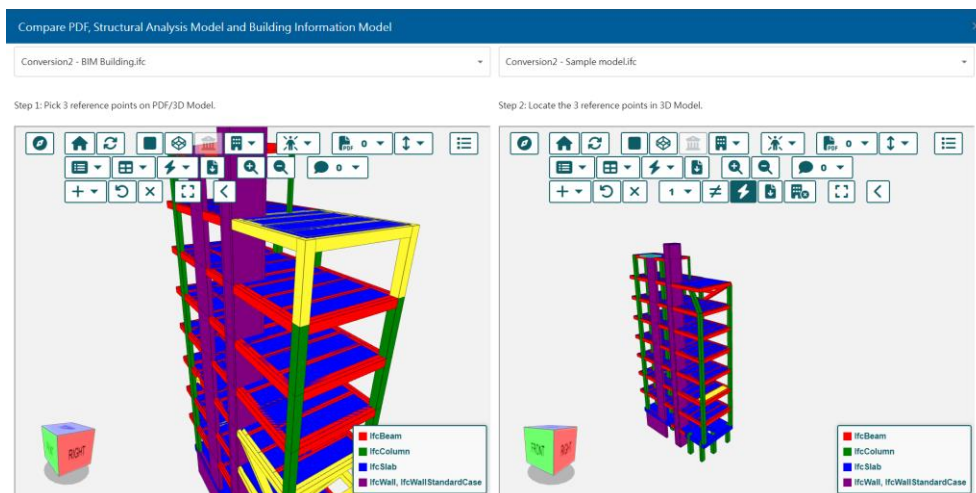
(x)   Press "Model Comparison Method" to switch to "Exact Match" mode or "Tolerance of One Unit Width" mode.
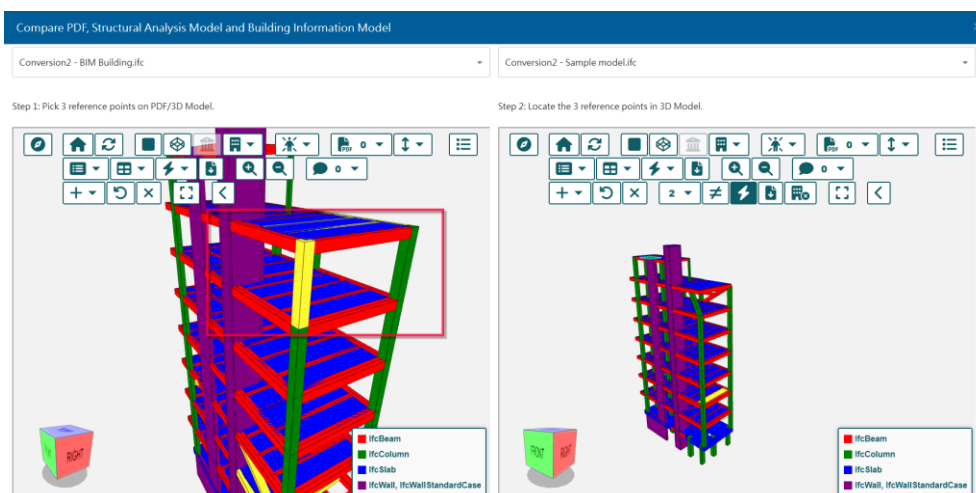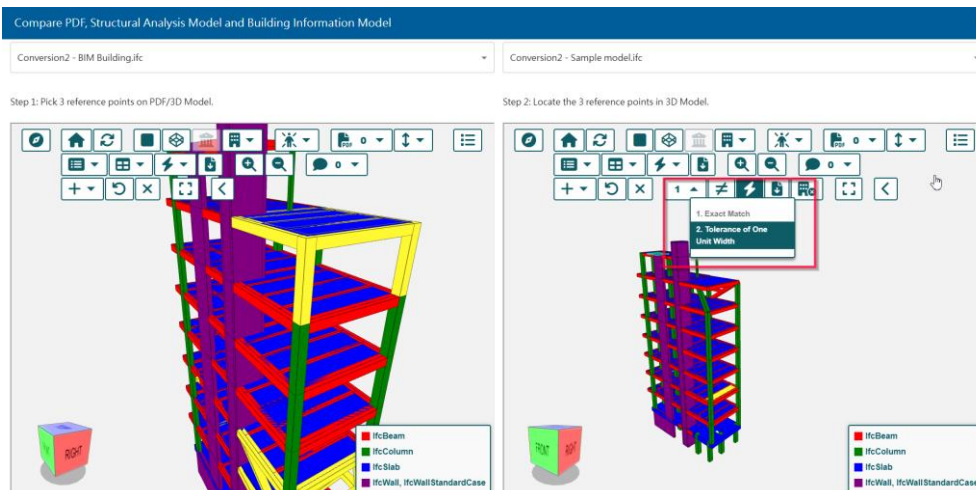
4.3   openBIM viewer of BST also have other functions like measuring dimensions, cutting sections, capturing screens and making comments. User may visit BD's BIM website to view the video guide for information. [Link].

