

468576

2021 Workflow for BIM 360, Revit, Robot Structural Analysis, Advance Steel, and Dynamo

Lina El-Khoury
James K.M Cheng Architects Inc.

Mahsan Omid
SolidCAD

Hung Nguyen
SolidCAD

Learning Objectives

- Learn how to set up and manage BIM 360 Design workflow for Autodesk 2021 products.
- Learn how to effectively work with the 2021 workflow of Revit, Robot Structural Analysis, and Advance Steel.
- Learn how to effectively use Robot Structural Analysis 2021 for structural steel code check and optimization.
- Learn the basic concept of Advance Steel connections, detailing, and Dynamo usage.

Description

Specialized applications for structure, analysis, detailing, and more are now included in your Architecture, Engineering & Construction Collection subscription.

How is the new, unified AEC Collection changing how you work?

In this 60-minute session, you'll learn about the seamless Revit software, Robot Structural Analysis software, Advance Steel software, and Dynamo software. You'll learn how to link a Revit structural model to Robot Structural Analysis for structural steel code check and optimization. You'll also learn how to control all models using Dynamo. This class will also cover how to set up and use BIM 360 Design software for sharing Revit, Robot Structural Analysis, and Advance Steel models, and to curate, coordinate, and manage deliverables throughout the project lifecycle. When design project teams have the right information at the right time, work happens faster.

Speaker(s)

Lina El-Khoury

Design Applications Manager - James K.M. Cheng Architects Inc.

Lina is the Design Applications Manager at James K.M. Cheng Architects in Vancouver BC. With over 25 years of experience in Architecture, Building Systems, Interior Architecture and Building Manufacturing, she now specializes in BIM technologies. She has been the National BIM Lead for WSP and worked at Perkins + Will locally and firm wide – Always raising the bar for better BIM projects deliverables, team cohesion and collaboration - with a forward-thinking. Equipped with CAD knowledge and BIM expertise in multidisciplinary platforms, Lina has trained and coached many teams in multiple design and subcontracting AEC firms. Her passion, dedication, contributions to the BIM development and implementation have been valuable and appreciated by many firms she worked with.

Mahsan Omid

Technical Consultant - SolidCAD

Mahsan is a BIM specialist and technical consultant who is passionate about the marriage of thoughtful design and technical rigor. She has more than 15 years of combined industry and academic experience in all disciplines of AECO industry. She has helped various architectural, mechanical, and structural firms leverage BIM for improved collaboration, implement integrated workflows and increase productivity, sustainability, precision and data quality. Her academic activities inform Mahsan's industry practice - to name a few, training professionals, writing research papers, testing best practices and delivering corporation training programs as a part of BIM innovation initiatives at SAIT and University of Calgary. Mahsan is a Certified Autodesk BIM and CAD instructor and a technical advisory board member at Can BIM and Passive House Alberta.

Hung Nguyen

Technical Consultant - SolidCAD

Hung Nguyen has 26+ years of experience in Autodesk Products. He has a strong background in Architectural and Manufacturing fields. His is a BIM & Manufacturing Technical Consultant. Hung also has extensive experience in a diverse range of CAD-related software such as: Revit, Inventor, Fusion 360, Alias, and Simulation to name a few. He has presented multiple times at Revit Technology Conference (RTC), Canadian Festival of Architecture, CanBIM, and Autodesk University from 2013 to 2019.

Contents

2021 Workflow for BIM 360, Revit, Robot Structural Analysis, Advance Steel, and Dynamo	1
Introduction	5
Autodesk BIM 360 solutions for Design Collaboration	6
Controlled Cloud Worksharing in Revit	7
Document Management module	7
Design Collaboration module	8
Benefits	8
BIM 360 Design Project Setup and Administration	9
1. Creating the Project	9
2. Assigning Project Administrators	9
3. Creating and organizing Project Folders	9
4. Creating Teams, adding members and setting permissions	10
5. Uploading files	10
6. Accessing and Reviewing Project Documents	11
7. Viewing Project Team Progress and Updates	11
8. Sharing Packages	11
9. Understanding Package Status	12
Revit, Robot Structural Analysis, and Advance Steel workflow	13
Desktop Connector	13
RSA and Advance Steel Information Exchange	13
Linking the Revit structural model to RSA and AS	14
Robot Structural Analysis 2021 for structural steel code check and optimization	15
1. Modify member types	15
2. Run calculations and review the results	15
3. Modify bar types	15
4. Test the changes and add materials	15
Basic concept of Advance Steel connections, detailing, and Dynamo usage	15
Transferred Elements (.smlx)	16
Advance Steel connections	16
The Connection Object	17
Connection Creation	17
Advance Steel Detailing – Drawings generation	18

Drawing Management	19
New in Advance Steel 2021	20
Dynamo for Revit, RSA and Advance Steel	21
Dynamo for Revit Structural	21
Dynamo for RSA	21
Dynamo for Advance Steel	21
BIM 360 Best Practices	22
Project Name, Revit Models Versions and Access	22
Files Upgrade	23
Naming Convention	23
Autodesk Desktop Connector (ADC)	23
Bad linking habits	24
Membership Roles	25
Where has all my hard drive space gone?	26
Location of Local Cached Revit files:	26
Data in the model is Corrupt.....	26
Create BIM360 project to house your company standard content	27
BIM 360 Document Management for internal users	27
References	28

Introduction

Projects in the AEC industry could be quite complex and generate an incredible amount of data. One of the biggest challenges in this industry is efficient workflows and accurate data extraction – where workflows and data seamlessly connect and realign during the lifecycle of a project, where synching and utilizing all this generated data can be possible.

Some projects are becoming even more complex and require a higher frequency of data iteration. Collaboration between geographically dispersed AEC teams is very intricate. This year, firms are even more challenged because of COVID-19 that forced team members to work remotely and still have to maintain deadlines.

As you know, there are many applications included in the Autodesk AEC Collection. Some of these applications are specialized for structure analysis and detailing. How is this unified collection changing our workflow and how are we working with it?

This delivery platform tremendously helps in streamlining the multidirectional structural data exchange between Revit, Robot and Advance Steel.

In this class we will

- 1- explore the BIM 360 project and its setup.
- 2- demonstrate how to work on a Revit structural model, link it to RSA for structural steel code check and optimization, link it to Advance Steel for creating the connections, and how they communicate to each other using XML format an XML X format.

BIM 360 -Revit – RSA - Advance Steel – Dynamo Workflow

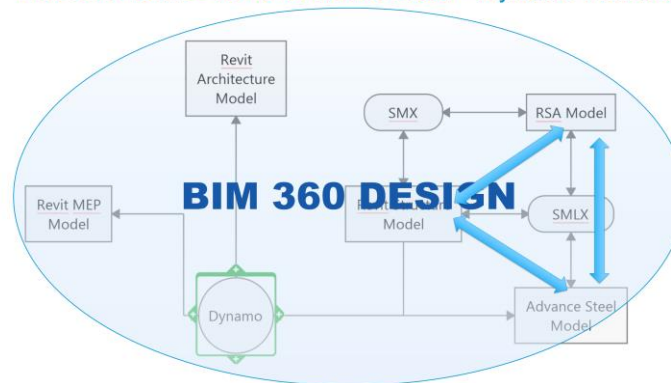


FIGURE 1

- 3- change the design in Revit using Dynamo and synchronize the models.
- 4- go beyond the previous workflow to incorporate content from additional Autodesk software included in the collections. (what Hung calls “the fun stuff”)

All this in BIM 360 platform – The One Central Platform. Project administrator can control external teams and/or project members access to folders, assign permissions according the roles, secure platform.

The project used for our presentation is [Grosvenor Ambleside](#). A two-phase Residential project developed by [Grosvenor](#). The architecture was designed by [James K.M. Cheng Architects Inc.](#) and the structure by [RJC Engineers](#).



