

Design Note

Project ETABS Base Reactions Exchange Tool
Subject Zero Code Tools
Project no [Project no]
Date 17 November 2025

Revision	Description	Issued by	Date	Approved (signature)
P01	User Guide for the "ETABS Base Reactions Exchange Tool"	GA	17/11/2025	

1. Description

The ETABS Base Reactions Exchange Tool is a Windows Desktop application developed in VB.Net allowing to transfer joint reactions between different ETABS Models based on multiple criteria.

The joint reactions from the source ETABS model get transferred as reversed point loads into the target ETABS Model based on Groups and Load Combos selection by the user.

Whatever misalignment between corresponding joints in the two models is handled by the tool by applying a customizable location tolerance that allows to match corresponding joints notwithstanding accidental mistakes in their positioning.

The use of this tool allows engineers to transfer significant amounts of base reactions in no time between whatever number of ETABS models without the hassle of managing this task manually with the use of multiple excel spreadsheets ending up in an incredibly time-consuming and error-prone workflow.

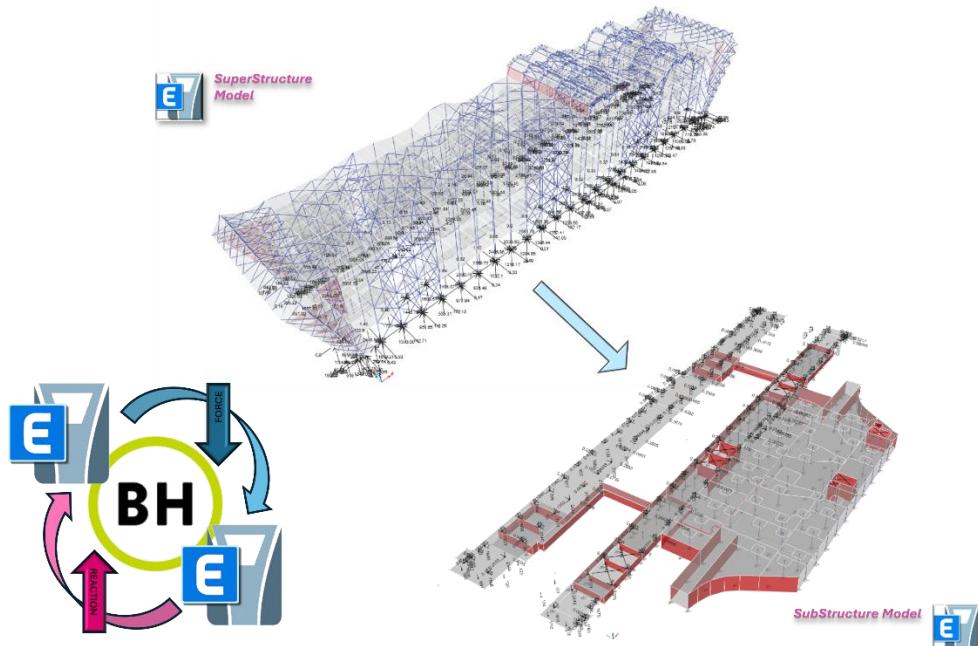


Figure 1: Transfer of Forces between SuperStructure and SubStructure ETABS Models on a BH Project in Saudi Arabia (right).

2. Installation

The process of installation of the tool is very simple. It's just a matter of running the provided msi installer and follow the step-by-step process below (see it also in Figure 2).

1. Launch the msi installer.
2. In the wizard window popping up, select the location of the Installation Folder.
 - e.g.: C:\Users\<username>\ETABSPlugins
3. Click on Next until installation is complete.

