





Microsoft Partner

REVIT SCIA ENGINEER LINK GETTING STARTED

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1 Introduction

CADS Revit SCIA Engineer link facilitates the bi-directional exchange of members, loads and supports between Autodesk Revit and SCIA Engineer and in doing so plays a vital role in the overall Building Information Modelling (BIM) process. A structure modelled in Revit can be transferred to SCIA Engineer for structural analysis and design using *CADS Revit SCIA Engineer link*. Once the structural analysis and design has been completed in SCIA Engineer, the updated model can be sent back to Revit. The modelling - analysis - design process may require a few iterations to arrive at the final design. *CADS Revit SCIA Engineer link* will save time by avoiding duplication and reducing errors.

This Getting Started guide will help you with instructions on how to install the software and make the best use of *CADS Revit SCIA Engineer link* to manage your BIM process successfully.

The Content libraries in Revit are stored as a collection of the *Revit family (*.RFA)* files. The Revit 2023 Content Packs may be downloaded from <u>here</u>.



2 Compatibility

CADS Revit SCIA Engineer link is shipped with a *Release Notes* document which lists the versions of Revit and SCIA Engineer with which it is compatible. You can also find this document in the following folder:

C:\Program Files\Revit To SCIA Engineer\Revit20xx\Docs

C:\Program Files folder is the default installation folder for CADS Revit SCIA Engineer Link.

🕢 Revit To SCIA Engineer	×
Destination Location	
Setup will install Revit To SCIA Engineer in the following folder.	
To install into a different folder, click Browse and select another folder.	
You can choose not to install Revit To SCIA Engineer by clicking Cancel to exit S	ietup.
Destination Folder	
C:\Program Files Brow	se
< Back	Cancel

Figure 2-1: CADS Revit SCIA Engineer Link installation folder

Revit20xx is the Revit version number on which *CADS Revit SCIA Engineer link* is installed.



3 Workflow

CADS Revit SCIA Engineer link supports the following workflows:

3.1 Revit to SCIA Engineer round trip



Figure 3-1: Revit to SCIA Engineer round trip

3.2 SCIA Engineer to Revit round trip



Figure 3-2: SCIA Engineer to Revit round trip

Note: In Revit 2023, the analytical model feature has been modified significantly. The approach for generating the analytical model is now changed from "Derived analytical model" to "Contextual analytical model". For more details about Structural analytical modelling in Revit, please visit the link <u>here</u>.



4 Installation

This section sets out how to install CADS Revit SCIA Engineer link on various system environments.

If you wish to have a direct link between Revit and SCIA Engineer, you should have both applications installed and licensed on your system.

If only one of the applications is licensed (i.e. Revit or SCIA Engineer) and you wish to share your model with your colleague then you need to use the file based transfer method. This means, you will have to create a **.R2S file* from either of the applications and then import it into the other application.

Note:

We suggest that you uninstall the previous version of CADS Revit SCIA Engineer link before starting the installation of the latest version of CADS Revit SCIA Engineer link.

4.1 Revit and SCIA Engineer licensed on the system

- Check in the *Release Notes* whether the Revit version is compatible with the version of *CADS Revit SCIA Engineer link* you wish to install on your system. If yes, then continue with the installation, or else install the required version of either Revit or SCIA Engineer.
- Run CADS Revit SCIA Engineer link installation and select the options as prompted in the dialogs.
- Finish the installation.

4.2 Only Revit licensed on your system

- Check in the *Release Notes* whether the Revit version is compatible with the version of *CADS Revit SCIA Engineer link* you wish to install on your system. If yes, then continue with the installation or else install the required version of Revit.
- Run CADS Revit SCIA Engineer link installation and select the options as prompted in the dialogs.

4.3 Only SCIA Engineer licensed on your system

CADS Revit SCIA Engineer link installation is not required. As long as you have the *Revit plug-in* installed on your system you can export or import the ***.*R2S* file from *SCIA Engineer* as explained in <u>Section 5</u>.





5 Basic commands

In order to transfer the model from Revit to SCIA Engineer, you must specify the following:

5.1 Code of practice

1.000

ctions		Op	otions		
National Code	EC - EN 🗸 🗸		Elements to export	All analytical	
	BS		Only selected elements	No	
Mode of export	EC - EN		Export elements based on layers	Yes	
SCIA Engineer version	EC - ENV IBC		Opening as panel	No	
SCIA Engineer version	IBC-Metric		Internal edges with beams	Yes	
- Export to SCIA Engineer	NEN	\sim	Export/Import		
			Ignore loads	No	
D AUTODESK' N SC			Ignore load combinations	No	
	NEER Create new		Ignore walls	No	
			Ignore slabs	No	
Import from SCIA Enginee	-		Ignore member release	No	
Import from SCIA Enginee	r		Ignore supports	No	
			Ignore load panels	No	
	NEER		Group sections based on length (applies only	No	
		\sim	importr opdate		
			Analysis results	Yes	
Mapping details			Ignore generated loads on load panels	Yes	
Revit family path Family type mapping	Mapping tables		nly selected elements et Yes to export only selected elements		

Figure 5-1: CADS Revit SCIA Engineer Link - National Code

Select the National Design Code you wish to use in SCIA Engineer before exporting the model from Revit. *CADS Revit SCIA Engineer Link* will automatically select the appropriate SCIA Engineer template to create the model.