FIGURE 2: RENDERING COURTESY OF JAMES K.M. CHENG ARCHITECTS INC.

We have used the same project for the last two presentations we did at AU for the same BIM 360 workflows between Revit, Robot Structural Analysis, Advance Steel, and Dynamo

BLD226851 [BIM 360 Design Workflow for Revit, Robot Structural Analysis, and Advance Steel](#)

BES319545 [2020 Workflow for BIM 360, Revit, Robot Structural Analysis, Advance Steel, and Dynamo](#)

Set up and manage BIM 360 Design workflow for Autodesk 2021 products.

Autodesk BIM 360 solutions for Design Collaboration

BIM 360 is Autodesk's AEC cloud solution that enables teams to collaborate on complex projects *from design to construction*, pretty much anytime, anywhere in a single connected cloud platform. *"This unified solution aggregates the data and provides transparency to project stakeholders making everyone more accountable"*. Made for distributed, multidisciplinary teams, you can co-author Revit models with greater file- and folder-based access controls, issue management, deliverable coordination, change visualization, and unlimited storage. It also enables real time cloud work-sharing on Revit projects and collaboration workflows in Civil 3D and, more recently, in AutoCAD Plant 3D.

Hosting, editing and synching other file types in the BIM 360 project is also possible.

After a BIM 360 subscription is created and activated, the account administrator will be able to manage the account profile, with options including customizing the account profile, adding additional account and project administrator(s), creating projects, activating services and more.

BIM 360 Design includes 3 key items:

1. Controlled Cloud work-sharing in Revit.
2. The document management module on the BIM 360 platform.
3. And the Design Collaboration module.

Controlled Cloud Worksharing in Revit

This is where you can co-author Revit models in real-time with anyone, from anywhere. It allows real-time cloud work-sharing, syncing with central and publishing cloud models.



FIGURE 3

Document Management module

The BIM 360 Docs replaced 360 Teams - a legacy data platform that is used by teams who want to collaborate using Revit versions 2015 to Revit 2018.2, or Plant 3D versions 2018 to 2020.

BIM 360 Docs is the "entry point" to the centralized BIM 360 platform. It is the foundation for all stakeholders on a project, where project information is stored. This is where a project team can share, view, markup, and manage drawings, documents, and models.

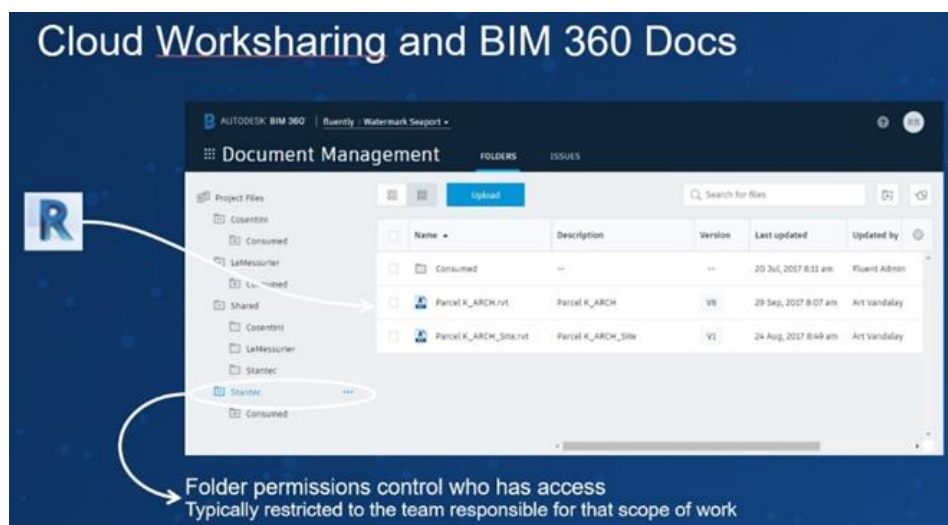


FIGURE 4

Design Collaboration module

The BIM 360 Design collaboration module allows the enhancement of Cloud work-sharing. This module gives teams the ability to create work-in-progress models before saving to the team space enabling greater control over their design space before contributing to the shared team project.

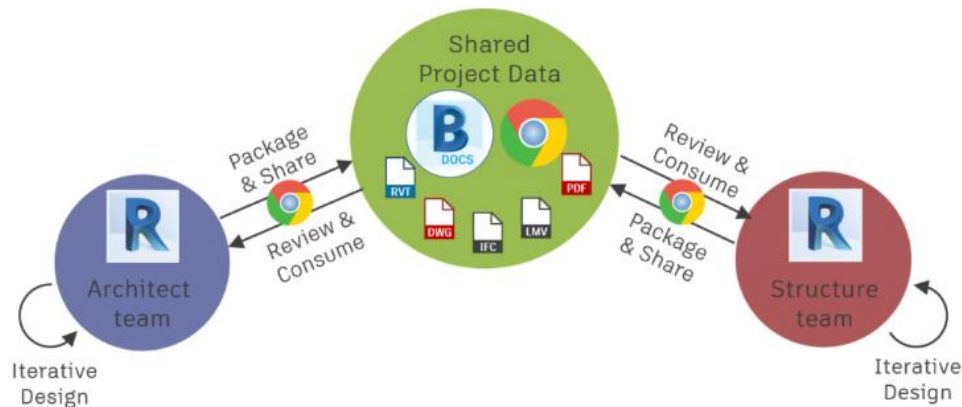


FIGURE 5

Benefits

Faster, more efficient Revit collaboration. With anytime access to Revit models – from anywhere in the world – your design team will not waste time. Virtual co-location means distributed design teams or remote staff can model from wherever they happen to be. And that translates to lower travel and office expenses -- and happier designers.

Access to more projects. Your firm's physical address doesn't matter anymore. Extend your reach and participate in projects or joint venture partnerships wherever they may be located.

Better allocation of team talents and resources. Assign the best team members with the strongest skill set and the talent you need. Enable designers to work on multiple projects based in different locations at the same time.

Include everyone. Use BIM team to give project team members, partners or consultants who do not have Revit a real-time view of models for faster communication and better buy-in. i.e. project managers can compare data and markup drawings.

Integrated project delivery in BIM 360 design integrated project delivery is much easier. It allows mechanical, electrical and structural teams to share their Revit models and collaborate live.

We believe that during this COVID19 pandemic time, this tool is truly a "life saver".

BIM 360 Design Project Setup and Administration

Main steps for setting up a BIM 230 Project:

1. Creating the Project

The Account administrator will create a project, assign Project Administrators, and activate services after logging in to <https://admin.b360.autodesk.com/login>

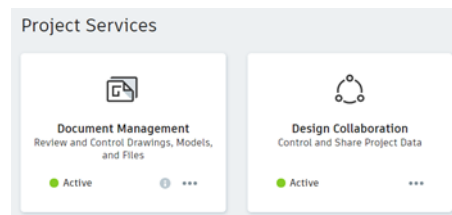


FIGURE 6: ACTIVE SERVICES

2. Assigning Project Administrators

More than one project member can be assigned as a Project Administrator from the

Project Admin module



For example, if multiple companies are collaborating on a project, each company acting as a smaller team within the larger project team, can have a Project Administrator; this could be the role of Project or BIM Manager, who can share their team's updates to the larger project team.

3. Creating and organizing Project Folders

The Document Management module  is used for creating folders and subfolders in the *Project Files*.

For simplicity, the Project Files folder for this project is organized by discipline and the 1-*Structural* folder by software.

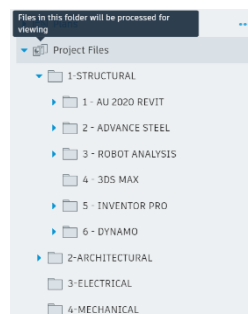


FIGURE 7: PROJECT FILES ORGANIZATION

4. Creating Teams, adding members and setting permissions

After creating the Project Folders and subfolders, the project administrator assigned teams to them, added members to those teams and set permissions. Each project member can have different levels of permission.