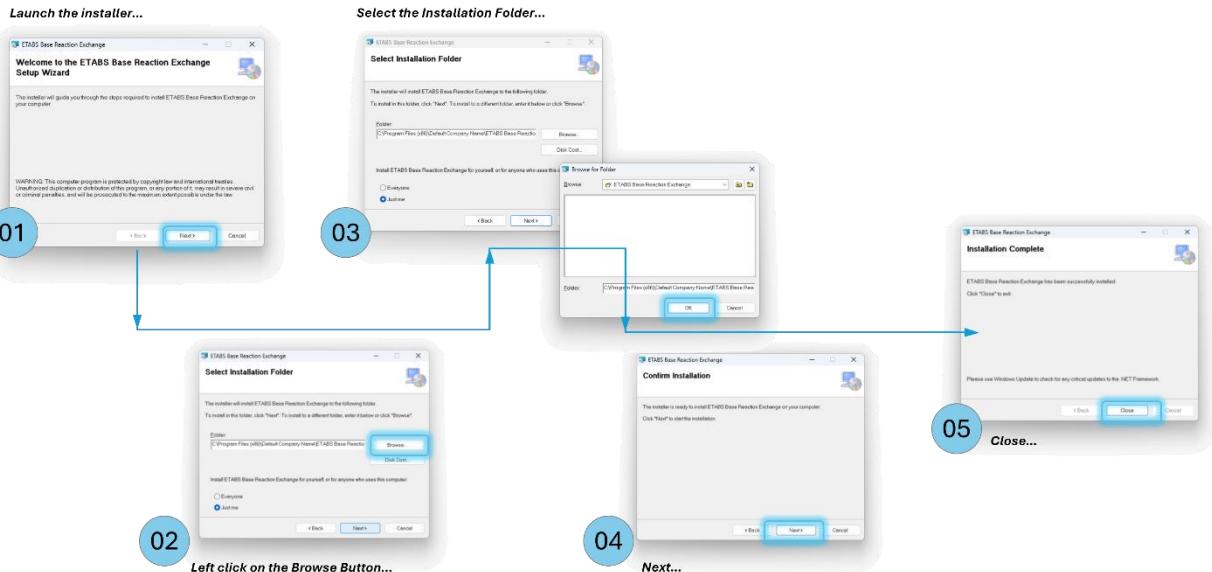


Figure 2: Installation process via msi installer - step-by-step

The installer creates a new folder named ETABS BRE Tool/ containing all relevant files required by the tool to run, including the .exe file that is used to launch the application (DO NOT DELETE or RENAME the folder/files).

Name	Date modified	Type	Size
ETABS Base Reaction Exchange.exe	07/11/2025 18:46	Application	1,291 KB
CSIPv1.dll	07/11/2025 18:46	Application extension	1,160 KB
ETABSV1.dll	07/11/2025 18:46	Application extension	328 KB
Microsoft.Win32.Registry.dll	07/11/2025 18:46	Application extension	26 KB
netstandard.dll	07/11/2025 18:46	Application extension	100 KB
System.Data.Common.dll	07/11/2025 18:46	Application extension	25 KB
System.Diagnostics.StackTrace.dll	07/11/2025 18:46	Application extension	24 KB
System.Diagnostics.Tracing.dll	07/11/2025 18:46	Application extension	34 KB
System.Globalization.Extensions.dll	07/11/2025 18:46	Application extension	24 KB
System.IO.Compression.dll	07/11/2025 18:46	Application extension	67 KB
System.IO.Compression.FileSystem.dll	07/11/2025 18:46	Application extension	27 KB
System.Net.Http.dll	07/11/2025 18:46	Application extension	195 KB
System.Net.Sockets.dll	07/11/2025 18:46	Application extension	25 KB
System.Runtime.InteropServices.RuntimeInformation.dll	07/11/2025 18:46	Application extension	24 KB
System.Runtime.Serialization.Primitives.dll	07/11/2025 18:46	Application extension	24 KB
System.Runtime.Serialization.Xml.dll	07/11/2025 18:46	Application extension	25 KB
System.Security.Cryptography.Algorithms.dll	07/11/2025 18:46	Application extension	25 KB
System.Security.SecureString.dll	07/11/2025 18:46	Application extension	24 KB
System.Threading.Overlapped.dll	07/11/2025 18:46	Application extension	24 KB
System.ValueTuple.dll	07/11/2025 18:46	Application extension	24 KB
System.Xml.XPath.XDocument.dll	07/11/2025 18:46	Application extension	24 KB
BREETabsBHE.ico	07/11/2025 18:46	ICO File	5 KB
ETABS Base Reaction Exchange.xml	07/11/2025 18:46	Microsoft Edge HTML Document	2 KB
ETABS Base Reaction Exchange.pdb	07/11/2025 18:46	Program Debug Database	98 KB
ETABS Base Reaction Exchange.exe.config	07/11/2025 18:46	XML Configuration File	1 KB