The first time you import a project from SCIA Engineer into Revit, ensure that you create a new Revit file and select the correct template file as per the country code used for creating the job in SCIA Engineer.



Template file	
Church and Townlate	
Structural Template	✓ Browse
Create new	
• Project	O Project <u>t</u> emplate

Figure 5-2: Revit - New project dialog

Use the *Browse* button to locate the correct template file.



Look in: Instory History Documents Look in: Look in: Look in: Look in: Look in: Look in: Look in: Look in: Look in: Name Date modified Type Preview Prev	? ×
Name Date modified Type History Im LT_USN_Default.rte 29-12-2021 15:22 Autod Mechanical-Default_Metric.rte 29-12-2021 15:25 Autod Jocuments Im Plumbing-Default_GBRENU.rte 29-12-2021 15:25 Autod Plumbing-Default_Metric.rte 29-12-2021 15:25 Autod Precast Detailing-DefaultGBRENU.rte 29-12-2021 15:25 Autod	📙 Views
History Histor	
Documents Image: Plumbing-Default/GBRENU.rte 29-12-2021 15:25 Autod Documents Image: Plumbing-Default/GBRENU.rte 29-12-2021 15:25 Autod Image: Plumbing-Default/GBRENU.rte 29-12-2021 15:25 Autod Image: Precast Detailing-Default/Metric.rte 29-12-2021 15:22 Autod	
Image: Deciments Plumbing-Default_Metric.rte 29-12-2021 15:22 Autod Documents Image: Plumbing-DefaultGBRENU.rte 29-12-2021 15:25 Autod Image: Precast Detailing-DefaultMetric.rte 29-12-2021 15:22 Autod	
Documents Implementing-Default/GBRENU.rte 29-12-2021 15:25 Autod Precast Detailing-DefaultMetric.rte 29-12-2021 15:22 Autod	-
Precast Detailing-DefaultMetric.rte 29-12-2021 15:22 Autod	
	•
ResidentialGBRENU.rte 29-12-2021 15:24 Autod	
My Computer Structural Analysis-DefaultGBRENU.rte 29-12-2021 15:25 Autod	

Figure 5-3: Revit - Choose template dialog

You may choose any customised Revit Structural template file as well, but make sure that the units are the same as those used in the SCIA Engineer model. For example, if the SCIA Engineer model is created in Metric units, then the Revit Structural template should also be in Metric.

Ensure that the Revit libraries of structural members are available in the default Revit installation folder, for example the library of UK cross sections are available in the following folder for Revit 2023 by default.

Browse For Fold	ler			?	>
Look in			v 🔶 📮	💥 📮 Views	s
*	Name	Date modified	Туре	Size	П
	Annotations	23/04/2019 13:27	File folder		
tory	Boundary Conditions	23/04/2019 13:27	File folder		
	Cable Tray	23/04/2019 13:27	File folder		
	Casework	23/04/2019 13:27	File folder		
ts	Columns	23/04/2019 13:27	File folder		
	Conduit	23/04/2019 13:27	File folder		
	Curtain Panel By Pattern	23/04/2019 13:27	File folder		
r	Curtain Wall Panels	23/04/2019 13:27	File folder		
	Detail Items	23/04/2019 13:27	File folder		
	Doors	23/04/2019 13:27	File folder		
	Duct	23/04/2019 13:27	File folder		
	Electrical	23/04/2019 13:27	File folder		
	Entourage	23/04/2019 13:27	File folder		
	Fire Protection	23/04/2019 13:27	File folder		
		23/04/2019 13:27	File folder		
	Generic Models	23/04/2019 13:27	File folder		
	Lighting	23/04/2019 13:27	File folder		
op 🗸	Folder <u>n</u> ame: UK				
ls 🔻			Open	Cancel	

Figure 5-4: Revit - Family folder

If you are using the library of customised Revit families and/or the library of Revit families stored in LAN, you have to configure the folder location where these Revit families are stored.

You can access this from:

Revit -> CADS -> CADS Revit SCIA Engineer Link -> Options -> Mapping Details -> Revit Family Path