5. Open the converted e2k text file in ETABS

5.1 Import converted e2k file to ETABS

(i) Open ETABS, in the panel select "File", then "Import" and click "ETABS Database Table to Text File".
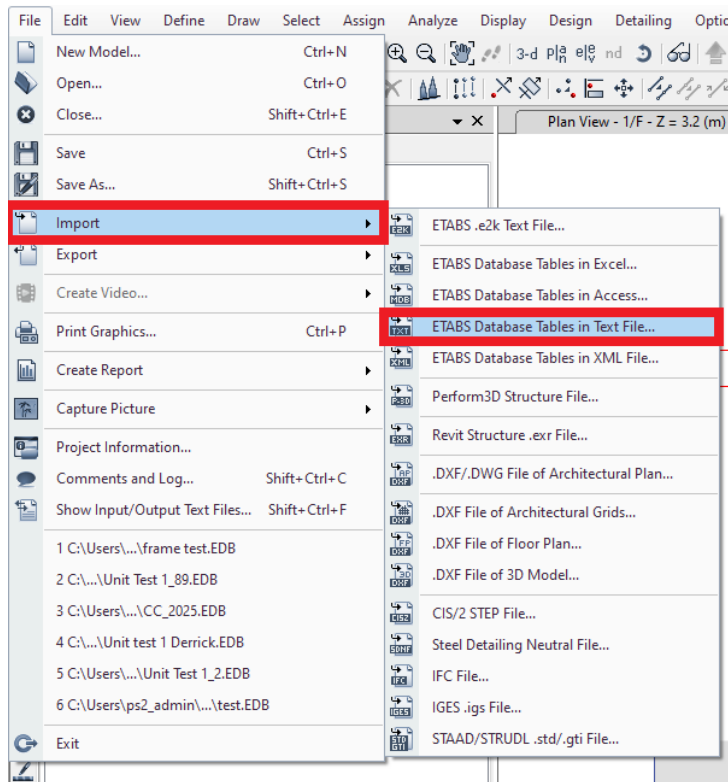
(ii) Choose New model and press "OK".
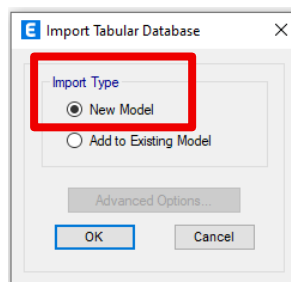
(iii) Select the converted e2k to import.
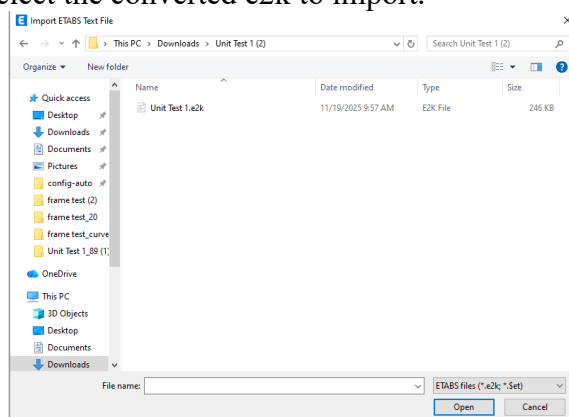
(iv)   A warning may display to alert user. Press "No" to ignore the message.
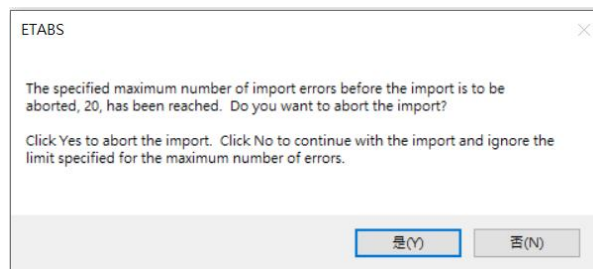
(v)   In the popped-up display "Database Import Log", Press "Done".
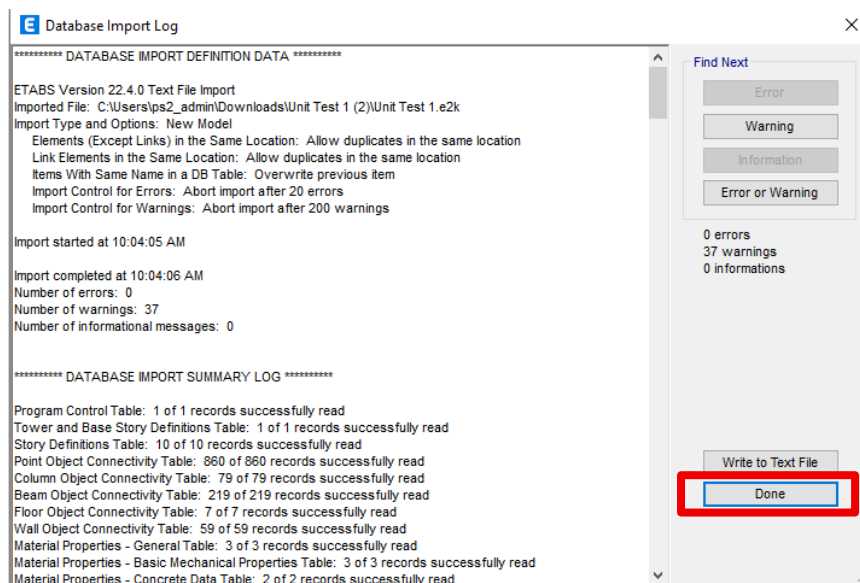
(vi)   The converted e2k text file is successfully imported.