Figure 3: Files created by the .msi installer in the ETABS BRE Tool/ folder

In addition to the folder, the .msi installer also creates a Shortcut to the .exe file on the user's desktop (see image below) so that the user can start running the tool straight away without even opening the installation folder.



Figure 4: ETABS BRE Tool Shortcut automatically appearing on the Desktop after installation

3. ETABS Model Setup

3.1. Introduction

A few requirements have to be met prior to running the tool.

These are also listed in the AboutBox Window popping up on screen when the application has started.

3.2. Pre-requisites

Run the tool only when all the following conditions are met.

- Any ETABS running instance has to be terminated before running the application.
- Levels shared by Source and Target ETABS Model must have the same name.
- Switch off the Walls Automatic Meshing in the Source ETABS Model prior to running the tool (No Automatic Meshing is allowed for walls in the Source Model)
 - Wall base point reactions at mesh points not coinciding with shell corner points will be neglected by the tool.

Let us look through the above in more detail.

3.2.1. Running ETABS Instances

The tool requires that there's no existing instance of ETABS running on the user's machine.

In order to make sure that this is the case, it is recommended to check all software instances currently running on the machine via the Task Manager.

Make sure to check also the Background processes as there might be instances of ETABS previously not correctly terminated that are still running in the background.

Once an instance of ETABS has been found, right click on it and click on "End task".

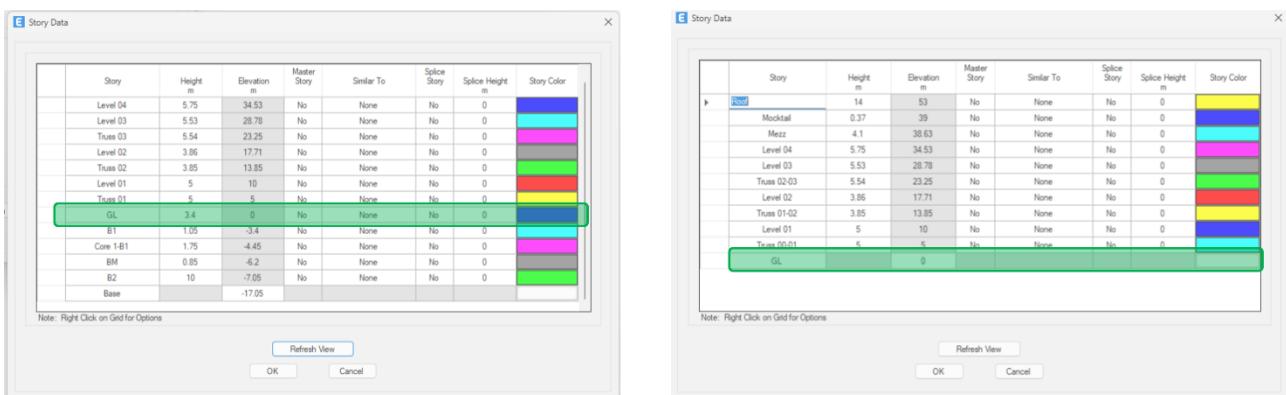
Do this with all the ones you find.