5. Uploading files

After the Project Administrator has created folders, teams, assigned members, and set permission levels, project members can upload project documents via the Document Management module.

As project/team members, we uploaded multiple file types from multiple software and sources.

a. Uploading Revit Files

The Revit models were uploaded to the Document Management Module via Revit. A package was published from the workshared structural Revit model and its links. The Non shared Revit models were saved as Cloud models (To use Cloud Models for Revit, you must be on Subscription)

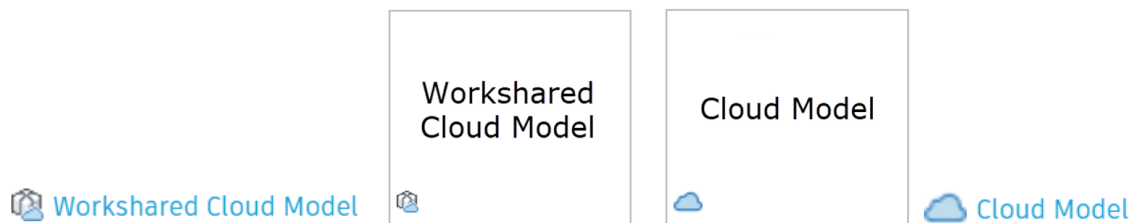


FIGURE 8: CLOUD WORKSHARED MODEL SYMBOL VS. CLOUD MODEL SYMBOL

b. Uploading Non-Revit Files

You can easily upload non-Revit files. A variety of file formats are supported by BIM 360 Docs - [Supported File Types](#)

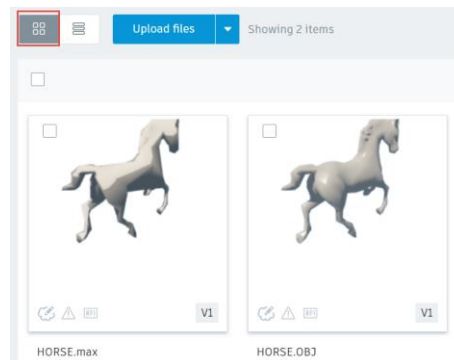


FIGURE 9: UPLOADED FILES (MULTIPLE TYPES)

6. Accessing and Reviewing Project Documents

After uploading and confirming the files upload, The Document Management Module is used to access and review these files.

7. Viewing Project Team Progress and Updates

The Team Space is the home portal in the Design Collaboration module. It provides an up-to-date viewing experience of the current state of the model.

This is where, in the Timeline, you will see the “swim lanes” for each team, with the packages shown in a different color for each team. The node symbol varies based on the packages and standalone models’ status (see *Understanding Package Status* for the description of each node type).



FIGURE 10

8. Sharing Packages

What is a package? Packages play a prominent role in the Design Collaboration module. If you are already familiar with Revit, you know that a “Set” equates to Sheets and Views generated by Revit. Extending upon this, a Package is essentially a Set plus the Revit model. Packages have different levels of states that indicate their level of consumption.

The figure below (Figure 11) is from one of our published packages that includes three 3D views: ORIGINAL (showing the original model), DEMO-1 and DEMO-2 options views.

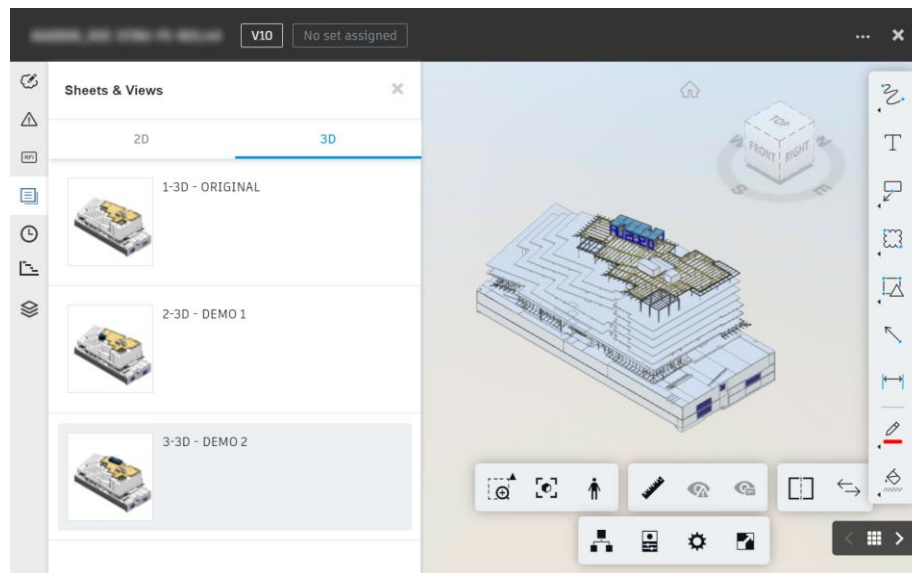


FIGURE 11

9. Understanding Package Status

Packages have different Node types that indicate their Status.













Node Type	Description
	An empty circle on another team's line represents a package that has been shared, but not consumed by your team.
	A filled circle on another team's line represents a package that your team has consumed.
	A filled circle on your team's line represents a package you have shared.
	A dotted-line circle on your team's line represents the start of a new package that you haven't shared yet.
	A numbered badge with a circle represents a cluster of packages. The two-tone color means some have been consumed, some have not. Click or zoom to expand.
	A numbered badge with an empty circle represents multiple packages that haven't been consumed. Click or zoom to expand.
	A numbered badge with a filled circle represents multiple packages that have been consumed. Click or zoom to expand.
	A square represents a model uploaded to the team folder in Document Management.
	A numbered badge with a square represents a cluster of models. Click or zoom to expand.
	A numbered badge with a hybrid square and circle shape represents a cluster of models and packages. Click or zoom to expand.
	A numbered badge with a hybrid square and circle shape represents a cluster of models and packages. The two-tone color means some have been consumed, some have not. Click or zoom to expand the cluster.
	The plus node allows you to create a new package to share your team's work.

FIGURE 12: PACKAGE NODES TYPES DESCRIPTION

New in BIM 360 Design

There are continuous updates to BIM 360 design, for recent release notes visit:
<https://blogs.autodesk.com/bim360-release-notes/category/design-collaboration/>

Effectively work with the 2021 workflow of Revit, Robot Structural Analysis, and Advance Steel

Revit, Robot Structural Analysis, and Advance Steel workflow

In BIM 360 Design we can co-author the Revit workshared models with greater file- and folder-based access controls, issue management, deliverable coordination, change visualization, and unlimited storage.

To work with non-workshared Revit files and other files such as RSA, Advance Steel models and detail drawings, you need to Install Autodesk Desktop Connector.

Desktop Connector

The ADC is a desktop service that integrates an Autodesk data management source (or data source) with your desktop folder and file structure for easy file management.

The files in the data source are replicated in a connected drive - a connected drive is a local folder that mirrors the structure of the connected data source.

You can manage files in the data source through the connected drive, just as you would any other folder on your machine. Changes made in the connected drive are automatically uploaded to the data source.

New for Desktop Connector:

You'll find what's new for the Desktop Connector [here](#)

RSA and Advance Steel Information Exchange

Transfer based on AS **smlx** file is used to allow the link between AS and Revit. **Smlx** file is then converted to **smx** file used for the link between RSA and Revit to store RSA analytical model information.