(vii)   The user is reminded to verify all key input data in SAM to ensure that the modelling assumptions and assigned properties are consistent with the design assumptions and requirements.   Additionally, the user is also reminded to check the object connectivity in the SAM.
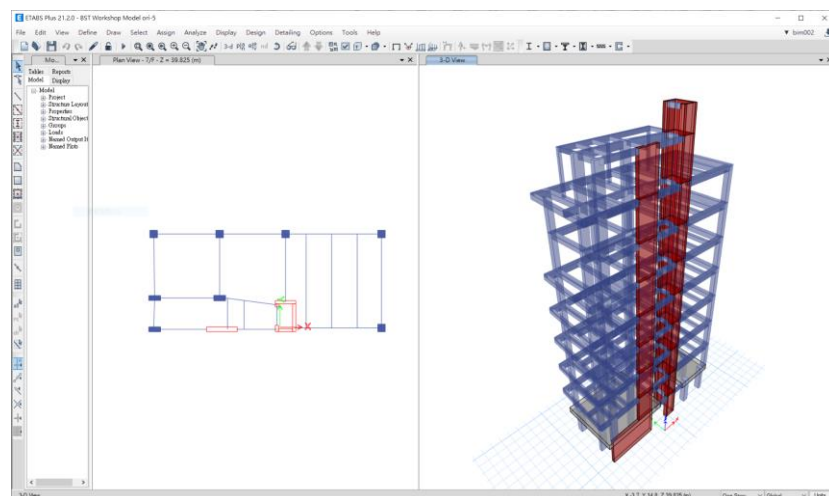
6. Convert SAM to openBIM data model