	Background processes (265)						
⌚ App history	> 📺 Acrobat Collaboration Synchronizer 25.1 (2)	0%	10.0 MB	0 MB/s	0 Mbps		
⚡ Startup apps	> 📺 Acrobat Update Service	0%	0.4 MB	0 MB/s	0 Mbps		
👤 Users	> 📺 Activation Licensing Service	0%	2.1 MB	0 MB/s	0 Mbps		
≡ Details	> 📺 Activation Licensing Service	0%	1.8 MB	0 MB/s	0 Mbps		
⚙️ Services	➤ AdSSO	0%	4.4 MB	0 MB/s	0 Mbps		
	> 📺 Antimalware Core Service	0%	5.4 MB	0 MB/s	0 Mbps		

	Name	Status	CPU	Memory	Disk	Network
Performance						
App history	Apps (30)					
Startup apps	> ETABS					
Users	> GitHub	Expand				
Details	> GitHub	End task	0%	2.3 MB	0 MB/s	0 Mbps
Services	> GitHub	Resource values	0%	380.0 MB	0.1 MB/s	0 Mbps
	> GitHub	Provide feedback	0%	0.3 MB	0 MB/s	0 Mbps
	> ITGad	Efficiency mode	0%	39.7 MB	0 MB/s	0 Mbps
			0%	0.6 MB	0 MB/s	0 Mbps

3.2.2. Naming of Shared Levels

In order to guarantee the maximum freedom and flexibility in the setting out of the elevations of the different ETABS models, the tool matches the transfer reactions level between Source and Target ETABS Models by name. That is why it's essential that such shared level is named exactly the same in the two models (see example below).



The figure shows two side-by-side 'Story Data' dialog boxes. Both boxes have a grid table with columns: Story, Height m, Elevation m, Master Story, Similar To, Splice Story, Splice Height m, and Story Color. The rows list various structural levels and stories, including 'GL' (Ground Level) at height 0. In both models, the 'GL' row is highlighted with a green background. The 'Story Color' column shows a color gradient from blue to red across the levels.

Story	Height m	Elevation m	Master Story	Similar To	Splice Story	Splice Height m	Story Color
Level 04	5.75	34.53	No	None	No	0	Blue
Level 03	5.53	28.78	No	None	No	0	Cyan
Truss 03	5.54	23.25	No	None	No	0	Magenta
Level 02	3.96	17.71	No	None	No	0	Grey
Truss 02	3.85	13.85	No	None	No	0	Green
Level 01	5	10	No	None	No	0	Red
Truss 01	5	5	No	None	No	0	Yellow
GL	3.4	0	No	None	No	0	Dark Blue
B1	1.05	-3.4	No	None	No	0	Cyan
Core 1-B1	1.75	-4.45	No	None	No	0	Magenta
BM	0.85	-6.2	No	None	No	0	Grey
B2	10	-7.05	No	None	No	0	Green
Base		-17.05					

Figure 5: Matching Naming for Base Reactions Transfer Level (Substructure Model on the left and Superstructure Model on the Right)

3.2.3. Walls Automatic Meshing

When the Automatic Meshing option is selected for walls, unless the minimum dimension of the mesh is set to a value bigger than the length of the wall, meshing points will be created along the edges of the wall panels in the ETABS Model. These joints are just mesh nodes and they are not considered as all the other standard geometric joints (end/corner points of elements).

