

## CADS Revit Scia Engineer Link



Getting Started

Version: 2017.0



GLOBAL CONSTRUCTION SOFTWARE AND SERVICES

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## **1** Introduction

**CADS Revit Scia Engineer link** facilitates the bi-directional exchange of members, loads and supports between **Revit Structure** and **Scia Engineer** and in doing so plays a vital role in the overall Building Information Modelling (BIM) process. A structure modelled in **Revit Structure** can be transferred to **Scia Engineer** for structural analysis and design using **CADS Revit Scia Engineer link**. When the structural analysis and design has been completed in **Scia Engineer**, the updated model can be sent back to **Revit Structure**. The modelling - analysis - design process requires numerous 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. Please ensure that the country specific libraries are installed on the system while installing Revit.

R	Autodesk Revit 2017	- 🗆 🗙
AUTODESK <sup>®</sup> <b>REVIT</b> <sup>®</sup> 2017	En	🙏 AUTODESK.
Install > Configure Installation		
📵 🗹 Autodesk® Revit® Content Librar	ies 2017	
<ul> <li>Click to close and return to product list</li> </ul>		
Content		^
Content Pack English Gustralia Canada Canada Cinted Kingdom Nev Zealand South Asia US Imperial US Imperial US Imperial Default Content English - United Kingdom	Add content	* *
Configurable		v
Installation path: C\Program Files\Autodesk\ Installation Help   System Requirements   Readme	Browse Disk space: 1.33	GB required / 37.5 GB available

Figure 1-1: Revit installation option



## 2 Compatibility

**CADS Revit Scia Engineer link** is shipped with a *Release Notes* document which lists the versions of **Revit Structure** 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\RevitStr20xx\Docs

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

5	Revit To Scia Engineer ×
D	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 Setup.
	Destination Folder
	C:\Program Files Browse
	< <u>B</u> ack [Next>] Cancel

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

*RevitStr20xx* is the **Revit Structure** 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 Architecture to Scia Engineer round trip**



Figure 3-1: Revit Architecture to Scia Engineer round trip



#### **3.2 Revit Structure to Scia Engineer round trip**



Figure 3-2: Revit Structure to Scia Engineer round trip

#### **3.3 Scia Engineer to Revit Structure round trip**



Figure 3-3: Scia Engineer to Revit Structure round trip



## **4** Installation

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

SIF you wish to have a direct link between **Revit Structure** 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 Structure** 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.

*ESA RevitLink (ESA.21)* module should be licensed as part of the **Scia Engineer** installation to exchange models in between **Revit Structure** and **Scia Engineer**.



Figure 4-1: Scia Engineer - Protection setup dialog

#### 4.1 Revit Structure and Scia Engineer licensed on the system

- 1. Check in the *Release Notes* whether the **Revit Structure** version is <u>compatible</u> 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 Structure** or **Scia Engineer**
- 2. Run *CADS Revit Scia Engineer link* installation and select the options as prompted in the dialogs
- 3. Finish the installation.



#### **4.2 Only Revit Structure licensed on your system**

- 1. Check in the *Release Notes* whether the **Revit Structure** version is <u>compatible</u> 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 Structure.
- 2. Run *CADS Revit Scia Engineer link* installation and select the options as prompted in the dialogs.
- 3. **CADS Revit Scia Engineer link** requires that **Scia Engineer** is installed on the system to generate the \*.*R2S file*. A licensed copy of **Scia Engineer** is not mandatory, for example, just the installation of a **Scia Engineer** demo version should be sufficient.

#### 4.3 Only Scia Engineer licensed on your system

**CADS Revit Scia Engineer link** installation is not required. As long as you have the <u>ESA RevitLink</u> (<u>ESA.21</u>) module installed and licensed on your system you can export or import the \*.R2S file from **Scia Engineer** as explained in <u>Section 5</u>.

## 4.4 Neither Revit Structure nor Scia Engineer license present on your system

*CADS Revit Scia Engineer link* requires at least one of the above applications to be installed and licensed on the system for it to work.

**CADS Revit Scia Engineer link** can be also installed on **Revit Architecture** or **Revit MEP**, but this is not advisable as the correct structural model may not get transferred to/from *Scia Engineer*. A structural model in Revit should have an analytical line associated with all structural elements. The analytical properties of a structural element can be modified from the Revit *Properties* tab.