6.1   Open the file to be converted into openBIM data model. Select "File", then choose "Export" and select "ETABS Database Table to Text".
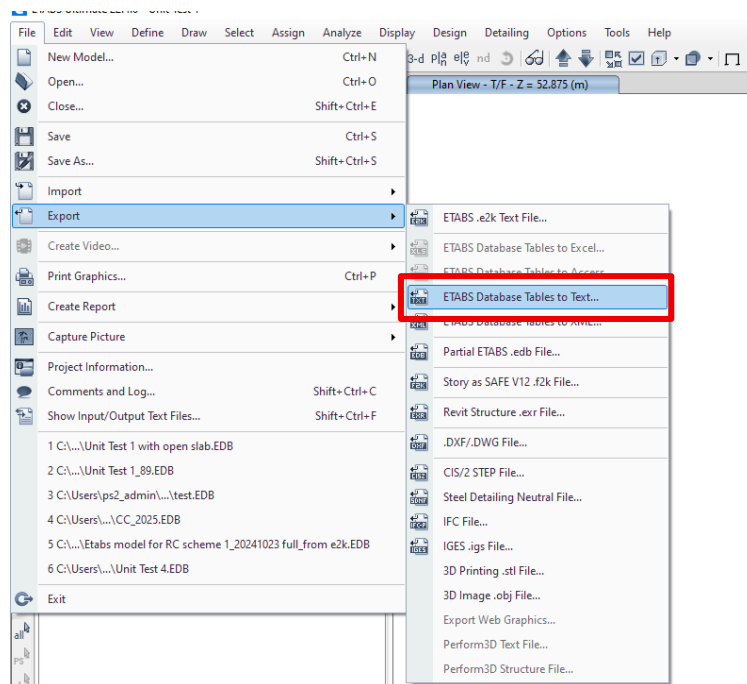
6.2   Select all items under "Model Definition" by clicking the check box and unselect "Selection only" under "Options", then click "OK".
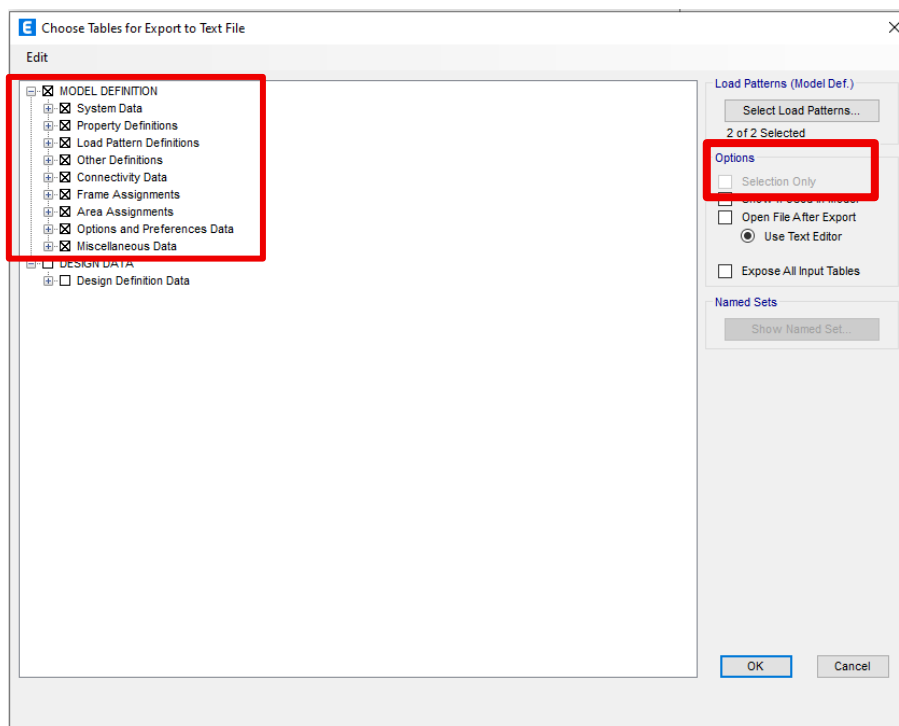
6.3   Follow the Steps in clause 3.1 to upload the converted the e2k text file. The BST will automatically convert the e2k text file to openBIM data model. User will also visualise the converted openBIM data model by using the openBIM viewer of BST with steps mentioned in clause 4 above.