Mode of expo User Path - Revit library	Direct exchange Only selected elements No Mode of export SCIA Enginee C:\ProgramData\Autodesk\RVT 2023\Libraries\English\UK X Export to SC C:\ProgramData\Autodesk\RVT 2023\Libraries\English\UK Up Import from 1 Down Down				Options		ctions
Mode of expo SCIA Engined Export to SC R AUTODI Import from S R AUTODI Mapping det Revit fat Add Delete QK Cancel	Mode of expo SCIA Enginee Export to SC R AUTOD Import from 1 R AUTOD R AUTOD		All analytical			EC - EN 🗸 🗸	Vational Code
SCIA Enginee SciA Enginee Export to SC C:\ProgramData\Autodesk\RVT 2023\Libraries\English\UK Import from \$ Up Import from \$ Down Mapping det OK Cancel OK	SCIA Enginee Export to SC R AUTODI Import from S R AUTODI R A		NO	iments No	 Only selected elem 		Node of export
Export to SC R AUTODI Import from 1 R AUTODI Add Delete QK Cancel	Export to SC R AUTOD mport from 1 R AUTOD R AUTOR R AUTOD R AUTOR R AUTOR R AUTOR R AU		×			User Path - Revit library	S 🛟 Usi
R AUTODI Import from 1 Import from 2 Mapping detz Mapping detz Examily for Add Delete OK Cancel	R AUTODI Import from 1 R AUTODI R AUTODI R AUTODI	_	_				
Import from 5 RAUTODI Mapping det Revit far Examily bar Add Delete QK Cancel	Import from \$				2023\Libraries\English\UK] C:\ProgramData\Autodesk\RVT 20	Export to SC
Import from 1 Down Down Down Mapping det Revit far Family by Add Delete QK Cancel	Import from 1 Down Down						
Import from 5 RAUTODI Mapping deta Revit far Family bits Add Delete OK Cancel	Import from 5						REVIT
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Mapping deta Revit far Add Delete QK Cancel			Down	Dov			_
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Add Delete OK Cancel	Mapping det						Mapping deta
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· • • • • • • • • • • • • • • • • • • •	Englisher		Cancel	<u>O</u> K Cancel		Add Delete	
	· dimy vy						r driniy typ
	CADS						

Figure 5-5: CADS Revit SCIA Engineer Link - Revit family path

5.2 Mode of Export

There are two ways in which a model can be exchanged between Revit and SCIA Engineer:

- Direct exchange method: In this method the model is transferred directly between Revit and SCIA Engineer without the need of any data exchange file. You must have both Revit and SCIA Engineer licensed on your system to use this method of model exchange;
- *R2S file exchange method*: If you have either Revit or SCIA Engineer licensed on your system then you can exchange modes using a data exchange file in the ***.*R2S* format.

Should you wish to transfer a model using the *Direct exchange method*, you should set the option *Mode of Export* to *Direct Exchange*.

CADS Revit SCIA Engineer Link			×
tions	Options		
lational Code EC - EN	 Elements to export 	All analytical	^
	Only selected elements	No	
lode of export Direct exchange	Export elements based on layers	Yes	
Direct exchange	Opening as panel	No	
CIA Engineer version File exchange	Internal edges with beams	Yes	
Export to SCIA Engineer	 Export/Import 		
	Ignore loads	No	
	Ignore load combinations	No	
RAUTODESK SCIA REVIT Create new	Ignore walls	No	
	Ignore slabs	No	
	Ignore member release	No	
Import from SCIA Engineer	Ignore supports	No	
	Ignore load panels	No	
	Group sections based on length (applies on	ly No	
	Import/Update		
	Analysis results	Yes	
Mapping details	Ignore generated loads on load panels	Yes	
Revit family path Mapping tables	Only selected elements		
	Set Yes to export only selected elements		

Figure 5-6: CADS Revit SCIA Engineer Link - Launch SCIA Engineer



The matrix below shows how the *CADS Revit SCIA Engineer Link* works when you use the export or import feature from Revit or SCIA Engineer.

	Revit		SCIA Engineer	
	Export	Import	Export	Import
Mode of Export = Direct Exchange	Invokes SCIA Engineer automatically with the same file name and folder location as that of a Revit Structure job.	Imports the SCIA Engineer job into Revit #	Prompts you to specify the file name for the *.R2S <i>file</i> you wish to create which can be imported into Revit.	Prompts you to select the *. <i>R2S file</i> you created / modified from Revit.
Mode of Export = File Exchange	Prompts you to specify the file name for the *. <i>R2S file</i> you wish to create which can be imported into SCIA Engineer.	Prompts you to select the *.R2S file you created/modified in SCIA Engineer.		

Figure 5-7: Model export & import matrix

[#]Owing to certain programming API limitations, while importing the job into Revit you might get an error message 'Unable to find SCIA Engineer model'. In such cases, please follow the following steps:

- 1. Save the job in SCIA Engineer;
- 2. Close SCIA Engineer;
- 3. Open Revit;
- 4. Create a new job with Structural template;
- 5. Save the new job with a dummy Revit file name, e.g. Test.rvt;
- 6. Export the job to SCIA Engineer with Mode of Export as "Direct Exchange";
- 7. A new session of SCIA Engineer will be created. Open the original job (point 1) in this session of SCIA Engineer;
- 8. Now import the SCIA Engineer job into Revit.

5.3 Elements to Export

You can choose the type of elements to be exported to SCIA Engineer from Revit. The options available are:

- All analytical All analytical elements are exported to SCIA Engineer irrespective of its association with the structural model. The elements will be exported to SCIA Engineer based only on the analytical member properties. Boundary conditions, member end fixities, and loads if defined in Revit will be exported. If this option is selected, the link will not read any structural elements or properties from structural member;
- All structural All structural elements are exported to SCIA Engineer irrespective of its association with the analytical model. The elements will be exported to SCIA Engineer based only on the structural member properties. Boundary conditions, member end fixities, and loads if defined in Revit will not be exported. If this option is selected, the link will not read any analytical elements or properties from structural member;



- With both analytical and structural The structural members which are associated to the analytical members only are exported to SCIA Engineer. If this option is selected, the link will not export the members which has only one type of elements, namely those members having only structural or analytical elements. The geometry of members and the properties like material, cross-section and section rotation will be read from analytical model and the additional properties like alignment, composite deck info are read from structural properties. Boundary conditions, member end fixities, and loads if defined in Revit will be exported;
- All All elements in Revit are exported to SCIA Engineer. If the structural members are associated with analytical members, the properties of analytical model will take precedence.