Figure 4-2: Analytical lines in Revit Structure



## **5** Basic commands

In order to transfer the model from **Revit Structure** to **Scia Engineer**, you must specify the following:

#### 5.1 Version of Scia Engineer

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

Revit Structure -> CADS -> Revit Scia Engineer Link -> Options -> General -> Scia Engineer Version -> Browse -> Add



Figure 5-1: CADS Revit Scia Engineer Link - Options button

<b>b</b>		CAI	OS Revit Scia Engineer Link	×
Actions National Code	BS Yes	~	Options Export Internal Edges with Beams Bevit Foundation Stah as	No
Scia Engineer Version	Browse	~	Revit Isolated Foundation as	Support
Export Selected Items Only Export to Scia Engineer          Autodesk Revit®       Creation         SCIAENGINEER       Import from Scia Engineer         Autodesk Revit®       SCIAENGINEER		Version 15.1.10 16.0.10	6 3 Remove Close	Yes Yes No No No Yes Yes
Mapping Tables Preferred Tables Section Paramete CADS	User T; er Mapping		Requires 'Structural Analysis Toolkit' from Au	Engineer. .todesk Exchange Apps. Close Help

Figure 5-2: 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:



Browse For Folder	×
Select Scia Engineer Application Path	
🔺 퉲 Scia	^
Description Parameter P	
Engineer15	
Engineer15.1	
Engineer15.2	
Engineer15.3	
Delta Engineer16.Q	
📕 Engineer2013.0	
D 📑 Skype	
DeamViewer	
D 🍱 Tekla	~
< >>	
OK Cancel	
	:

Figure 5-3: CADS Revit to Scia Engineer Link - Browse for Scia Engineer folder

Select OK and then Close the previous dialog.

### 5.2 Code of practice



Figure 5-4: CADS Revit Scia Engineer Link - Options button



National Code EC - EN   BS BS   Launch Scia Engineer EC - ENV   Scia Engineer Version EC - ENV   BC Metric IBC-Metric   IBC Metric IBC-Metric   NEN IBC Metric   IBC Metric IBC Metric   No Ignore Load   Ignore Load Yes   Ignore Load Combinations Yes   Ignore Slabs No   Ig	National Code       EC - EN       V         BS       BS       EC - EN         Launch Scia Engineer       EC - ENV       BC         Export Selected Items Only       BC-Metric         IBC-Metric       IBC-Metric         NEN       IBC-Metric         NEN       IC create New         Ignore Load       Yes         Ignore Load       Yes         Ignore Slabs       No         Ignore Slabs       No         Ignore Support       No         Ignore Support       No         Ignore Slabs       No         Ignore Walls       No         Ignore Walls       No         Ignore Tables       User Table         Preferred Tables       User Table         Section Parameter Mapping       Set Yes 'to import analysis results from Scia Engineer.         Requires 'Structural Analysis Toolkit' from Autodesk Exchange Apps.				E :				
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ricquires stractural viagas reside non viagas reside Exchange vips.		Section Parameter Mapping		Requires 'Structural Analysis Toolkit' from Autodesk Exchange Apps.					

Figure 5-5: CADS Revit Scia Engineer Link - National Code

Select the National Design Code you wish to use in **Scia Engineer** before exporting the mode from **Revit Structure**. *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 Structure**, ensure that you create a new **Revit Structure** file and select the correct template file as per the country code used for creating the job in **Scia Engineer**.

	Ne	w Project		
emplate file				
Structural Temp	late		~	Browse
reate new				
Project		O Project	template	

*Figure 5-6: Revit Structure - New project dialog* 

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



R				Choo	ose Ter	nplate						?	×
Look in:	🔐 ик							~	<b>4</b>	×	<b>E</b> ,	<u>V</u> iews	•
Look in: History Documents Favorites My Computer	Name	l Analysis-I	^ DefaultEU	ROENU.rte	2	Date modified 09-05-2016 18:29	Type Autodesk Re	× i	Preview	×	•	<u>V</u> iews	
My Network Desktop	< File <u>n</u> ame: Files of <u>t</u> ype:	Structural Template F	Analysis-D Files (*.rte	DefaultEURC :)	DENU.rte			> ~ Op	en		C	ancel	

Figure 5-7: Revit Structure - Choose template dialog

You may choose any customised **Revit Structure** 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 Structure** template should also be in Metric.

Ensure that the **Revit Structure** libraries of structural members are available in the default **Revit Structure** installation folder, for example the library of UK cross sections are available in the following folder for **Revit** 2017 by default.

	Br	owse For Folder			?
Look in	: 🕕 ИК		~ 듣	🖪 🗙 🖬	<u>V</u> iews
· 📉 🛆	Name	Date modified	Туре	Size	
	Annotations	22-03-2016 17:06	File folder		
My Computer	Boundary Conditions	22-03-2016 17:06	File folder		
	Casework	22-03-2016 17:06	File folder		
	Columns	22-03-2016 17:06	File folder		
Mv Network	Curtain Panel By Pattern	22-03-2016 17:06	File folder		
	Lurtain Wall Panels	22-03-2016 17:06	File folder		
	Detail Items	22-03-2016 17:06	File folder		
	Doors 🔋	22-03-2016 17:06	File folder		
Desktop	Electrical	22-03-2016 17:06	File folder		
	\mu Entourage	22-03-2016 17:06	File folder		
	\mu Furniture	22-03-2016 17:06	File folder		
Metric Library	Generic Models	22-03-2016 17:06	File folder		
	\mu Lighting	22-03-2016 17:06	File folder		
	Mass 📜	22-03-2016 17:06	File folder		
Metric Detai	Mechanical	22-03-2016 17:06	File folder		
	Openings	22-03-2016 17:06	File folder		
	퉬 Parking	22-03-2016 17:06	File folder		
Metric Library	Folder name: C:\ProgramData\Autodesk\	RST 2017\Libraries\UK			