Appendix I: Structural Parameters for Beam

Revit Representation	Tekla Structures Representation	ETABS Representation	IFC Entities	Property Set	Parameter Name or IFC Property Name	Property Type	Property Unit	ETABS Property	Sample Value for Reference
Structural Framing	Beam	Beam	IfcBeam	BUD_BeamDimension	Beam_Mark	String	N.A	"Unique Name"	1B1, 1FB1
Structural Framing	Beam	Beam	IfcBeam	BUD_BeamMaterial	Beam_MaterialGrade	String	N.A	"Material Name" under "Material Property"	C20/20,C30/20, C45/20, C60/10 or C60/20 etc
Structural Framing	Beam	Beam	IfcBeam	BUD_BeamDimension	Beam_Width	Integer	mm	"Width" under "Frame Section Property Data" (Rectangular Section)	300
Structural Framing	Beam	Beam	IfcBeam	BUD_BeamDimension	Beam_Depth	Integer	mm	"Depth" under "Frame Section Property Data" (Rectangular Section)	600
Structural Framing	Beam	Beam	IfcBeam	BUD_BeamDimension	Beam_MomentRestrainedLeft	String	N.A	Moment release in 2-2 and 3-3 Direction at Start Point under "End Release"	Fix, Pin, Free
Structural Framing	Beam	Beam	IfcBeam	BUD_BeamDimension	Beam_MomentRestrainedRight	String	N.A	Moment release in 2-2 and 3-3 Direction at End Point under "End Release"	Fix, Pin, Free
Structural Framing	Beam	Beam	IfcBeam	BUD_BeamProperty	Beam_Cantilever	Boolean	N.A	Nil	True/False
Structural Framing	Beam	Beam	IfcBeam	BUD_BeamProperty	Beam_Transfer	Boolean	N.A	Nil	True/False
Structural Framing	Beam	Beam	IfcBeam	BUD_BeamProperty	Beam_WindFrame	Boolean	N.A	Only objects will convert to ETABS if "True"	True/False
Structural Framing	Beam	Beam	IfcBeam	BUD_BeamProperty	Beam_TorsionRestrained	Boolean	N.A	Torsion release under "End Release"	True/False
Structural Framing	Concrete Beam	Beam	IfcBeam	BUD_BeamReinforcement	Beam_ReferTo2DDetail	String	N.A	Nil	Dwg Number
Structural Framing	Concrete Beam	Beam	IfcBeam	BUD_BeamReinforcement	Beam_RebarSteelGrade	String	N.A	"Material Name" under "Material Property" and "Rebar Material" under Frame Section Property Data	250, 500A, 500B, 500C
Structural Framing	Concrete Beam	Beam	IfcBeam	BUD_BeamReinforcement	Beam_RebarBottomLeft	String	N.A	Nil	3T25
Structural Framing	Concrete Beam	Beam	IfcBeam	BUD_BeamReinforcement	Beam_RebarBottomMiddle	String	N.A	Nil	3T32+3T25+3T20
Structural Framing	Concrete Beam	Beam	IfcBeam	BUD_BeamReinforcement	Beam_RebarBottomRight	String	N.A	Nil	3T25
Structural Framing	Concrete Beam	Beam	IfcBeam	BUD_BeamReinforcement	Beam_RebarTopLeft	String	N.A	Nil	3T32+3T25
Structural Framing	Concrete Beam	Beam	IfcBeam	BUD_BeamReinforcement	Beam_RebarTopMiddle	String	N.A	Nil	3T25
Structural Framing	Concrete Beam	Beam	IfcBeam	BUD_BeamReinforcement	Beam_RebarTopRight	String	N.A	Nil	3T32+3T25
Structural Framing	Concrete Beam	Beam	IfcBeam	BUD_BeamReinforcement	Beam_RebarStirrupsLeft	String	N.A	Nil	T10 - 300 c/c 2 Legs + T10-300 c/c C.L.
Structural Framing	Concrete Beam	Beam	IfcBeam	BUD_BeamReinforcement	Beam_RebarStirrupsMiddle	String	N.A	Nil	T10 - 300 c/c 2 Legs
Structural Framing	Concrete Beam	Beam	IfcBeam	BUD_BeamReinforcement	Beam_RebarStirrupsRight	String	N.A	Nil	T10 - 300 c/c 2 Legs
Structural Framing	Concrete Beam	Beam	IfcBeam	BUD_BeamReinforcement	Beam_RebarSideBar	String	N.A	Nil	T16-250 BOTH SIDE