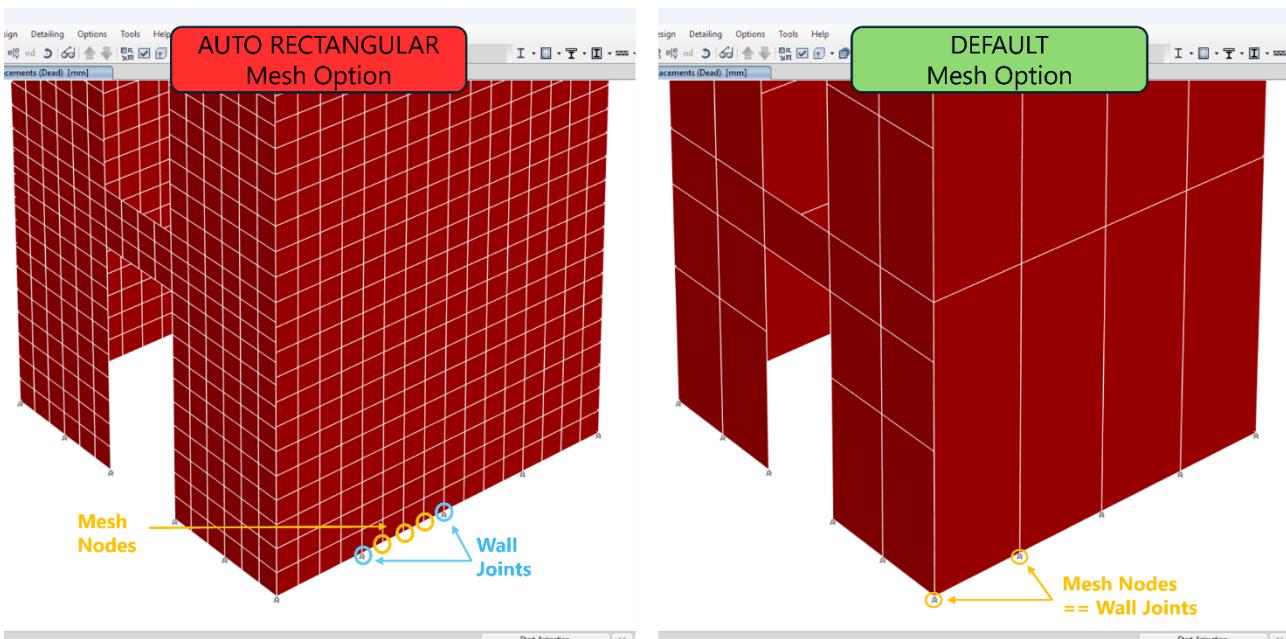


Figure 6: Comparison Walls Meshing Options - Auto Rectangular (left) and Default (right)

Due to limitations of the ETABS API, the tool will neglect any partial reaction/force integrated on these mesh nodes. Therefore, in order not to get the risk of missing part of the total reaction/load computed in the Source Model, it is important to make sure that ETABS uses the Default Meshing Option – so that the mesh nodes will coincide with the geometric nodes of the wall panels themselves.

This will guarantee that 100% of the loads/reactions are transferred by the tool to the Target ETABS Model.