Figure 5-8: Revit Structure - Cross section library folder

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



You can access this from:





Figure 5-10: CADS Revit Scia Engineer Link - Revit family path



#### **5.3 Model export / import**

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

- Direct exchange method: In this method the model is transferred directly between Revit Structure and Scia Engineer without the need of any data exchange file. You must have both Revit Structure and Scia Engineer licensed on your system to use this method of model exchange.
- *R2S file exchange method*: If you have either **Revit Structure** 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 *Launch Scia Engineer* to Yes.



Revit Structure -> CADS -> Revit Scia Engineer Link -> Options -> Preferences -> Launch Scia Engineer



Figure 5-11: CADS Revit Scia Engineer Link - Options button

CAE	OS Revit Scia Engineer Link	×
Actions	Options	
National Code BS V	Export Internal Edges with Beams	No
Scia Engineer Version No	Revit Foundation Stab as Revit Isolated Foundation as	Support
Export Selected Items Only	Ignore Load Combinations	Yes Yes
Autodesk Revit®	Ignore Slabs Ignore Slabs Ignore Support	No No No
Import from Scia Engineer	Ignore Walls  Import Analysis results	No Yes
	Update 2D Member Openings     User Mapping     Material as Unknown	No
Mapping Tables		
Preferred Tables User Table Section Parameter Mapping	Analysis results Set 'Yes' to import analysis results from Scia Requires 'Structural Analysis Toolkit' from Au	Engineer. todesk Exchange Apps.
CADS		Close <u>H</u> elp

Figure 5-12: 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 Structure** or **Scia Engineer**.



	Revit Structure		Scia Engineer	
	Export	Import	Export	Import
Launch Scia Engineer = Yes	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 Structure #	Prompts you to specify the file name for the *.R2S <i>file</i> you wish to create which can be imported into <b>Revit Structure.</b>	Prompts you to select the *. <i>R2S file</i> you created / modified from <b>Revit</b> <b>Structure.</b>
Launch Scia Engineer = No	Prompts you to specify the file name for the *.R2S file you wish to create which can be imported into Scia Engineer.	Prompts you to select the *. <i>R2S file</i> you created/modified in <b>Scia</b> <b>Engineer.</b>		

Figure 5-13: Model export & import matrix

<sup>#</sup>Owing to certain programming API limitations, while importing the job into **Revit Structure** 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 Structure
- 4. Create a new job
- 5. Save the new job with a dummy **Revit Structure** file name, e.g. Test.rvt
- 6. Export the job to **Scia Engineer** with Launch Scia Engineer = Yes
- 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 Structure

#### 5.3.1 Case 1: Export from Revit Structure to Scia Engineer



Figure 5-14: CADS Revit Scia Engineer Link - Export model from Revit Structure to Scia Engineer



Project Browser - 3D Revit Model.rvt

Export a

Review & Export

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

Using the *Review & Export* will open the review manager that will list the changes to export by comparing the current Revit model with the last exported model. If this is a first time export, it will list all the items as 'New' under the 'Changes' column as shown below.



Figure 5-15: CADS Revit Scia Engineer Link – Review & Export – Model Preview

The review manager lists the element ID, member category, cross section, material, type of change and an option to export. The preview on the left zooms to show the selected ID.

The following changes to structural members and openings are tracked by the review manager in this release:

- New when a new item is available in the current model;
- Cross section changes to the cross section (for example UB 305x102x25 to UB 305x127x37 or wall thickness changed from 200 mm to 300 mm);
- Dimension changes to length of 1D members such as beam, column and changes to dimensions of 2D elements such as slab;
- Position if the structural element is moved from its previous position, including changes in eccentricity;
- Rotation changes to cross section rotation;
- Material changes to material;
- Member releases changes to member end releases such as hinges in Scia Engineer;



- Opening changes to opening dimension, position;
- Delete when a member is deleted in Scia Engineer.

Changes to *Loads* and *Supports* are not tracked by the review manager in this release. Elements deleted from the Revit model will not be listed as the review manager compares just the currently available items.

You can save the contents of the review manager into a file by clicking on the *Save log* for future reference. Clicking on the *Export To* option in the preview allows you to save the file to multiple file formats.



Figure 5-16: CADS Revit Scia Engineer Link – Review & Export – Save Log

Using the selection in the last column (*Export*) you can choose not to export a particular element by un-ticking it. Clicking on *Export* will automatically perform Revit's *Analytical Consistency Check*.

It displays the following dialog if any errors / warnings exist providing an opportunity to correct the errors thus ensuring the Revit model is good for structural analysis prior to export.