Appendix II: Structural Parameters for Column

Revit Representation	Tekla Structures Representation	ETABS Representation	IFC Entities	Property Set	Property Name	Property Type	Property Unit	ETABS Property	Sample Value for Reference
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnDimension	Column_Mark	String	N.A	"Pier Label"	C1, T2C4
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnDimension	Column_StartingStorey	String	N.A	Nil	G/F, 1/F, 1F
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnDimension	Column_EndStorey	String	N.A	For Column's "Unique Name" naming	G/F, 1/F, 1F
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnMaterial	Column_MaterialGrade	String	N.A	"Material Name" under "Material Property"	C20/20,C30/20, C45/20, C60/10 or C60/20 etc
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnDimension	Column_Depth	Integer	mm	"Width" under "Frame Section Property Data" (Rectangular Section)	300
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnDimension	Column_Width	Integer	mm	"Depth" under "Frame Section Property Data" (Rectangular Section)	600
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnDimension	Column_Diameter	Integer	mm	"Diameter" under "Frame Section Property Data" (Circular Section)	600
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnProperty	Column_MomentRestrainedBottom	String	N.A	Moment release in 2-2 and 3-3 Direction at Start Point under "End Release"	Fix, Pin, Free
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnProperty	Column_MomentRestrainedTop	String	N.A	Moment release in 2-2 and 3-3 Direction at End Point under "End Release"	Fix, Pin, Free
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnProperty	Column_WindFrame	Boolean	N.A	Only objects will convert to ETABS if "True"	True/False
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnProperty	Column_Hanger	Boolean	N.A	TC Limit	True/False
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnReinforcement	Column_RebarSteelGrade	String	N.A	"Material Name" under "Material Property" And "Rebar Material" under Frame Section Property Data	250, 500A, 500B, 500C
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnReinforcement	Column_ReferTo2DDetail	String	N.A	Nil	Dwg Number
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnReinforcement	Column_MainRebar	String	N.A	Nil	6T32+6T25
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnReinforcement	Column_BinderNormalRegion	String	N.A	Nil	T10-190
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnReinforcement	Column_BinderCriticalRegion	String	N.A	Nil	T10-85
Structural Columns	Concrete Column	Column	IfcColumn	BUD_ColumnReinforcement	Column_BinderLapRegion	String	N.A	Nil	T10-190

Appendix III: Structural Parameters for Wall

Revit Representation	Tekla Structures Representation	ETABS Representation	IFC Entities	Property Set	Property Name	Property Type	Property Unit	ETABS Property	Sample Value for Reference
Walls	Concrete Panel	Walls	IfcWall	BUD_WallDimension	Wall_Mark	String	N.A	"Pier Label"	W1, T1W1
Walls	Concrete Panel	Walls	IfcWall	BUD_WallDimension	Wall_StartingStorey	String	N.A	Nil	G/F, 1/F, 1F
Walls	Concrete Panel	Walls	IfcWall	BUD_WallDimension	Wall_EndStorey	String	N.A	For Wall's "Unique Name" Naming	G/F, 1/F, 1F
Walls	Concrete Panel	Walls	IfcWall	BUD_WallDimension	Wall_Thickness	Integer	mm	"Thickness" under "Wall Property"	300
Walls	Concrete Panel	Walls	IfcWall	BUD_WallMaterial	Wall_MaterialGrade	String	N.A	"Material Name" under "Material Property"	C20/20,C30/20, C45/20, C60/10 or C60/20 etc
Walls	Concrete Panel	Walls	IfcWall	BUD_WallProperty	Wall_WindFrame	Boolean	N.A	Only objects will convert to ETABS if "True"	True/False
Walls	Concrete Panel	Walls	IfcWall	BUD_WallReinforcement	Wall_ReferTo2DDetail	String	N.A	Nil	Dwg Number
Walls	Concrete Panel	Walls	IfcWall	BUD_WallReinforcement	Wall_RebarSteelGrade	String	N.A	Nil	250, 500A, 500B, 500C
Walls	Concrete Panel	Walls	IfcWall	BUD_WallReinforcement	Wall_NonConfinedBoundaryElement_VerticalRebar	String	N.A	Nil	T20-200
Walls	Concrete Panel	Walls	IfcWall	BUD_WallReinforcement	Wall_NonConfinedBoundaryElement_HorizontalRebar	String	N.A	Nil	T10-100
Walls	Concrete Panel	Walls	IfcWall	BUD_WallReinforcement	Wall_NonConfinedBoundaryElement_Links	String	N.A	Nil	T12-150-100 (Size-Hori-Vert)
Walls	Concrete Panel	Walls	IfcWall	BUD_WallReinforcement	Wall_ConfinedBoundaryElementType	String	N.A	Nil	Type1, Type2 or Type3
Walls	Concrete Panel	Walls	IfcWall	BUD_WallReinforcement	Wall_ConfinedBoundaryElement_VerticalRebar	String	N.A	Nil	T20-150
Walls	Concrete Panel	Walls	IfcWall	BUD_WallReinforcement	Wall_ConfinedBoundaryElement_HorizontalRebar	String	N.A	Nil	T10-100
Walls	Concrete Panel	Walls	IfcWall	BUD_WallReinforcement	Wall_ConfinedBoundaryElement_Links	String	N.A	Nil	T12-150-100 (Size-Hori-Vert)