	Ň	Revit -> CADS ->	> CADS Revit SCIA	Engineer Link ->	Options -> Actions ->	Elements to export
--	---	------------------	-------------------	------------------	-----------------------	--------------------

tions	FC - FN V	a la seciencia de la seciencia	tions Export			
lational Code	EC-EN V		Elements to export		All analytical	\sim
Node of export	Direct exchange \sim		Only selected elements	All analytica		Ť
	21 1 4021 64 ~	1	Export elements based on layers	All structura		
CIA Engineer version	21111021104	1	Opening as panel	With both s	tructural and analytical	
Export to SCIA Engineer			Internal edges with beams All			
Export to SCIA Engineer		\sim	Export/Import	1		
RAUTODESK' SCIA REVIT' Create new			Ignore loads		No	
			Ignore load combinations		No	
			Ignore walls		No	
			Ignore slabs		No	
			Ignore member release		No	
			Ignore supports		No	
			Ignore load panels		No	
			Group sections based on length (a	applies only	No	_
		~	Import / Update			
Mapping details			Analysis results		Yes	
Revit family path	Mapping tables	EL	ements to export			
normanity paul	mapping tables		oose which elements are to be exp	orted - elem	ents that have analytical m	od
Family type mapping	Layer mapping		that have structural model or those			

Figure 5-8: Elements to export

Please note that, the option specified during export will become read-only after successful export. To change the option, you have to export the model by setting the option "Create New" to true.

5.4 Version of SCIA Engineer

You will have to select the SCIA Engineer version you wish to use for export/import of models.

Revit -> CADS -> CADS Revit SCIA Engineer Link -> Options -> Actions -> SCIA Engineer Version -> Browse -> Add

🞴 🖬 🕞 🔒 🔇) • + 		Autodesk Re	vit 2023 - Not For Re	sale Version -		
File Architectur	e Structure Steel Precast Systems	Insert Annotate Analyze	Massing & Site	Collaborate View	Manage Add-Ins	CADS Modify	•
Options Exp	Import Import <td></td>						
Options	CADS Revit SCIA Eng	Jineer Link					
Node format	🗙 🔂 Analytical Model 🗙	(

Figure 5-9: CADS Revit SCIA Engineer Link - Options button



CADS Revit SCIA Engineer Link			>
Actions	Op	otions	
National Code EC - EN 🗸	~	CAPOR	All condition
Mode of export Direct exchange ~		Elements to export Only selected elements	All analytical
		Export elements based on layers	Yes
SCIA Engineer version 21.1.4021.64 V		Opening as panel	No
21.1.4021.64 Browse		Internal edges with beams	Yes
Export to SCIA Engineer	~		
		Ignore loads	No
REVIT SCIA		Ignore load combinations	No
		Ignore walls	No
		Ignore slabs	No
Import from SCIA Engineer		Ignore member release	No
		Ignore supports	No
		Ignore load panels	No
Endincery		Group sections based on length (applies only	No
	\sim	Import/Update	
Mapping details		Analysis results	Yes
Revit family path Mapping tables		ements to export	
Neviciarnity path Mapping tables		noose which elements are to be exported - elem	ents that have analytical model
Family type mapping Layer mapping		that have structural model or those with analyti	

Figure 5-10: CADS Revit SCIA Engineer Link - Add SCIA Engineer version dialog

Click on the *Add* button to select the SCIA Engineer root folder as shown below:



Figure 5-11: CADS Revit to SCIA Engineer Link - Browse for SCIA Engineer folder

Select OK and then Close the previous dialog.

5.5 Case 1: Export from Revit to SCIA Engineer

Revit -> CADS -> CADS Revit SCIA Engineer Link -> Export

You can export the structural model in Revit to SCIA Engineer using the *Export / Review & Export* option.

R 🖻 🖻	📙 🕥 • 🖘 • R	> - 🖨 📑 📴	⇔ • 🖈 I	◎ A 🔂 • 🗘	1 1	• •			A	lutodesk Re	vit 2023 -	Not For Resale
	hitecture Structur		Systems	Insert Annotat	e Analyze	Massing & Site	Collaborate	View	Manage	Add-Ins	CADS	Modify
Options	Review & Sho Export	······································	Select Imported	Mapping tables	 Getting S Best Pract Help 	ra Check I	List					
	Review & Export	CADS R	vit SCIA Engi	ineer Link								
	Export											

Figure 5-12: CADS Revit SCIA Engineer Link – Export



CADS Revit SCIA Engineer Link application reads the Revit model and prepares a list of the elements from each category that is to be exported. The application then exports the Revit model into SCIA Engineer based on the settings listed in "Options" dialog.