(	Cads Analytical Consis	stency Check results	×				
	There are analytical model consistency check warnings / errors.						
	Do you want to continue export?						
🛛 S	ee <u>d</u> etails	Yes <u>N</u> o					

Figure 5-17: CADS Revit Scia Engineer Link – Review & Export – Export – Analytical Consistency Check



Please save the Revit model once the export is completed in order to enable the review manager to track the changes.

Alternatively you may choose the *Export* option which directly starts to create the Scia Engineer model (without tracking).



Figure 5-18: CADS Revit Scia Engineer Link – Export

**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 Structure**. You may either choose to create a new **Scia Engineer** file or overwrite an existing one by setting the following option.

Revit Structure -> CADS -> Revit Scia Engineer Link -> Options -> Export to Scia Engineer -> Create New

	• 🖓 • 🖴	A Ol X, -	<b>@</b> • ¢			vit Mode  Typ
Options Consistency	Review & Export Un	ms Insert Show Re exported I	Annotate	Analyze Select Imported	Massing & Site Getting Started Best Practices Help	Collaborate View
Project Browser 3D Pavit Mo	Review & Expo Export	DS Revit Sc	ia Engineer	Link		

Figure 5-19: CADS Revit Scia Engineer Link - Options button

ctions	DC		Op	Francet				
National Code ZIN	65	~	1	Internal Edges with Beams	No			
unch Scia Engineer Yes	~		Revit Foundation Slab as	Slab				
	16.0.103	~		Revit Isolated Foundation as	Support			
Scia Engineer Version	10.0.105	*	4	Export / Import				
Export Selected Items Only				Ignore Load	Yes			
Evont to Scia Engineer				Ignore Load Combinations	Yes			
	Country Country	NI		Ignore Member Release	No			
Autodesk Revit <sup>®</sup> -	Create	New		Ignore Slabs	No			
SCIAENGINEER				Ignore Support	No			
				Ignore Walls No				
Import from Scia Engineer			4	Import				
				Analysis results	Yes			
Autodesk Revit 🖌				Update 2D Member Openings	Yes			
SCIAENGINEER -	/		4 User Mapping					
	_			Matenal as Unknown	No			
Mapping Tables								
Preferred Tables	User Table	•	Ar	nalysis results				
			Se	Set 'Yes' to import analysis results from Scia Engineer.				
Section Parameter Mapping				equires 'Structural Analysis Toolkit' from A	utodesk Exchange Apps.			
04-0-0-								
					Close <u>H</u> elp			

Figure 5-20: 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.

Solution of the set of

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



Figure 5-21: Scia Engineer - Import Revit file

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







Figure 5-22: Scia Engineer - Update Revit file

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

#### 5.3.2 Case 2: Import from Scia Engineer to Revit Structure



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Arc	hitecture St	ructure 3	Systems	Insert	Annotate	Analyze	Massing	g & Site	Collaborate Vi
Options	Consistency	Review & Export	Show Unexporte	Re ed I	eview & mport	Select Imported	Dett Best	ing Started Practices	Check List
			CADS	Revit Sc	ia Er ineer	Link			
					Revie	ew & Impo	rt		

Figure 5-23: 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.



CADS Revit	t Scia Engineer I	Link - Mo	del Preview			-	□ ×
	~	Revi		Scia			
	and and	Id	Member I	Name Type	Changes	Import	✓
	ALL BY	•	0 Member#395361	Column	New	$\checkmark$	
Zoom to selection					Save log Impo	rt Cl	lose

Figure 5-24: CADS Revit Scia Engineer Link – Review & Import – Model Preview

You can choose not to import a change by using the option in the last column. This is particularly helpful if the changes are specific to analysis.

During import, *CADS Revit Scia Engineer Link* will always update the existing mode available in **Revit Structure**.

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 5.2 Code of practice</u>.

You may import the model into **Revit Structure** 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 5-25: 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:







Figure 5-26: Scia Engineer - Export Revit file



## **6** Features

Structural elements present in **Revit Structure** 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 Structure**, hence it will be ignored when you import a model into **Revit Structure** 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 Structure** 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.

Revit Structure -> CADS -> Revit Scia Engineer Link -> Help -> Introduction -> Bi Directional Link between Revit and Scia Engineer



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

All structural elements present in a **Revit Structure** project will be exported to **Scia Engineer** if the configuration option *Export Selected Items Only* is *un-ticked*. This includes all the members physically present in the **Revit Structure** project irrespective of whether the *Worksets* they lie in are active or not.