Appendix IV: Structural Parameters for Slab

Revit Representation	Tekla Structures Representation	ETABS Representation	IFC Entities	Property Set	Property Name	Property Type	Property UnitFl	ETABS Property	Sample Value for Reference
Floors	Slab	Slab	IfcSlab	BUD_SlabDimension	Slab_Mark	String	N.A	"Unique Name"	1S1
Floors	Slab	Slab	IfcSlab	BUD_SlabDimension	Slab_Thickness	Integer	mm	"Thickness" under "Slab Property"	150
Floors	Slab	Slab	IfcSlab	BUD_SlabProperty	Slab_SlabType	String	N.A	Nil	One way, Two way, Cantilever, Flat slab, Flat slab with drop panel,Cantilever Slab, Transfer slab
Floors	Slab	Slab	IfcSlab	BUD_SlabProperty	Slab_WindFrame	Boolean	N.A	Only objects will convert to ETABS if "True"	Yes/No
Floors	Slab	Slab	IfcSlab	BUD_SlabMaterial	Slab_MaterialGrade	String	N.A	"Material Name" under "Material Property	C20/20,C30/20, C45/20, C60/10 or C60/20 etc
Floors	Slab	Slab	IfcSlab	BUD_SlabReinforcement	Slab_ReferTo2DDetail	String	N.A	Nil	Dwg Number
Floors	Slab	Slab	IfcSlab	BUD_SlabReinforcement	Slab_RebarSteelGrade	String	N.A	Nil	250, 500A, 500B, 500C
Floors	Slab	Slab	IfcSlab	BUD_SlabReinforcement	Slab_RebarBottomMain_nominal	String	N.A	Nil	T25-150+T16-300
Floors	Slab	Slab	IfcSlab	BUD_SlabReinforcement	Slab_RebarBottomDistribution_nominal	String	N.A	Nil	T25-150+T16-300
Floors	Slab	Slab	IfcSlab	BUD_SlabReinforcement	Slab_RebarTopMain_nominal	String	N.A	Nil	T32-150+T20-300
Floors	Slab	Slab	IfcSlab	BUD_SlabReinforcement	Slab_RebarTopDistribution_nominal	String	N.A	Nil	T25-150+T16-300
Floors	Slab	Slab	IfcSlab	BUD_SlabReinforcement	Slab_RebarStirrups	String	N.A	Nil	1T10-150-300
Floors	Slab	Slab	IfcSlab	BUD_SlabReinforcement	Slab_RebarWeldedMesh	Boolean	N.A	Nil	TRUE/FALSE

Appendix V – Limitation of the Conversion Function in BST

Objects	IFC Entity	IFC Representation	Remark
Beam	IfcBeam	IfcShapeRepresentation	It must include identifier "Axis" and the type "Curve2D" or "Curve3D" to indicate the start point and end point of the frame object.
Column	IfcColumn	IfcShapeRepresentation	It must include identifier "Axis" and the type "Curve2D" or "Curve3D" to indicate the start point and end point of the frame object.
Column	IfcColumn	IfcExtrudedAreaSolid	To derive column's angle of rotation, width and depth.
Wall	IfcWall	IfcShapeRepresentation	It must include identifier "Body" and the type "CSG" or "SweptSolid" to indicate the point of the area object. The wall's side face should be rectangular shape.
Wall Opening	IfcWall		Wall opening will be disregarded by BST during conversion
Slab	IfcSlab	IfcShapeRepresentation	It must include identifier "Body" and the type "CSG" or "SweptSolid" to indicate the point of the area object.
Slab Opening	IfcSlab	IfcShapeRepresentation	