On completion of the export action, a Log dialog shows the summary of the number of items exported. You can save the log file which can be opened in a text editor to review the transfer. Please save the Revit model once the export is completed in order to enable the review manager to track the changes for subsequent exports.

After export, for any reason, if you make some changes to the Revit model and export it to SCIA Engineer and if you want to review the changes to the model, you may choose the Review & Export option which updates the SCIA Engineer model.

	hitecture Structu	☆ + 🖨 🛃 😼 1 re Steel Precast	🛋 🔹 🖍 🕻 Systems	🔊 🗛 🔂 🔹 🖓 Insert Annot		₩ Wassing & Site	Collaborate	View	A Manage	utodesk Re Add-Ins	vit 2023 - CADS	Not For Resa Modify
Options	Review & Export	ow ported Import	Select Imported	Mapping tables	Getting Star	ted		view	Manage		CAUS	mouny
Properties	Export	Review & Export	Model X									

Figure 5-13: CADS Revit SCIA Engineer Link - Export model from Revit to SCIA Engineer

Using the *Review & Export option, the application* will open the review manager that will list the changes to export by comparing the current Revit model with the last exported model. Please refer to the Help document for more details on this feature.

CADS Revit SCIA Engineer Link will open an instance of SCIA Engineer and create a SCIA Engineer model with the same file name as that of Revit. You may either choose to create a new SCIA Engineer file or overwrite an existing one by setting the following option:

CADS Revit SCIA Engineer Link				\times	port to SCI
ons	Op	tions			
tional Code C - EN V	~	Export		^	
	i l	Elements to export	All analytical		
ode of export Direct exchange V		Only selected elements	No		
21.1.4021.64		Export elements based on layers	Yes		
IA Engineer version 21.1.4021.64 ✓		Opening as panel	No		
Contraction COLA Francisco		Internal edges with beams	Yes		
xport to SCIA Engineer	\sim	Export/Import			
		Ignore loads	No		
REVIT Create new		Ignore load combinations	No		
LINGULEN		Ignore walls	No		
	- 1	Ignore slabs	No		
mport from SCIA Engineer		lanore member release	No		
		Ignore supports	No		

Figure 5-14: CADS Revit SCIA Engineer Link - Create new SCIA Engineer file

When the option *Create New* is *un-ticked*, only the changes in the model will be updated to the existing SCIA Engineer file. Where the model is being transferred for the first time then *CADS Revit SCIA Engineer Link* will automatically create a new SCIA Engineer file (*.ESA) with the model.

If the option *Create New* is *ticked*, *CADS Revit SCIA Engineer Link* will overwrite the entire model information in the SCIA Engineer file. If an existing SCIA Engineer file with the same name is available then the old data in the file will be completely replaced by the new model data.

If you already have a SCIA Engineer session open in your system then CADS Revit SCIA Engineer Link may open another session owing to certain programming limitations.

For the *File exchange method* of model exchange, the *.*R2S* file generated from Revit can be imported into SCIA Engineer using the *Import* or *Update* option.





1	New Ctrl+	N	e	X 2 63	o 🛱	A A		an I
1	Open Ctrl+i			-21				W P
n	Project manager							
1	Close							
-	Close All							
1	Save Ctrl+	s						
1	Save As							
	Save All							
	Import	•	224	XML file				
	Export	•	Rest	Revitfile				
	Update	•	ъкъ.	Tekla file				
	Print Data		AAL	ETABS file	•			
	Print Picture		۲	Steel Det	ailing Neu	tral File (S	DNF)	
1	1 NSS-Analytical Model.esa		STP	STEPSTEE	L-CAD			
	· · ·			IFC 2x3				
-	2 D:\BIM\\Revit2Scia.esa		h	Esa In				
	3 D:\Example04withresults.esa	1	V927/	DSTV				
	4 Testcase193_Asymmetrical bracing_Rvt 2014.esa		STP	STEPSTEE	L			
	5 C:\Users\\Desktop\123.esa	1						
	6 C:\Users\\Rossi (1).esa							
	7 D:\Backup\2016\May\01.esa							
	8 D:\BIM\\Examples\206d.esa							
	9 D:\BIM\Revit_SEN\3.1\frame.esa	_						
-	Exit							

Figure 5-15: SCIA Engineer - Import Revit file

The *Import* option will create a new SCIA Engineer file and add the model information to it.

A	S	CIA Engineer -> Fi	le -> Ul	odate	->	Revit	File	
4								
: F	File	Edit View Libraries Too	ls Modify	Tree Pl	ugins	Setup	Window	Help
: 🗅		New		Ctrl+N	:∈) Ij f	🞯 🛱	66
		Open		Ctrl+O				
Main		Project manager						
		Close						
		Close All						
		Save		Ctrl+S				
		Save As						
		Save All						
		Import						
		Export						
		Update			хм	XML file		
		Print Data		•	Rest	Revit file	6	
ļ		Print Picture		•	7-63.	Tekla file	-	
		1 NSS-Analytical Model.esa					er model IT	file
		2 D:\BIM\\Revit2Scia.esa			4	Project (.e	esa)	
-		3 D:\Example04withresults.esa			*	IFC 2x3		
11		a an assumption minimeral courts read						

Figure 5-16: SCIA Engineer - Update Revit file

The Update option will update only the changes to an existing SCIA Engineer file.