CADS Revit Scia Engineer Link
Figure 6-2: CADS Revit Scia Engineer Link - Options button



Options

ctions				tions				
Vational Code 🛛 🕅	BS	~	4	Export				
	Yes	~		Internal Edges with Beams	No			
aunch Scia Engineer.				Revit Foundation Slab as	Slab			
Scia Engineer Version	16.0.103	~		Revit Isolated Foundation as	Support			
Energia Calenda Ibarro Onto F			4	Export / Import	×			
Export Selected Items Univ				Ignore Load	Yes			
Export to Scia Engineer				Ignore Load Combinations	Yes			
8	Create N	ew		Ignore Member Release	No			
Autodesk Revit				Ignore Slabs	No			
SCIAENGINEER	ECR 🖌			Ignore Support	INO No.			
					IND			
Import from Scia Engineer			4		Var			
Autodeak Doutt®		_	4	Analysis results	Vac			
Autodesk Revit				Upon Manphing	Tes			
SCIAENGINEER J	1			Material as Unknown	No			
				Material as Oriknown	No			
Mapping Tables		_						
Preferred Tables	User Table		An	nalysis results				
		_	Se	Set 'Yes' to import analysis results from Scia Engineer.				
Section Parameter Mapping				quires 'Structural Analysis Toolkit' from A	utodesk Exchange Apps.			

Figure 6-3: CADS Revit Scia Engineer Link - Export selected items only

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 Structure -> CADS -> Revit Scia Engineer Link -> Options -> Node Format

0, 🏷 + 🖴 + 🖓 + 🕼 + 🖓 - 🖓 -
Architecture Structure Systems Inser
Ontions Consistency Review & Show
Export Unexported
CADS Revi
Node flymat 25cia.nt ×
CADS Revit Scia Engineer Link
Node Format
Node Name Prefix
Node Number Start 0001
OK Cancel Reset

Figure 6-4: CADS Revit Scia Engineer Link – Options – Node Format



Structural members visible in the **Revit Structure** job but linked to external Revit or other CAD files will not be exported, for example linking an external **Revit Structure** 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.

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 Structure**.

#### 6.1 Log of events

Whenever you export or import a model from **Revit Structure**, 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 Structure

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

<b>())</b>				CAD	S Revit Scia Engineer Link	×
Expc	Category Snuctural Columns Snuctural Foundations Load Case Load Nature Total	Total items 8 4 8 8 8 8 8 3 6 3 6	Exported 8 4 8 7 7 3 4 3 4	Not Exported	load Nature : Seismic2005218 : Not Supported     LoadCase : SEIST37246 : Not Supported     Revit Material : "Steel ASTM A992" is mapped as "S460" based on user mapping.     Revit Material : "Concrete, Cast-In-Place gray" is mapped as "C20/25" based on user mapping.     Wapped Cross Section(s):     · "W10X49" is mapped as "W(Imp)10X49"     · "W102X6" is mapped as "W(Imp)10X49"     · "W12X26" is mapped as "W(Imp)10X49"     vul of & Structural Columns exported     4 out of 4 Structural Framing exported     8 out of 8 Structural Framing exported     7 out of B Load Case exported     Total Teme : 05/02/2014 12:01:14     Total Time : 00:01:28.3299250	~
			1 2		Llose	_og

Figure 6-5: 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 Structure** by using *Manage->Select by ID* option in **Revit Structure**.

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.



1				CAE	DS Revit Scia Engineer Link	×
	Category	Total Items	Exported	Not Exported	Ignore Slabs: No	^
•	Structural Columns	8	8		Ignore Revit Member Release: Yes	
	Structural Framing	4	4		lignore Support No	
	Structural Foundations	8	8		Revit Isolated Foundation as: Foundation Block	
	Load Case	8	7	1	Revit Foundation Slab as: Slab	
	Load Nature	8	7	1	Material as Unknown: No	
	Total	36	34	2	Internal Edges with Beams: No	
Expo	rt to Scia Engineer is complet ie save this Revit model to ret	ed! ain the synchronisat	ion with the exp	orted Scia Engineer	Exporting  A bad Nature : Seismic2005218 : Not Supported  LoadCase : SEIS137246 : Not Supported  Rewit Material ::Steel ASTM A992' is mapped as "S460" based on user mapping.  Rewit Material ::Concrete, Cast-In-Place gray' is mapped as "C20/25" based on user mapping.  Mapped Cross Section(s):  '-W10x49' is mapped as "W(Imp)10x49" '-W12x26' is mapped as "W(Imp)12x26"  Summary: B out of 8 Structural Columns exported 4 out of 4 Structural Framing exported 8 out of 8 Structural Foundations excorted model.	×
×			1 2	]	<u>Q</u> lose <u>S</u> ave	Log

Figure 6-6: 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 Structure** to highlight the slab and take the required action.

Figure 6-7: Revit Structure - Select by ID

Sele	ct Elements by	/ ID
<u>I</u> D - (use semicolon fo	r multiple IDs):	
227544		
Show	ОК	Cancel

Figure 6-8: Revit Structure - 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 Member export/import**

The standard cross section and material libraries in both **Revit Structure** and **Scia Engineer** are comprehensive but are labelled differently. For example *BS* – *Universal Beam* (*UB*) sections are named as *UB254/102/25* in **Scia Engineer** but as *UB254x102x25* in **Revit Structure**.

Therefore, **CADS Revit Scia Engineer link** is shipped with a pre-installed mapping library which matches cross sections and material properties between **Scia Engineer** and **Revit Structure**. In addition to the above, you can also specify your own mapping rules for any new section you add to the library.