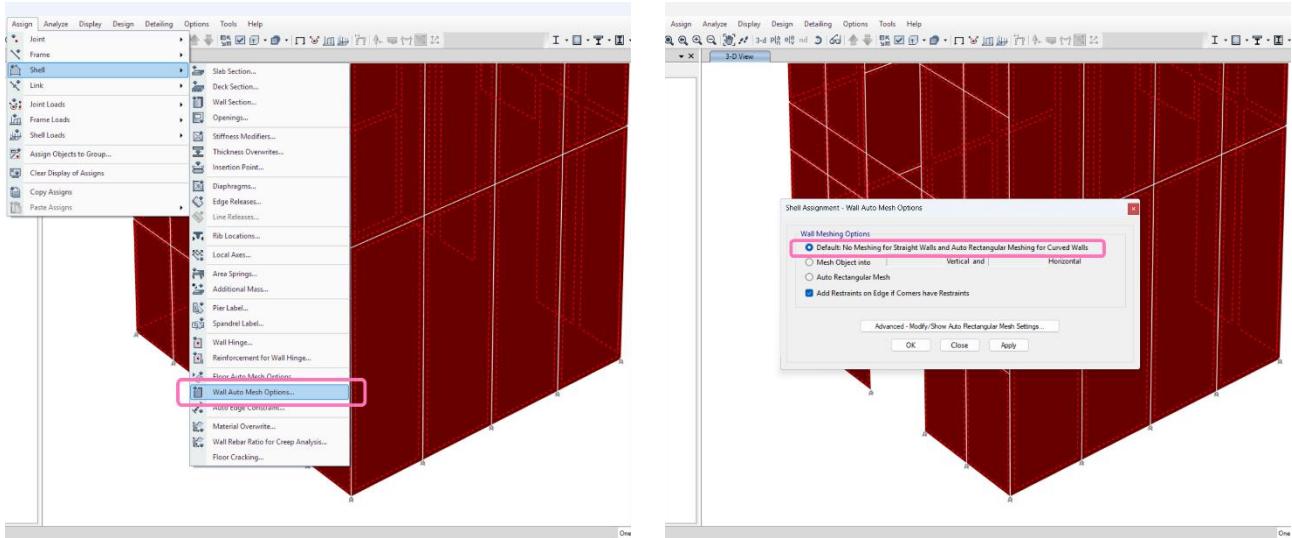


Figure 7: Selection of Default Meshing Option for Walls in ETABS UI

3.3. Limitations

Currently only Linear Static Load Cases are supported by the tool.

Based on number of requests and feedback from the users, support for also Non-Linear Load Cases shall be implemented.

4. User Interface

4.1. SplashScreen

As soon as we click on the tool's icon and the application starts running, a Splashscreen will appear on the screen.

This contains the logo of the tool, the name, the version and the copyright.

After few seconds it will disappear leaving space to the AboutBox window.

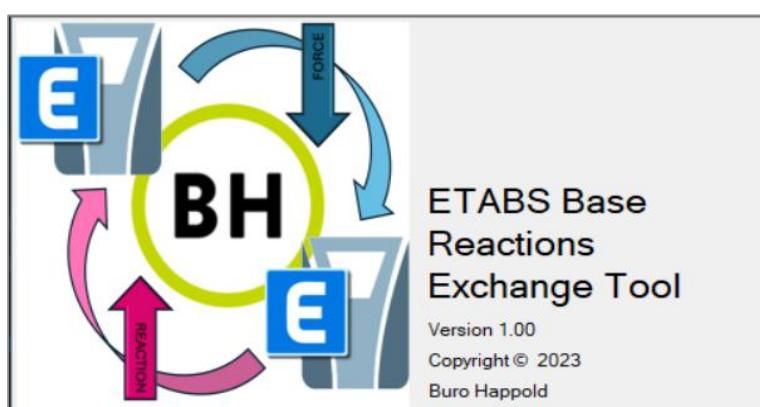


Figure 8: ETABS BRE Tool - Splashscreen

AboutBox

The AboutBox window is a very important part of the tool's UI as it contains relevant information about the use of the plugin. In addition to the logo and the versioning/copyright information, it contains a textbox where the strengths and limitations of the tool are reported and regularly updated.

It is strongly recommended that, whenever a new version of the tool gets released, the user takes the chance to read all this information before moving on using the tool.

The information reported is subdivided in the following sections:

- **FEATURES**
 - High level description of the scope of the tool.
 - Step-by-step process followed by the tool to compute the outputs.
- **LIMITATIONS**
 - Current limitations the user has to be aware of before using the tool.

Once finished reading, left click on the "OK" button in the bottom right corner of the window to move on to the Inputs Form.