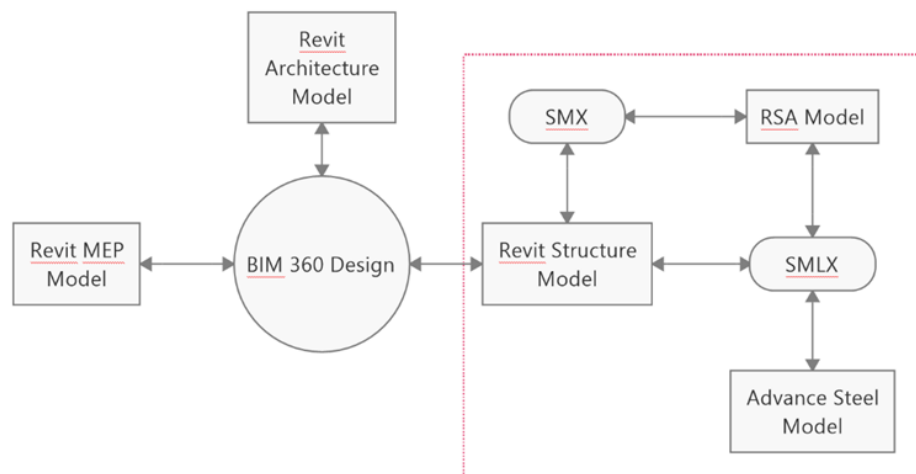


FIGURE 13: REVIT STRUCTURE-RSA AND AS WORKFLOW

Linking the Revit structural model to RSA and AS.

The link can be started from Revit to either RSA or AS.

Linking the Revit model to RSA from Revit

From the *Analyze* tab, select *Robot Structural Analysis Link*.



FIGURE 14: LINKING REVIT MODEL TO RSA

Once the information is sent to Robot Structural Analysis, the RSA model opens.

Linking the Revit model to Advance Steel

From the *add-ins* tab in Revit, select *Advance Steel Extension* > *Export*.

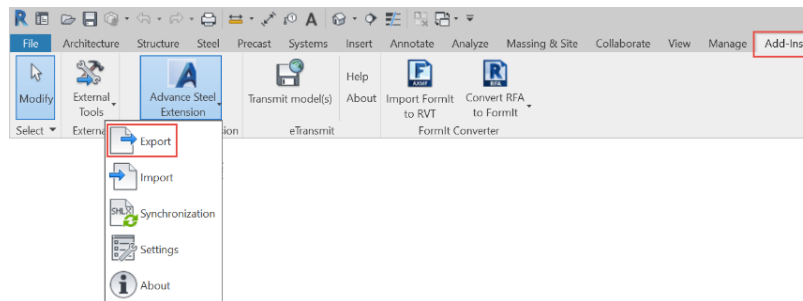


FIGURE 15: EXPORTING SMLX FILE FROM REVIT

This will create a **smlx** file that can then be imported in Advance Steel using the *Import* tool in Advance Steel from the *Export & Import* tab.

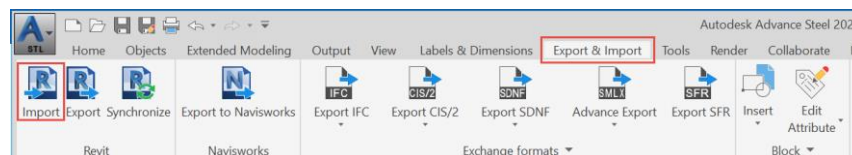


FIGURE 16: IMPORTING SMLX FILE IN ADVANCE STEEL

Effectively use Robot Structural Analysis 2021 for structural steel code check and optimization.

Robot Structural Analysis 2021 for structural steel code check and optimization

The steel design option offers the possibility for a quick and efficient verification of the sections that are used in the structure.

Main steps to follow:

1. **Modify member types.**

Modify member types to prepare a model for verification.

2. **Run calculations and review the results.**

Run calculations and review the outcome of the steel verification process.

3. **Modify bar types.**

Change member types and how to create a new member type.

4. **Test the changes and add materials.**

Modify the materials of bars and change the bar size of existing members.

We will go through the following RSA tasks:

- Change member types.
- Run the appropriate calculations, review the outcomes, and adjust the project so the structural elements are an adequate size for the structure to withstand its loads as shown below.
- Link back to Revit and update the Revit model.

Basic concept of Advance Steel connections, detailing, and Dynamo usage.

Basic concept of Advance Steel connections, detailing, and Dynamo usage

Advance Steel contains a variety of preset parametric joints used to connect Advance elements, especially beams. Joints are complex elements that consist of basic elements such as plates, stiffeners, beams, bolts, welds, and dependent elements and are controlled by construction rules. An Advance joint is created with all its parts, connection objects, and features with a single operation. At the same time, the existing connected elements are processed (i.e., shortened, coped, etc.) and connection logic between the parts is established.

A connection (joint) is created with all its parts, connection objects, and features using a single operation. At the same time, the existing connected elements are processed (shortened, coped, etc.) and a connection logic between the parts is established.

Advance Steel contains a variety of default, preset parametric connections to connect Advance Steel elements. You can access these connections, using the Connection Vault. In addition to the default connections, you can define, store and reuse other custom connections.

Transferred Elements (.smlx)

You can transfer numerous elements from/to Revit to/from Advance Steel, such as levels, steel beams, plates, wood, concrete elements, grating, some connection elements, some beam features and some plate features. All element transfers are dependent on the feature extent and limitations of each application (Revit and Advance Steel).

Check the table to see which elements you can transfer using Advance Steel 2021.
[Extension for Revit. Element Transfer between Advance Steel and Revit](#)

Advance Steel connections

A connection (joint) is created with all its parts, connection objects, and features using a single operation. At the same time, the existing connected elements are processed (shortened, coped, etc.) and a connection logic between the parts is established.

Advance Steel contains a variety of default, pre-set parametric connections to connect Advance Steel elements.

You can access these connections, using the Connection Vault. In addition to the default connections, you can define, store, and reuse other custom connections.

In Advance Steel 2021, you can automate steel connection creation by propagating connections already in place. Just select the joint box from one connection and select the Propagate Joint option available in the contextual menu. The steel connection will then be automatically inserted in other locations where the framing conditions are similar. Since all these connections are now part of the same group of connections, modifying this connection will automatically update similar connections accordingly.

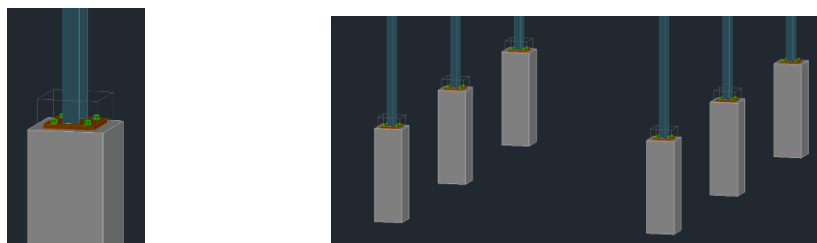


FIGURE 17: CONNECTION ADDED FROM THE CONNECTION VAULT AND PROPAGATED

With the installation of Advance Steel 2021 in US English, users receive access to a more localized version for the US market. This includes files like a new cut symbol added for general arrangement drawings or new process suites to speed up shop drawings creation.

The Connection Object

All individual elements in the connection, including their properties and processing objects, are held together, and represented as a bounding box (connection object). All connection elements and definitions are included in the gray box.

To display the box: In the Extended Modeling tab Joint Utilities panel, click (Display).

The connections are intelligent: If a beam, connected using a connection, is changed, the connection automatically adapts to the new situation according to the set parameters. These set parameters are stored in the connection object (the gray box) that is hidden (by default) when the connection is created. It contains all the connection information but not individual component properties. Connection objects can be displayed, updated, deleted, copied, and changed.

Connection Creation

Connections can be created between various elements. To create the connection, the connected elements should meet several geometric requirements that may vary, according to the connection type.