Figure 6-10: CADS Revit Scia Engineer Link - User tables



đ	🁌 Mapping 🕯	Tables		latera i			x
	Database :	UK-Metric ·	Table : CrossSectionsMapp	oing  ▼ Revit fam	ily role filter by: All	•	
	Id	Belgium Beams Belgium Columns	Family Name	<b>Revit Family Role</b>	Scia Engineer Section Name	Scia Engineer Catalog Name	
	<b>▶</b> 400	Document-Materials Europe Specific Sections	nels	Frame	RSC76/38/6.70	Rolled	
	400	General-Materials	nels	Frame	RSC102/51/10.42	Rolled	
	400	General Section-Metric	nels	Frame	RSC127/64/14.90	Rolled	
	400	HollowCore Section-Metric Metric Sections	nels	Frame	RSC152/76/17.88	Rolled	
	400	Netherlands Beams	nels	Frame	RSC152/89/23.84	Rolled	
	400	UK-Corus Advanced Sections	nels	Frame	RSC178/76/20.84	Rolled	
	400	UK-Europe Specific Sections UK-Metric	nels	Frame	RSC178/89/26.81	Rolled	
	400	US-Imperial US-Metric User Table	nels	Frame	RSC203/76/23.82	Rolled	-

Figure 6-11: CADS Revit Scia Engineer Link - Mapping tables

The *Database* drop down menu contains the different section libraries that the *CADS Revit Scia Engineer Link* supports. For each library you will find data mapped between **Revit Structure** and **Scia Engineer** cross sections and materials using the *Table* drop down menu.

You cannot edit any pre-installed mapping database, but you can add new mapping rules by selecting the *User Table* in the *Database* dropdown menu.

đ	Mapping Tables								
۵	Database :	User Table	▼ Table : CrossSectionsMapp	ing 🔹 Revit fami	ly role filter by: All	•			
1	Id	Revit Section Na	me Revit Family Name	Revit Family Role	Scia Engineer Section Name	Scia Engineer Catalog Name			
	• 4	C15X40	C-Channel	Frame	C(Imp)15X40	Rolled			
	7	RECT	Rectangular Column	Column	Rectangle	Concrete			
	Add	<u>D</u> elete		Save					

Figure 6-12: CADS Revit Scia Engineer Link - User table

Click on the *Add* button to include your customised *Revit Structure family (\*.RFA) file* to the cross section *Database*. You can add cross sections or material to the *User Table* only. Please contact <u>CADS</u> <u>Support</u> if you wish to update the pre-installed mapping database.

You can map the *Revit Structure family (\*.RFA) file* with the sections available in the **Scia Engineer** cross section library. The cross section library can be selected from the *Supporting Mapping Database* drop down menu.

The example below shows how you can add your custom *Revit Structure family (\*.RFA) file* to the *User table*.



🕼 Add Cross Sec	tion To User Table
Supporting Mapping	Database : UK-Metric 🔹
Family Name :	My UKT Family
Section Name :	TUB152x229x30 -
Family Role :	Frame 💌
Scia Engineer Catalog Name :	Bolled
- Section Name :	UBT152/229/30
Catalog Id :	6
	<u> </u>

Figure 6-13: CADS Revit Scia Engineer Link - Add cross section to the user table

Revit Family File				x
Computer + Local	Disk (C:) ▶ ProgramData ▶ My Revit Families	<b>▼</b> 4 <sub>7</sub>	Search My Revit Fa	milies 🔎
Organize 🔻 New folder			•== •==	- 1 0
Documents	Name	Date modified	Туре	Size
Pictures	🔜 My UKT Family.rfa	24/09/2012 16:36	Revit Family	260 KB
Videos				
Image: Computer         Image: Local Disk (C:)         Image: Data (D:)         Image: Company Data (\\CADSFP0:         Image: Company Data (\\CADSFP0:\Archive)         Image: Scratch (\\CADSFP0:\Archive)         Image: Company Data (\\Larchive)         Ima				
File name: My I	۲ الم		Revit Family File (* r	fa)
	rk i ranniyara	•	Open 🖵	Cancel

Figure 6-14: CADS Revit Scia Engineer Link - Revit family file



🚯 I	Mapping Tab	les		Careford Careford	No. 14	
Da	atabase : Us	er Table	▼ Table : CrossSectionsN	Mapping	ly role filter by: All	<b>~</b>
	Id	Revit Section Name	Revit Family Name	Revit Family Role	Scia Engineer Section Name	Scia Engineer Catalog Name
	0	TUB152x229x30	My UKT Family	Frame	UBT152/229/30	Rolled
1						
	<u>A</u> dd	Delete		Save		

Figure 6-15: CADS Revit Scia Engineer Link - Mapping tables

The feature is useful when you edit some details of the existing family or create a new one.

Please refer to the *Help file ->Bi Directional Link between Revit and Scia Engineer* on how members are mapped between **Revit Structure** and **Scia Engineer**.