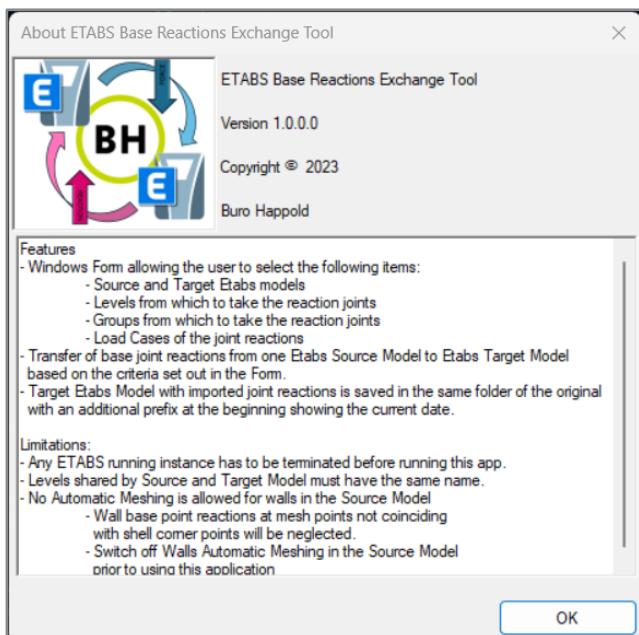


Figure 9: **ETABS BRE Tool** - AboutBox

Inputs Form

The Inputs Form is the main window of the tool. It's the window allowing the user to select the Source and the Target Etabs models as well as the key parameters for carrying out the transfer of base point reactions. It allows to run the transfer and inform the user when the process is finished.

The Form is designed to be as simple as possible and it consists of the following items:

- ETABS MODELS Selection Buttons
- STOREYS Selection CheckedListBox
- GROUPS Selection CheckedListBox
- LOAD CASES Selection CheckedListBox
- JOINTS LOCATION TOLERANCE DropDownBox
- TRANSFER REACTIONS Button
- PROGRESS BAR

A more detailed description of both Inputs and Outputs is reported in the following paragraphs of this document.

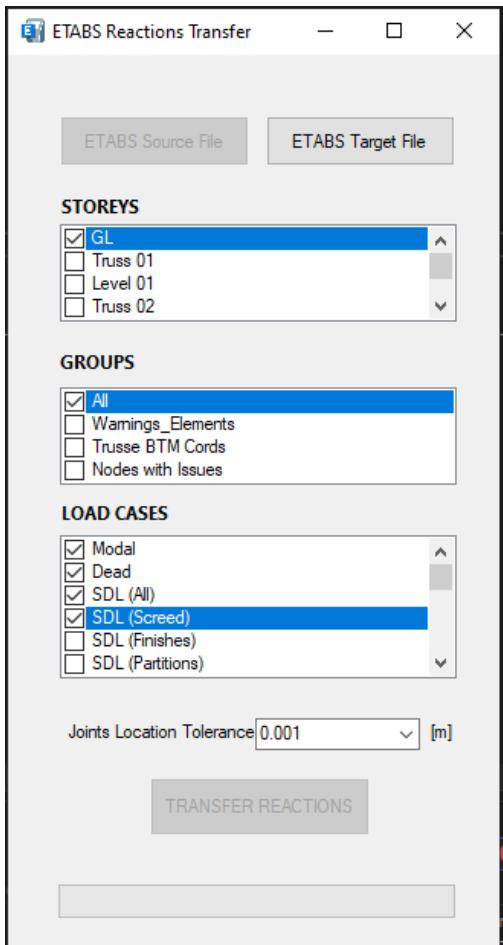


Figure 10: ETABS BRE Tool – Inputs View

5. Inputs

5.1. ETABS Source File

This is the first input the User is requested to provide. Left clicking on the “ETABS Source File” Button in the Inputs Form, an Open File Dialog pops up on screen allowing the user to select the Source File from which to transfer base reactions to the Target File.

As soon as the user chooses the Source Model file, the ETABS Application gets run in the background, the ETABS Model gets opened and the listboxes below in the Inputs Form (i.e. Storeys, Groups and Load Cases) get populated with the corresponding data extracted from the Source ETABS Model.