After selecting a connection in the Connection Vault, you need to select the members to connect by pressing Enter after each selection. The number of selected members as well as their type vary depending on the selected connection.

Examples:

- For a base plate only one element should be selected: a column.
- For a gusset plate for 3 diagonals, four elements should be selected: a beam of any section type and three diagonal beams with suitable sections (angle, channel, flat, hollow).

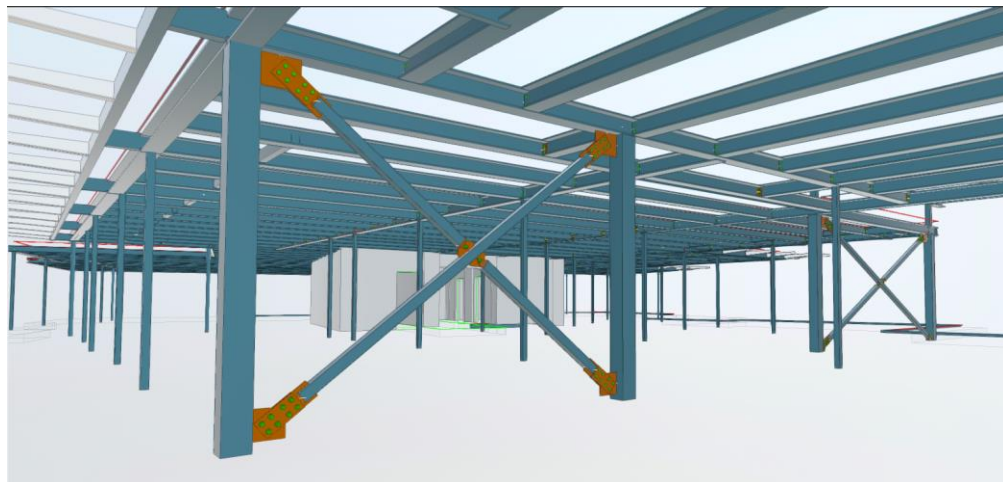


FIGURE 18: GUSSET PLATE CONNECTIONS

In several situations, after the connection is created, a confirmation dialog box appears. Simply click OK to finish the creation. The connection properties dialog box appears allowing you to make the desired settings.

Advance Steel Detailing – Drawings generation

Once the design and numbering of the 3D model is completed, create 2D drawings based on that information.

Numbering Workflow

This workflow provides an overview of the automatic numbering process.

1. At first, all structural parts should be numbered, so start with single part marks.
2. The program then determines the assembly marks for parts connected in the shop. The biggest part of an assembly is the main part and will get an assembly mark while all the other parts are considered attached parts and will have a single part mark.
3. Standard parts are numbered using additional options. Any part in the current model that matches a standard part in the template will get the same mark (single part mark or assembly mark, according to the case).
4. A post numbering method can be applied after the initial numbering is complete to obtain the desired result.

During the numbering process, beams, followed by plates, are the first to be numbered. In each case, the group with the most elements will get the lowest number.

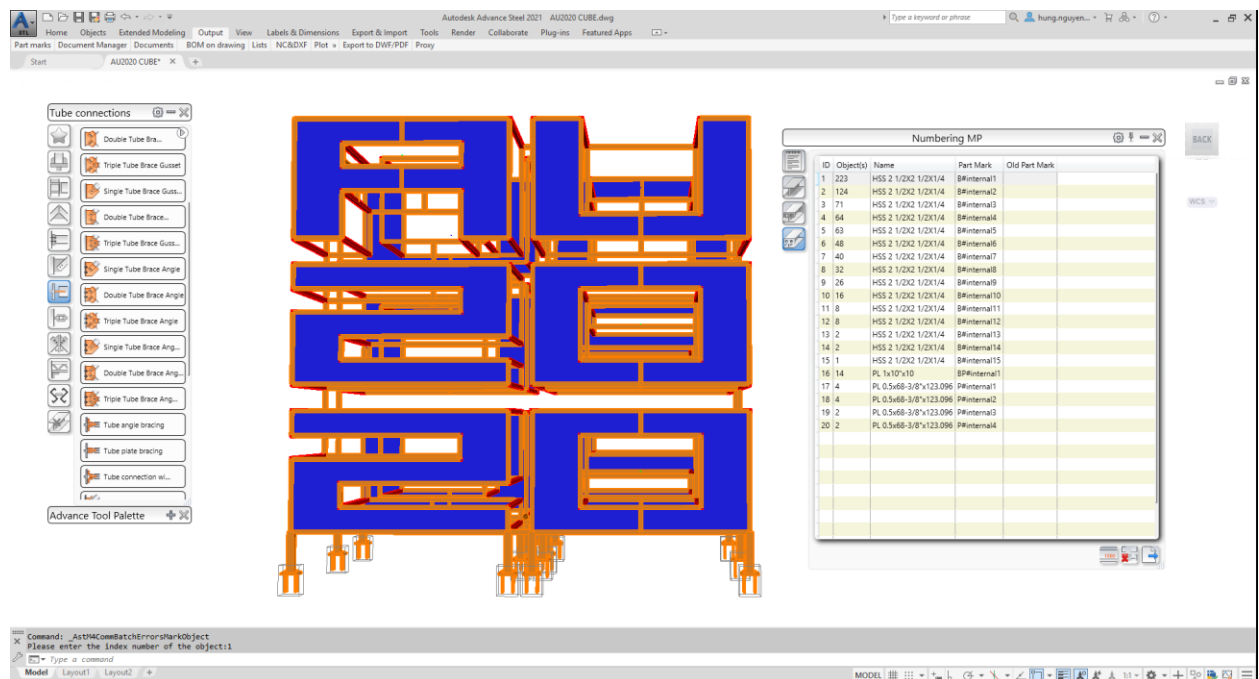


FIGURE 19: ADVANCE STEEL NUMBERING PROCESS

Switch between Single Parts and Assemblies

In the Output tab -> Part marks panel, the highlighted button (Toggle switch display SP/MP) is a switch between single parts and assemblies. According to the switch position, the numbering options refer to single parts or to assemblies.

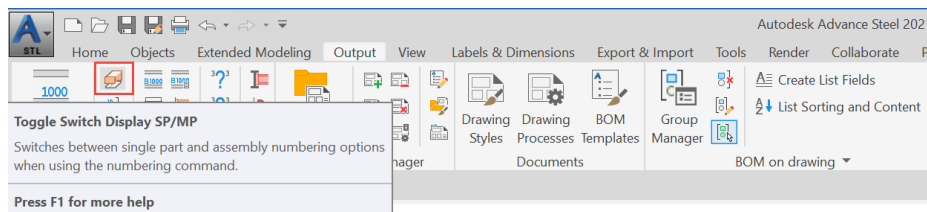


FIGURE 20: TOGGLE SWITCH DISPLAY SP/MP

Drawing Styles

Advance Steel offers a variety of drawing styles for creating general arrangement drawings, sections, and shop drawings in various designs.

Drawing Management

Use the Document Manager to preview, manage and erase details in separate DWG files. A connection (joint) is created with all its parts, connection objects, and features using a single operation. At the same time, the existing connected elements are processed (shortened, coped, etc.) and a connection logic between the parts is established.