😵 Revit and Scia Engineer Exchange	-					-		×			
(テーロ) Back Forward Print											
Contents Index Search	Following table list	Following table lists how physical Revit Structure objects are transferred between Revit and Scia Engineer.									
Getting Started     Disclaimer     Ortact Address     Grund Address	Main Items	Sub Items	Revit Scia Engir	To leer	Scia Engir Revit	ieer To	Comments				
Introduction     Bi Directional Link between Revit and So	cia Engineer		New	Update	New	Update					
Creating the Revit Model     Exporting to the Scia Engineer     Commands	Grid		n/p	n/p	n/p	n/p	Orthogonal 1D grid can be converted as rectangular 2D grid.				
⊕-� Round Trip Example	Levels		n/p	n/p	Yes	n/p	No feature in Scia Engineer				
	Materials										
		Steel, Concrete Wood(Euro)	Yes	Yes	Yes	Yes					
		Wood (BS,IBC,LRFD,NEN)	n/p	n/p	n/p	n/p	No material available in Scia Engineer				
	Cross sections	Standard steel sections Double sections	Yes No	Yes No	Yes No	Yes No					
		Concrete Sections						-			

Figure 6-16: CADS Revit Scia Engineer Link - Help file

Where **CADS Revit Scia Engineer link** encounters a cross section or material that is not available in any of its libraries, it will ask you to map the cross section while the export or import command is in progress. Once you map the cross section or material, it gets added to the *User Table*. This mapping can be used the next time the same cross section or material is found. Thus as you keep working with **CADS Revit Scia Engineer link**, your user table will keep growing, adding the cross sections and the materials you generally work with.

Where a duplicate entry is found for the same cross section or material type then you will be prompted to select the appropriate one during the export or import process.

Whilst exporting or importing a project, you might unexpectedly be required to map a member or a material. If you are not sure, just use your best guess and then once the export or import is over; you can review the log file, highlight the member, change the cross section and export/import the member again.



#### 6.3 Rotation

The Member cross section definition in **Scia Engineer** differs from that of **Revit Structure**. *CADS Revit Scia Engineer Link* maps the sections between these two different applications. **Revit Structure** depends on the *Revit family (\*.RFA)* to define the cross section properties. *Revit family* is a very powerful tool but is also prone to errors since a cross section can be defined in many different ways. The default section library does not follow a systematic pattern to define a cross section. Hence CADS Revit Scia Engineer Link depends on mapping files to map the sections.

**CADS Revit Scia Engineer Link** has developed the mapping logic based on the default cross section library supplied with **Revit Structure**. Since the *Revit family* implementation logic is not uniform in **Revit Structure** 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 Structure** 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 Structure**. 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 <u>CADS Support</u> team if there is any issue with the cross sections library supplied with **Revit Structure**.

#### 6.4 Eccentricity

**CADS Revit Scia Engineer Link** ensures that the member eccentricity is correctly updated during the model exchange between **Revit Structure** & **Scia Engineer**. Since the parameters required defining eccentricity is different in **Revit structure** 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.

#### 6.5 Support

Foundations and Boundary conditions can be exported from **Revit Structure** to **Scia Engineer** either as a foundation block or as supports. These can be specified from the configuration option *Export Revit Foundation*. If it is set to *Support* then the foundations are exported to **Scia Engineer** as *Fixed Supports*, otherwise the foundations are exported as *Foundation Blocks* in **Scia Engineer**.



R 🕞 🕞 🛱	) - <	• 🕫 •	⇔ • X	A 01	<b>8</b> • 0	> 🗾 🚭	STR →	10069-S-S 🕨 T
Architectu	re St	ructure	Systems	Insert	Annotate	e Analyze	Massing & Site	Collaborate V
Options	istency	Review 8 Export	Show Unexport	R	eview &	Select Imported	<ul> <li>Getting Start</li> <li>Best Practice</li> <li>Help</li> </ul>	ed S (j) About
			CAD	S Revit So	tia Enginee	er Link		

Figure 6-17: CADS Revit Scia Engineer Link - Options button



ð	CAD	S Re	vit Scia Engineer Link	
Actions		Opt	tions	
National Code BS	~	4	Export	N
Launch Scia Engineer Yes	~		Revit Foundation Slab as	Foundation
Sein Engineer Version 16.0.103	~		Revit Isolated Foundation as	Default
		4	Export / Import	Foundation
Export Selected Items Only			Ignore Load	Slab on grade
Export to Scia Engineer			Ignore Load Combinations	Slab
Create Ne	5147		Ignore Member Release	No
Autodesk Revit	544		Ignore Slabs	No
SCIAENGINEER			Ignore Support	No
			Ignore Walls	No
Import from Scia Engineer		4	Import	
			Analysis results	Yes
Autodesk Revit 👞			Update 2D Member Openings	Yes
SCIAENGINEER J		4	User Mapping	
			Material as Unknown	No
Mapping Tables				
Preferred Tables User Table		Re	vit Foundation Slab as	
Section Parameter Mapping		Fou Ana	undation slabs will be exported as specifi alyze As, when set as Default here.	ied here or as set in Revit properties,
CADS				Close <u>H</u> elp