5.2. Storeys

The Storeys CheckedListBox contains the list of all the storeys available in the selected Source ETABS Model. The user has to select one and only one level. The level must be the one shared between the Source and the Target Model (i.e. the level where are located the base reactions to transfer).

5.3. Groups

The Groups CheckedListBox contains the list of all the groups available in the selected Source ETABS Model. The user can select as many of them as they need. Whatever base joint is not assigned to one of the selected groups will be disregarded by the tool. The selection of groups helps the user filtering base joints based on customized criteria.

5.4. Load Cases

The Load Cases CheckedListBox contains the list of all the load cases available in the selected Source ETABS Model. The user can select as many of them as they need. The base reactions transferred by the tool into the Target ETABS Model will be determined for each of the selected load cases.

5.5. Joints Location Tolerance

Corresponding joints in the Source and the Target ETABS Models might be slightly offset from each other in plan due to many reasons including mistakes due to manual modelling from the user.

Defining the Joints Location Tolerance (in meters) will allow the tool to match corresponding base reactions joints in the two ETABS Models even if their location doesn't perfectly match.

The match is achieved as long as the offset between the two is within the input tolerance.

5.6. ETABS Target File

Once the Source ETABS Model has been selected and the selection of Storeys, Groups and Load Cases has been completed, the "ETABS Target File" Button gets activated allowing the user to select the Target ETABS Model via an Open File Dialog popping up on screen. Finally run the transfer of base reactions by clicking on the button "TRANSFER REACTIONS" at the base of the Inputs Form.

6. Outputs

6.1. Overview

The output produced by the ETABS BRE Tool, is a copy of the target ETABS model incorporating all the base reactions transferred from the source file as point loads at the corresponding locations (see image below).

This new model gets saved in the same folder of the Target ETABS Model and with a labelled name containing the name of the tool as well as the date of its creation following the execution of the forces transfer (see convention below).

Output File Naming Convention: BRE_<Year><Month><Day>_<OriginalModelName>.edb

Example: BRE_20251026_HOI Substructure.edb

In this way, it's possible to track all different versions of the ETABS Model without the risk of overriding the original.

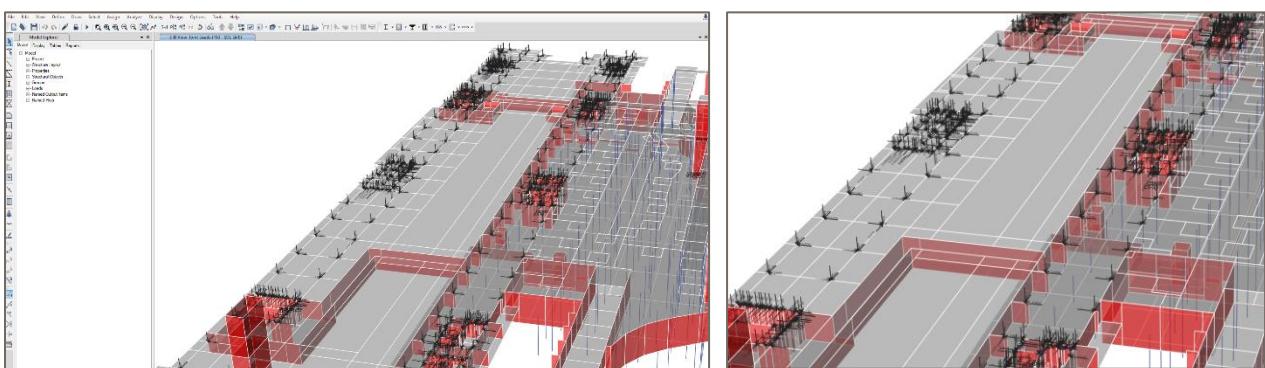


Figure 11: Example of output ETABS Model with detail of transferred point load reactions