5.6 Case 2: Import from SCIA Engineer to Revit

Revit -> CADS ->	> Revit SCIA Engineer Link -> Import B B III = - → ∞ A B + → EII % B - = Autodesk I	Revit 2023 - N
File Architecture Structure Ste	teel Precast Systems Insert Annotate Analyze Massing&Site Collaborate View Manage Add-In:	CADS
Options Preview & Show Export	Review & Select Import Import Import	
	Review & Import A Engineer Link Import / Update	

Figure 5-17: CADS Revit SCIA Engineer Link - Import model from SCIA Engineer to Revit Structure

You can import a SCIA Engineer model into Revit Structure using the *Review & Import / Import* option.



Click on *Review & Import* to track the changes between the SCIA Engineer model and the current Revit model.



Figure 5-18: CADS Revit SCIA Engineer Link – Review & Import – Model Preview

Please refer to the Help document for more details on this feature.

First, set the standard Code of Practice and ensure the cross section library is mapped correctly before starting the import as detailed in <u>Section 5.1 Code of practice</u>.

You may import the model into Revit from SCIA Engineer using the **.R2S* file too.

In both cases, you can use the *Select Changes* option to highlight the new or updated elements.



Figure 5-19: CADS Revit SCIA Engineer Link - Select changes

For the *R2S file exchange method*, you will have to first create a *.*R2S* file from SCIA Engineer using the following option:

<pre></pre>	S	CIA Eng	gineer	-> F	ile ->	• Exp	00	ort	-> Revit File
@ : 🗩	File	Edit View	Libraries	Tools	Modify	Tree	Plu	ugins	Setup Window Help
: 🗅		New Open				Ctrl+N Ctrl+C		: 6	3 I) fo 🛛 🛱 🖨 🛱 🖬 🗗 🚽
Main		Project manag Close Close All	er						
		Save Save As Save All				Ctrl+	5		
		Import					•		
		Export Update					•	۵ ۵	New project (.esa) Viewer project (.esav)
		Print Data Print Picture					•	DX3 rxwg Restt	Graphic format Revit file
÷		1 C:\Users\\E	Desktop\01.6	esa				7-63.	Tekla file

Figure 5-20: SCIA Engineer - Export Revit file



5.7 Mapping tables

The standard cross section and material libraries in both Revit and SCIA Engineer are comprehensive but are labelled differently. Therefore, *CADS Revit SCIA Engineer link* is shipped with a pre-installed mapping databases which matches materials, cross-sections and profile sheets between SCIA Engineer and Revit.

In many cases, you may require to use custom families in addition to the standard families. In such cases, the pre-defined database which contains the entries of standard material mapping or the section mapping is not enough to transfer the data between Revit and SCIA Engineer. Hence it is necessary for you to map the custom Revit families with equivalent SCIA Engineer materials/ sections.

The "Mapping Tables" command will allow you to create your own database for custom family mapping. On the first use of *CADS Revit SCIA Engineer Link* the user table will be blank. The application will allow you to add/create new entries for any new family (cross section) / material / profile sheet.

	ping database test erial Cross section Profile sheet P	∼ arameter	Document ma	EN 🗸 🔝 🛃 🏂
	Material category	Revit material name	National Code	SCIA Engineer material name
•	Concrete	Structural Foundations	IBC	C4000
	Concrete	Concrete - Cast-in-Place Concrete	EC - EN	C16/20
	Timber	Wood	EC - EN	C18 (EN 338)
	Steel	Metal - Steel 43-275	EC - EN	S 275
	Timber	Wood - Dimensional Lumber	EC - EN	C16 (EN 338)
	Steel	Metal - Steel	EC - EN	S 235
	Concrete	Structural Framing (Concrete)	EC - EN	C16/20
	Steel	Structural Framing (Steel)	EC - EN	S 235
	Concrete	Structural Framing (Other)	EC - EN	C16/20
	Concrete	Structural Framing (PrecastConcrete)	EC - EN	C16/20
ŧ				

Figure 5-21: CADS Revit SCIA Engineer Link - Mapping tables

The application will also allow you to save and export the mapping database and this file can be shared across the users. The "Import" option will allow you to load any database into the project and use them during export/import. For more details on mapping tables, please refer to the help document.



6 Features

Structural elements present in Revit or SCIA Engineer can be exchanged between the two applications, provided both the products support them. For example, you can apply a *Moment in node* in SCIA Engineer but there is no equivalent feature in Revit, hence it will be ignored when you import a model into Revit from SCIA Engineer.

Similarly, structural properties may be known by different names, but are mapped based on their role. For example, the 'line support', known as *Boundary Condition – Line* in Revit is equivalent to *Support – Line on Beam* or *Support – Line on 2D Member* in SCIA Engineer.

A complete list of features supported is available in the Help file.



Figure 6-1: CADS Revit SCIA Engineer Link - Help button

It is possible to specify the format of the node names to be used in the SCIA Engineer model through the *Node format* option. It is used only for export from Revit to SCIA Engineer for the first time.