Figure 6-18: CADS Revit Scia Engineer Link - Export Revit isolated foundation as option

If you have placed any *Boundary Conditions (Point, Line* or *Area*) in **Revit Structure** then it will get exported as supports in **Scia Engineer** with the same translational and rotational stiffness values as specified in **Revit Structure**. When a job is imported into **Revit Structure** from **Scia Engineer** for the first time the supports are ignored and they do not get imported as **Revit Structure** *Foundataions* or *Boundary Conditions* since *CADS Revit Scia Engineer Link* has no information about its structural usage. But if the model is first created in **Revit Structure** using the *Boundary Conditions* feature then when you edit the support condition in **Scia Engineer** and import it back into **Revit Structure**, it recognises that the supports were mapped to *Boundary Conditions* and will update it with the modified values.

Where the support parameters are modified in **Scia Engineer** and you do not wish them to get overwritten during the next export from **Revit Structure**, set the configuration option *Ignore Support* to *Yes*.



Actions		Option	s	
National Code Launch Scia Engineer Scia Engineer Version Export Selected Items Only Export to Scia Engineer Autodesk Revit® SCIAENGINEER	BS ▼ Yes ▼ 16.0.103 ▼ Create New	Britisher	port     email Edges with Beams     evit Foundation Slab as     evit foundation Slab as     evit folated Foundation as     port / Import     nore Load Combinations     nore Member Release     nore Slabs     nore Slabs     nore Walls     port     alysis results     odate 2D Member Openings     ser Mapping     distance	No Foundation Support Yes No No No No Yes Yes Yes
Mapping Tables				
Preferred Tables Section Param	User Table eter Mapping	Ignore Suppo set to `	e Support rts will not be considered for both exp Yes.	ort and import of models if this option is
CADS				Close <u>H</u> elp

Figure 6-19: CADS Revit Scia Engineer Link - Ignore support

Supports can be exported from **Revit Structure** to **Scia Engineer** only when *Structural Settings* in **Revit Structure** is set to include *Member Supports* as shown below.



Figure 6-20: Revit Structure - Structural settings



nor Representation Setting	Joad Cases   Load C	ombinations A	Analytical Model Settings	Boundary Conditions Settings	
Automatic Checks			Analytical / Physica	al Model Consistency	
Tols, inces	<u>S</u> upport dista	nce: 300.0		Analytical auto detect - Horizontal:	300.0
Analyti	cal-to- <u>p</u> hysical model dista	ance: 150.0		Analytical auto detect - Vertical:	300.0
				Analytical Link auto detect:	300.0
Analytical model adjusted     Analytical Beam and Floo	d away from default locati r overlap check	on			
Possible instability based	on release conditions				
Analytical model outside	physical model				
Valid Physical Material As	set				
Analytical Model Visibility	ar analytical models				

Figure 6-21: Revit Structure - Member supports

#### 6.6 Loads

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

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

Please refer to the features list in the *Help file* to check how the load types are mapped between the two applications.

Revit Structure -> CADS -> Revit Scia Engineer Link -> Help -> Introduction -> Bi Directional Link between Revit and Scia Engineer



Figure 6-22: CADS Revit Scia Engineer Link - Help button



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 Structure** and handle them in **Scia Engineer** separately. You can opt to ignore load cases and load combinations in **Revit Structure** by setting the configuration option *Ignore Revit Load Combination* to *Yes*.

# Revit Structure -> CADS -> Revit Scia Engineer Link -> Options -> Filters -> Ignore Load Combinations

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Archi	tecture	Structure	Systems	Insert	Annotate	Analyze	Massing & Site	Collaborate V
Opt 2ns	Consisten	cy Review & Export	Show Unexport	F	Review & Import	Select Imported	<ul> <li>Getting Starte</li> <li>Best Practices</li> <li>Help</li> </ul>	ed G Check List
			CAD	S Revit S	cia Enginee	r Link		

Figure 6-23: CADS Revit Scia Engineer Link - Options button

National Code BS	~	Op	tions Export			
Launch Scia Engineer Scia Engineer Version	<ul><li>✓</li><li>0.103 ✓</li></ul>	4	Internal Edges with Beams Revit Foundation Slab as Revit Isolated Foundation as Export / Import	N F	oundation upport	
Export Selected Items Only	Z Create New	4	Ignore Load Ignore Load Combinations Ignore Member Release Ignore Slabs Ignore Support Ignore Walls Import Analysis results Update 2D Member Openings User Mapping Material as Unknown		es s o o o es o o o o o o o o o o o o o	5
Mapping Tables						
Preferred Tables Section Parameter Ma	Jser Table	lg Lo set	nore Load Combinations ad combinations will be ignored for both to Yes.	export and i	mport of models	if this option is
PARS					Close	Help

Figure 6-24: CADS Revit Scia Engineer Link - Ignore load combinations option