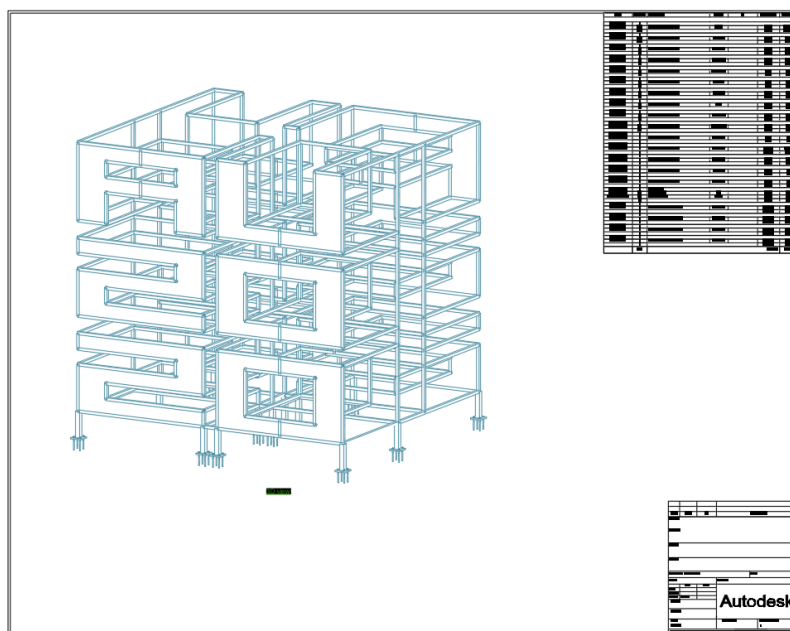


FIGURE 21: 3D MODEL DRAWING W/O LABELS

New in Advance Steel 2021

General application

- **New dedicated SQL localdb instance for Advance Steel:** Advance Steel is now creating and using a new, dedicated SQL localdb instance instead of the default one.
- **All SQL Server Editions are now supported by Advance Steel** to allow custom access privileges to shared databases made by the SQL server, allowing either full read and write capabilities or restricting the Advance Steel functionalities on read-only rights. See [SQL Server Support for Advance Steel](#).

Create and manage drawings

- **New Element Properties Detail Sorting Tokens for Drawing Processes:** Arrange details created by drawing processes based on the properties of the detailed elements. See [Element Properties Detail Sorting Tokens for Drawing Processes](#)
- **New Commands for Adding or Removing Weld Symbol Leader Lines:** Learn how to add or remove leader lines from automatic and manual, simple or combined weld symbols. See [Weld Symbol Leader Lines](#).
- **New Management Tools Default to Automatically Combine Weld Symbols:** Automatically combine weld symbols corresponding to welds connecting elements with the same single part numbers. See [Create a Combined Weld Symbol](#).

3D MODELING

- **New Panelized Monowills Connection:** Use the new panelized monowills connection to create monowills railings with a max panel size, easier to fabricate and ship on site. See [Place a Monowills Panelized Hand-Railing](#).
- **New Switch Connection Object Pattern Commands:** Easily transform a connection object type pattern into a different one, using contextual menu options. See [Switch Connection Object Patterns](#).
- **New Messaging Framework for User Section Creation:** Changed the display of results and corresponding error messages for generating user sections. This information is now handled in the Data Panel, similarly to the results of part numbering and clash check analysis. See [Check Generated User Sections](#).
- **Grip Point Extension for Beam Elements:** You can now modify the length of beam elements by using the end grip points, without inadvertently changing the direction of the element. Using the Lengthen command or the Extension object snap, you can easily do this, regardless of the orientation of the element or the coordinate system. See [Modify the Beam Length Using End Grip Points](#).
- **New Filter Options for Detailed Parts:** You can now use the Search Filter to find the model elements detailed as single part and/or main part. See [Search for Detailed Parts in the Model](#).

There are many enhancements and fixes for Advanced Steel 2021.

You will find the list in this web page:

<https://knowledge.autodesk.com/support/advance-steel/learn-explore/caas/CloudHelp/cloudhelp/2021/ENU/AdvSteel-WhatsNew/files/GUID-D64995B8-B423-4CB7-8B9D-9C46F3C88081-htm.html>

And in Philippe Bonneau Blog:

<https://blogs.autodesk.com/revit/2020/04/16/whats-new-in-advance-steel-2021/#:~:text=In%20Advance%20Steel%202021%2C%20you%20have%20more%20flexibility%20when%20using,role%20and%20even%20user%20attributes.>

Dynamo for Revit, RSA and Advance Steel

Dynamo for Revit Structural

Many classes focus on how Dynamo software could be used in the structural design. One AU class which is extremely helpful was done by Marcello Sgambelluri.

<https://www.autodesk.com/autodesk-university/class/Dynamo-Structure2017#downloads>

Other Dynamo for Revit Structural links are listed in the Reference session of this handout.

Dynamo for RSA

Dynamo Plug-in for Robot Structural Analysis is a free technology preview that allows designers and engineers to drive Robot Structural Analysis or React Structures from Dynamo. The plug-in helps designers to create parametric and complex structural frames models in Dynamo, submit it to Robot Structural Analysis or React Structures for simulation and review the results returned from the analysis. The technology preview includes an executable and a package.

To learn more about using Dynamo with RSA, check this link:

<https://knowledge.autodesk.com/support/robot-structural-analysis-products/learn?sort=score&s=dynamo&page=1>

Dynamo for Advance Steel

The Dynamo Extension for Advance Steel adds the functionalities of Dynamo to Advance Steel, to quickly generate complex structures using Advance Steel beams and plates. Materials, beam sections or user attributes can be assigned from Dynamo to the generated elements to minimize the number of steps required for modeling.

A Dynamo package called “Autodesk Steel Connections” is now available. It enables Dynamo to control steel connections creation, streamlining the modeling of steel buildings in Revit. It can identify similar geometrical conditions for placing standard and custom connections.

Learn more about Installing the Steel Connections for Dynamo in Revit 2021:

[Install the Extension](#)

BIM 360 Best Practices

Project Name, Revit Models Versions and Access

Make a habit of opening the Docs and Design Collaboration in different browser tabs, so you can check them simultaneously

Be aware of the Revit version: with Design Collaboration, you cannot access the project through Revit unless you are using the correct version of Revit. So, if you need to do any model management through Revit (such as Publish, or Relinquish) or simply opening the model, you need to know the version of Revit first, because once a model is saved into your Collaboration service (Design Collaboration) it is now only accessible by that version of Revit.

This also cause issues with users trying to open the model through Revit, they may believe they are not invited to, or they do not have Design Collaboration Entitlement because they cannot see the project through Revit while opening the file. That could simply be because they are not in the right version of Revit.

It is a good practice to add the Revit version to the project name and the Revit models. This way if someone needs to access the model, they immediately know the version to use (for opening the model or to do model management through Revit).

Model Placeholder

As mentioned above, the BIM360 project is only accessible by that version of Revit, BUT

When a BIM360 project is first created, that project is in version limbo until it is imprinted to a version of Revit, once the first cloud workshared model is saved to that project, that project is then imprinted to that version of Revit and can only be upgraded to a newer version from project admin module.

Before a model is saved to that project, that limbo project runs the risk of someone saving the wrong version of Revit to that limbo site, so if the project was intended to be a BIM360 Design Collaboration project for Revit 2020, but then a user saves a Revit 2021 model, that project is now imprinted for Revit 2021 cloud model files (Oh No).

So, what we tend to do is create a BIM360 project (Example 999-99999 – ABC Hotel – R20), then before we invite anyone else to the Project site, we save a blank placeholder model for the intended version of Revit “Placeholder – R20.rvt”, this way there is no possibility of having the wrong version of Revit saved to the project and being imprinted incorrectly.

Files Upgrade

Project administrators can upgrade Revit Cloud Models from the Project Admin module using the Revit Cloud Upgrade function.

Revit users should not access or edit cloud models in a BIM 360 project during the upgrade process.