Revit -> CADS -> Revit SCIA Engineer Link -> Options -> Node Format



3D View: Analytical N 🗸 📴 Edit Type

Figure 6-2: CADS Revit SCIA Engineer Link – Options – Node Format

Structural members visible in the Revit job but linked to external Revit or other CAD files will not be exported, for example linking an external Revit file using the *Insert->Revit Link* option.

You may choose to export only the selected members by ticking the configuration item *Export Selected Items Only*. This option could be very useful when you have a very large job but would like to analyse the structure in parts or would like to send updates for only a few members.

But there is no such option available when you export the job from SCIA Engineer. All structural elements present in SCIA Engineer will get imported into Revit.

6.1 Log of events

Whenever you export or import a model from Revit, a log of important events is created. For example:

"UC356x368x202" is mapped as "UC356/368/202"



Doors | Doors 4 - 225505: Not exported as this is not a structural element!

Where 225505 is the member ID in Revit

The log will list the different categories of items present in the model and their status.

	Category	Total Items	Exported	Not Exported	Mapped Cross Section(s):	
•	Structural Foundations	102	1	101	 "W12X26" is mapped as "W(Imp)12X26" 	
	Structural Framing	645	618	27	 "34RB48" is mapped as "Precast-Inverted Tee#275393" 	
	Structural Columns	256	248	8	 "24 x 24" is mapped as "Concrete-Rectangular-Column#275394" 	
	Load Case	9	8	1	"26LB40" is mapped as "Precast-L Shaped Beam#275411"	
	Load Nature	9	8	1	 "HSS10X8X3/8" is mapped as "HSS(Imp)10X8X3/8" 	
	Walls	54	54			
	Reveals	26			Summary:	
	Floors	14	14		1 out of 102 Structural Foundations exported	
	Openings in Members	16		16	618 out of 645 Structural Framing exported	
	Total	1131	951	154	248 out of 256 Structural Columns exported 8 out of 9 Load Case exported	
					0 out of 26 Reveals exported 14 out of 14 Floors exported 0 out of 16 Openings in Members exported Total items exported 951 out of 1131 End Time : 06/01/2017 13:31:48	
	ort to SCIA Engineer is comp				Total Time : 00:01:17.1515344	
le	ase save this Revit model to	retain the synchronisa	ation with the exporte	ed SCIA Engineer mode	d.	

Figure 6-3: CADS Revit SCIA Engineer Link – Save Log file

It is recommended to save the log as a *.RTF file using the Save Log button for checking and version control purposes.

Items which are successfully exported or imported are marked in blue. Elements that could not be exported/imported or have some issues attached to it are marked in red. You can highlight the affected member in Revit by using *Manage->Select by ID* option in Revit.

In the absence of a review manager, this is a very good option to highlight the elements marked in red in the log file and then take appropriate corrective action to export/import the member again.

	CADS Revit SCIA Engineer	LINK				×
	Category	Total Items	Exported	Not Exported	Structural Framing - 257733 : Only Auto Detect analytical alignment is supported.	,
*	Structural Foundations	102	1	101	Structural Framing - 257929 : Only Auto Detect analytical alignment is supported.	
	Structural Framing	645	645		Structural Framing - 332078 : Only Auto Detect analytical alignment is supported.	
	Structural Columns	256	236	20	Structural Framing - 257867 : Only Auto Detect analytical alignment is supported.	
	Load Case	9	8	1	Structural Framing - 257923 : Only Auto Detect analytical alignment is supported.	
	Load Nature	9	8	1	Structural Framing - 257941 : Only Auto Detect analytical alignment is supported.	
	Walls	54	54		Floors - 259357 : Warning - Analytical line may not conform to the physical floors location, please	
	Reveals	26			check the member position in SCIA Engineer.	
	Floors	14	14		Structural Foundations - 259946 : Warning - Analytical line may not conform to the physical structural	
	Openings in Members	16		16	foundations location, please check the member position in SCIA Engineer.	
	Total	1131	966	139	Floors - 260334 : Warning - Analytical line may not conform to the physical floors location, please	
					check the member position in SCIA Engineer. • Floors - 280301: Warning - Analytical line may not conform to the physical floors location, please check the member position in SCIA Engineer. • Floors - 259694: Warning - Analytical line may not conform to the physical floors location, please check the member position in SCIA Engineer. • Structural Foundations - 258462: Not For Analysis. • Structural Foundations - 259409: Not For Analysis. • Structural Foundations - 259450: Not For Analysis.	
	ort to SCIA Engineer is compl	lotodi				

Figure 6-4: CADS Revit SCIA Engineer Link – Error checking in log file

For example in the above log file, a warning that the analytical line is not in the proper position is given for floor slab 227544. You can use the *Manage->Select by ID* option in Revit to highlight the slab and take the required action.



Revit SCIA Engineer link - Getting Started



Select Elements by ID

 (use semicoion f 	or multiple IDs):	
27544		

Figure 6-6: Revit - Select elements by ID

You may then change the required member attributes and send only the selected elements using the option *Export Selected Items Only*.