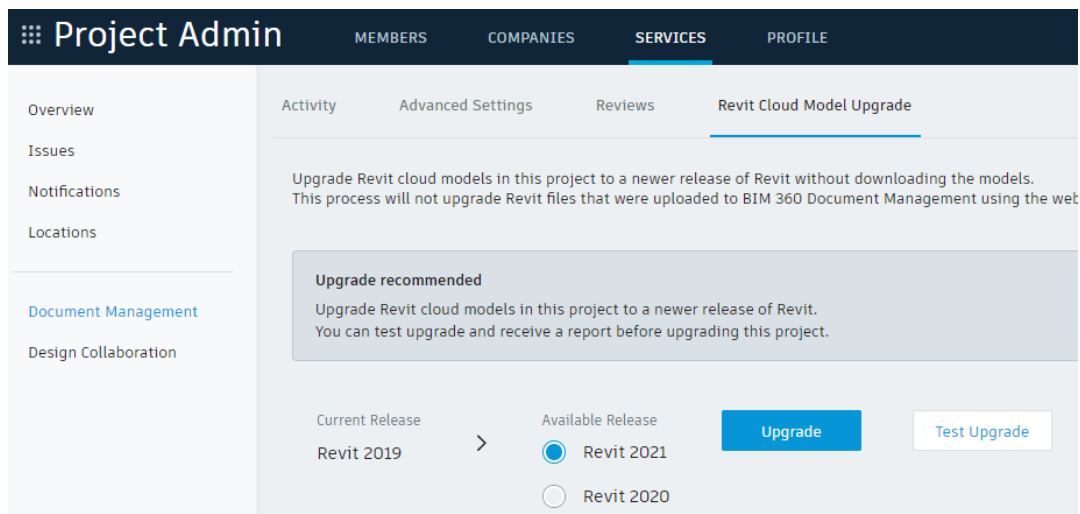


Figure 22

You can find additional information on upgrading Revit cloud models [here](#)

Naming Convention

Revit files uploaded to BIM 360 Docs using the web interface or the Desktop Connector do not get upgraded with the “Revit Cloud Model Upgrade” function. It would be helpful to add the Revit version to those files as a suffix.

Autodesk Desktop Connector (ADC)

A great addition to the BIM360 environment. Using ADC, you can mimic your company’s folder structure on the cloud, rename and delete project folders, upload documents and be sure the files will be on the cloud when you get online again, you can also download documents to work offline.

With the latest version of ADC, AutoCAD files are uploaded on the cloud with their XREF connection maintained.

Did you know:

- Did you know you can now drag and drop an empty folder structure using windows explorer into the ADC?

Caveats/Concerns with ADC (Autodesk Desktop Connector)

Desktop Connector does not support file paths longer than 244 characters. This is due to Microsoft's file path length limit of 260 characters for files and 247 characters for folders.

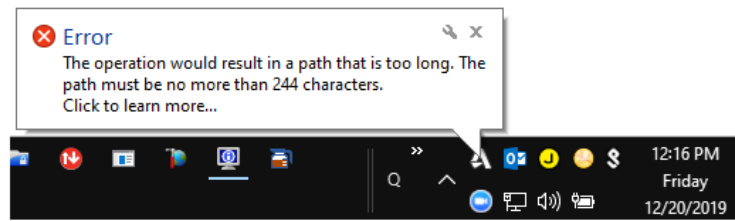


FIGURE 23

The ADC is there to allow someone to drop a model there for others to link to, this is more of an unmanaged model file, it is not intended to save a work directly through the ADC.

It's not intended to work directly from the ADC and save back to it, if this is done (for Central or even non-workshare models) you will get the typical backup files created in your ADC area and in your BIM360 site.

Something to be aware of with Models in ADC, if someone opens a model through the ADC, it will create the standard Central backup files (the ones that generally appear on Local servers) or the standard non-workshare backup files (Project1.0001.rvt)

Bad linking habits

You may find this an issue more with newer users to BIM360 Cloud Environment, linking in CAD and Revit models to your local LAN instead of placing the model/cad file on BIM360 and linking them to the cloud (ADC)

This will generally not be a problem if all team members are working on a BIM360 project and happen to be in the same office (on the same LAN and have the same drive mapping).

But it is an issue if you have external companies invited to the account that need to work on this model and do not have the same drive mapping,

Or they are on your network but are in different offices and all the above link need to be then pulled over the WAN (Gees this BIM360 thing is very slow).

So, if the team is distributed (multiple locations), it is recommended to place the models on **BIM 360** and link them from there.

There are three Revit Model Linking Methods in the BIM 360 environment:

Method 1 - Controlled Sharing - ‘Consume’ Published Models from Packages.

In this method, a team creates a “package”, “publish” it, so that other teams could “consume” it. (bring it) to their team “Consumed” folder.

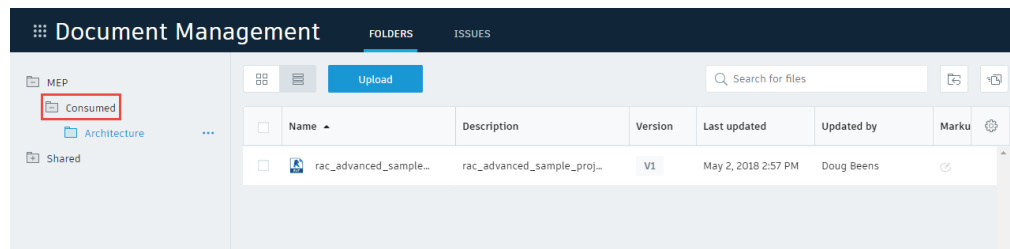


FIGURE 24

Method 2 - Controlled Sharing - Link from the Shared Folder

In this method, a team, (i.e. Mechanical) links a published model (i.e. Architectural) directly from the “Shared” folder.

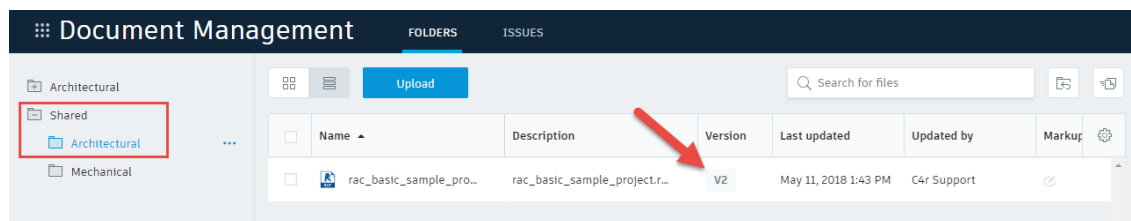


FIGURE 25

Method 3 - Live Linking

In this method, you are linking directly to another team's model where they are actively making “live” changes to the model.

Membership Roles

When creating Members, you may find that using just the companies allows you more flexibility than using the roles.

Some of the default roles in BIM 360 are too vague. You may want to create more roles to be assigned to members (i.e. create *Electrical Engineer* role instead of using the default *Engineer* role).

Where has all my hard drive space gone?

Working Cloud Services, especially BIM360 Design Collaboration we can quickly run out of local hard drive space. However, SSD hard drive allows for better efficiencies.

- New Free Up Space command allows users to remove local Desktop Connector workspace files and folders to free up disk space
For more information please refer to:
<https://knowledge.autodesk.com/support/desktop-connector/learn-explore/caas/CloudHelp/cloudhelp/ENU/CONNECT/files/CONNECT-What-s-New-in-Desktop-Connector-html.html>

Location of Local Cached Revit files:

C:\Users\%USERNAME%\AppData\Local\Autodesk\Revit\Autodesk Revit Version\CollaborationCache



FIGURE 26: LOCAL CACHED REVIT FILE LOCATION

Data in the model is Corrupt

You will also need to clear your cache from time to time if you receive the Corrupted error message when opening or saving a BIM360 model

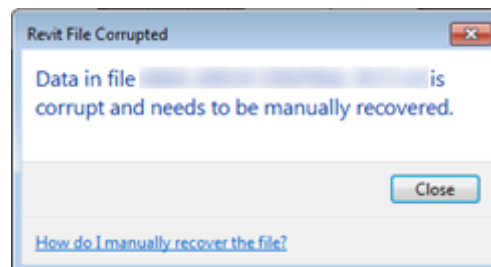


FIGURE 27

You will know this is the case when you talk with other team members that are working with the same workshared model and they DO NOT have issues, it probably means the model (or a linked model) is corrupt

In this case delete that cache and try re-opening, 90% of the time this does the trick, otherwise you will need to access your Versions through the Manage Cloud Model through Revit.

Create BIM360 project to house your company standard content

Since there is no cost on the amount of cloud space used when using BIM360, just the cost for BIM360 Docs entitlement, you can create a BIM360 project and invite other team members in your company (that have the BIM360 Document Management Entitlement) to this project, here you can place all your company families, templates, and even the Revit OOTB Content.

In conjunction with the ADC, it is easy and efficient to access your Revit Company families, templates, dynamo files, etc.

BIM 360 Document Management for internal users

BIM 360 Docs can be used for design collaboration without the BIM 360 Design Collaboration module turned on.

This can be done with internal teams of a multidisciplinary firm collaborating on BIM 360 projects, so for instance if you need to design collaborate with Structure, Mechanical, Electrical teams within your firm on a BIM 360 project, you could create a BIM 360 Document Management project alone with no other modules.

This allows an easy setup and administration for a design team, with the addition of Managed Access (where BIM360 Docs is a High Trust access).

BIM 360 Docs and Design Modules:

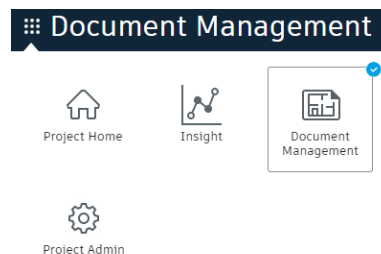


FIGURE 28 - BIM 360 Docs

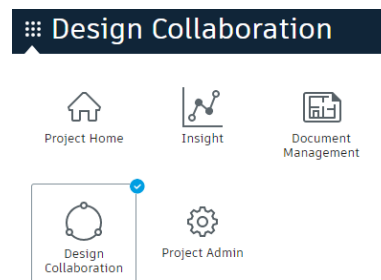


FIGURE 29: BIM 360 DESIGN

References

- BIM 360 Design Workflow for Revit, Robot Structural Analysis, and Advance Steel
<https://www.autodesk.com/autodesk-university/class/2020-Workflow-BIM-360-Revit-Robot-Structural-Analysis-Advance-Steel-and-Dynamo-2019>
- Steel Fabrication Transfer from Revit to Advance Steel—Under the Hood
<https://www.autodesk.com/autodesk-university/class/Steel-Fabrication-Transfer-Revit-Advance-Steel-Under-Hood-2019>
- A Better Structural Workflow: Integrated Design, Analysis, and Detailing
<https://www.autodesk.com/autodesk-university/class/Better-Structural-Workflow-Integrated-Design-Analysis-and-Detailing-2019>
- Best practices for working remotely in bim 360 design
<https://projectdelivery.autodesk.com/blog/working-remotely-bim-360-design/>
- BIM 360 to the MAT (Management, Administration, and Troubleshooting)
<https://www.autodesk.com/autodesk-university/class/BIM-360-MAT-Management-Administration-and-Troubleshooting-2019>
- Tips and Tricks to Enhance BIM 360 Productivity
<https://www.autodesk.com/autodesk-university/class/Tips-and-Tricks-Enhance-BIM-360-Productivity-2019>
- Setting Up and Using Desktop Connector with BIM 360 Docs
<https://www.autodesk.com/autodesk-university/class/Setting-and-Using-Desktop-Connector-BIM-360-Docs-2019>
- Structural Dynam(o)ite: Optimized Design and Fabrication Workflows with Dynamo
<https://www.autodesk.com/autodesk-university/class/Structural-Dynamoite-Optimized-Design-and-Fabrication-Workflows-Dynamo-2018>
- Advance Steel for BIM: Seamless Workflow from Design to Fabrication
<https://www.autodesk.com/autodesk-university/class/Advance-Steel-BIM-Seamless-Workflow-Design-Fabrication-2018>
- More Dynamo for Structure
<https://www.autodesk.com/autodesk-university/class/More-Dynamo-Structure-2018>
- Automated Structural Load Calculation Using Dynamo and Revit
<https://www.autodesk.com/autodesk-university/class/Automated-Structural-Load-Calculation-Using-Dynamo-and-Revit-2018>
- Dynamo for Structural Precast
<https://www.autodesk.com/autodesk-university/class/Dynamo-Structural-Precast-2018>

- Robot Structural Analysis Professional Structural Analysis—from Design to Calculation
<https://www.autodesk.com/autodesk-university/class/Robot-Structural-Analysis-Professional-Structural-Analysis-Design-Calculation-2017>
- Dynam(o)ite Your Steel Design
<https://www.autodesk.com/autodesk-university/class/Dynamoite-Your-Steel-Design-2017>
- Advance Steel Powered by the Magic of Dynamo
<https://www.autodesk.com/autodesk-university/class/Advance-Steel-Powered-Magic-Dynamo-2017>
- The Structural Design Workflow Based on Revit as a Core Platform with Dynamo
<https://www.autodesk.com/autodesk-university/class/Structural-Design-Workflow-Based-Revit-Core-Platform-Dynamo-2017>
- From Revit to FEM and Back-with Use of Dynamo
<https://www.autodesk.com/autodesk-university/class/Revit-FEM-and-Back-Use-Dynamo-2017>
- Dynamo for Structure
<https://www.autodesk.com/autodesk-university/class/Dynamo-Structure-2017>
- The Structural Design Workflow Based on Revit as a Core Platform with Dynamo
<https://www.autodesk.com/autodesk-university/class/Structural-Design-Workflow-Based-Revit-Core-Platform-Dynamo-2017>
- Conceptual Structural Design Using Revit Adaptive Components and Dynamo
<https://www.autodesk.com/autodesk-university/class/Conceptual-Structural-Design-Using-Revit-Adaptive-Components-and-Dynamo-2017>
- Dynamo for Advance Steel—Hands-On for Beginners
<https://www.autodesk.com/autodesk-university/class/Dynamo-Advance-Steel-Hands-Beginners-2017>
- Daily Dynamo: Innovative Solutions to Everyday Structural Problems
<https://www.autodesk.com/autodesk-university/class/Daily-Dynamo-Innovative-Solutions-Everyday-Structural-Problems-2016>
- Extended Workflows with Advance Steel
<https://www.autodesk.com/autodesk-university/class/Extended-Workflows-Advance-Steel-2016>
- Precast Building Design Using Revit, Robot Structural Analysis, and Dynamo
<https://www.autodesk.com/autodesk-university/class/Precast-Building-Design-Using-Revit-Robot-Structural-Analysis-and-Dynamo-2016#downloads>

- Extended Structural Workflow Integration Between AutoCAD Plant 3D, Revit Structure, Robot Structural Analysis, and Advance Steel
<https://www.autodesk.com/autodesk-university/class/Extended-Structural-Workflow-Integration-Between-AutoCAD-Plant-3D-Revit-Structure-Robot>
- Dynam(o)ite Your Design for Engineers
<https://www.autodesk.com/autodesk-university/class/Dynamoite-Your-Design-Engineers-2015>
- Dynam(o)ite Your Design from Concept to Fabrication
<https://www.autodesk.com/autodesk-university/class/Dynamoite-Your-Design-Concept-Fabrication-2015>
- Steel Fabrication Element Transfer
<https://knowledge.autodesk.com/support/revit-products/learn-explore/caas/CloudHelp/cloudhelp/2020/ENU/Revit-AddIns/files/GUID-912942CC-9126-4135-B098-0ABE912A5F27-htm.html>