6.2 Rotation

CADS Revit SCIA Engineer Link has developed the mapping logic based on the default cross section library supplied with Revit. Since the *Revit family* implementation logic is not uniform in Revit you might find that the log file shows a message such as *Member rotated*. This is done to ensure that the cross section's handing (plane about which a cross section is mirrored) and orientation (member rotation about its centroid) with respect to the model are maintained in both Revit and SCIA Engineer.

This is generally not a problem with symmetrical sections, but with asymmetrical sections you might find that some sections are transferred with a different handing or orientation. In these cases please check if the *Revit family* used for member mapping is a custom made *Revit Family* or a default one supplied with Revit. For a custom made *Revit family* try changing the variables which affect member handing and orientation and use those values which gives the correct result. Please get in touch with the support team if there is any issue with the cross sections library supplied with Revit.

If the "Elements to Export" option is set as "All analytical" or "With both structural and analytical", the cross-section rotation specified in analytical model will be used in the members in SCIA Engineer. In these cases, the orientation of members in Revit Structural model may not be the same in SCIA Engineer.

6.3 Eccentricity

CADS Revit SCIA Engineer Link ensures that the member eccentricity is correctly updated during the model exchange between Revit and SCIA Engineer. Since the parameters required for defining eccentricity is different in Revit and SCIA Engineer, you may find the eccentricity parameters showing slightly different values, but the relative position of the member with respect to the centre line is maintained.

If the "Elements to Export" option is set as "All analytical" or "With both structural and analytical", the geometry of analytical model is exported to SCIA Engineer. In these cases, the position of members in Revit Structural model may not be the same in SCIA Engineer.



6.4 Support

Boundary conditions can be exported from Revit to SCIA Engineer as supports. If you have placed any *Boundary Conditions (Point, Line* or *Area*) in Revit then it will get exported as supports in SCIA Engineer with the same translational and rotational stiffness values as specified in Revit.

Where the support parameters are modified in SCIA Engineer and you do not wish them to get overwritten during the next export from Revit, set the configuration option *Ignore Support* to *Yes*. The boundary conditions cannot be exported if the "Elements to Export" option is set as "All structural".

6.5 Loads

Loads modelled in Revit can be exported to SCIA Engineer and you can import them back into Revit after modifying them in SCIA Engineer. You may also choose to model loads in SCIA Engineer and import it into Revit.

The self-weight of the structural member is not exported to SCIA Engineer from Revit. You may change the load values if required in SCIA Engineer using SCIA Engineer's standard product features.

If you are not interested to import the generated loads, they can be ignored by choosing the "Ignore generated loads options to "Yes". Please refer to the features list in the *Help file* to check how the load types are mapped between the two applications.

Bi-Directional exchange of load cases and load combinations are also supported by *CADS Revit SCIA Engineer link*. Structural Engineers may choose to ignore load cases and load combinations specified in Revit and handle them in SCIA Engineer separately. You can opt to ignore load cases and load combinations in Revit by setting the configuration option *Ignore Revit Load Combination* to *Yes*.

The loads will not be exported if the "Elements to Export" option is set as "All structural".

6.6 Composite Slabs

Composite slabs and Roof decks modelled in Revit can be exported to SCIA Engineer and you can import them back into Revit after modifying them in SCIA Engineer.

The composite slab decks are modelled in Revit as an assembly. The composite slab data are transferred from Revit to SCIA Engineer by reading the appropriate materials and dimensions of the different layers of the slab. A separate mapping database is used to automatically map the standard profile sheets from Revit and SCIA Engineer. The composite slab info can be exported only if the "Elements to Export" option is set as "All structural" or "With both structural and analytical".

Non-standard (user defined or user modified) families of profile sheets decks are not directly supported, but they can be exported to SCIA Engineer by mapping to the equivalent profile sheet.

If you have the composite beam design info for the members in SCIA Engineer, the design info will be imported into Revit. The design info includes camber, studs and the end forces on the member.

6.7 Virtual Joists

Steel bar joists modelled in Revit can be exported to SCIA Engineer as virtual joists. Virtual joists are light-weight steel truss which consists of parallel chords and a triangulated web system. Standard



mapping database is used to map the steel bar joists with the equivalent virtual joists. You can modify the virtual joists in SCIA Engineer.

After performing the design, if you store the design info, the steel bar joists in Revit will be updated with the joist designation specified in the design info. The end forces are also imported into Revit as member forces.

For Joists Girders, the number of joist spaces and the point load on each panel will be updated while importing the model from SCIA Engineer.

6.8 Levels

When the model is imported from SCIA Engineer, you may specify how the levels are to be created in Revit. You may optionally choose to create the levels based on the height of *Stories* if defined in SCIA or based on the elevations of slabs or based on the Z coordinates of the elements. The offsets on the elements and their levels in Revit are set according the geometric position.

6.9 Reinforcement

CADS Revit SCIA Engineer link allows you to import the user defined (Input) reinforcement from SCIA Engineer to Revit. CADS Revit SCIA Engineer link v 2020.1 or later also supports the import of practical reinforcement (Real bars converted from reinforcement design for 1D members) from SCIA Engineer to Revit. The 2D reinforcements defined for the slab will be imported as "Area reinforcement" in Revit.

For more details on import of reinforcement, please refer to the Help document.

