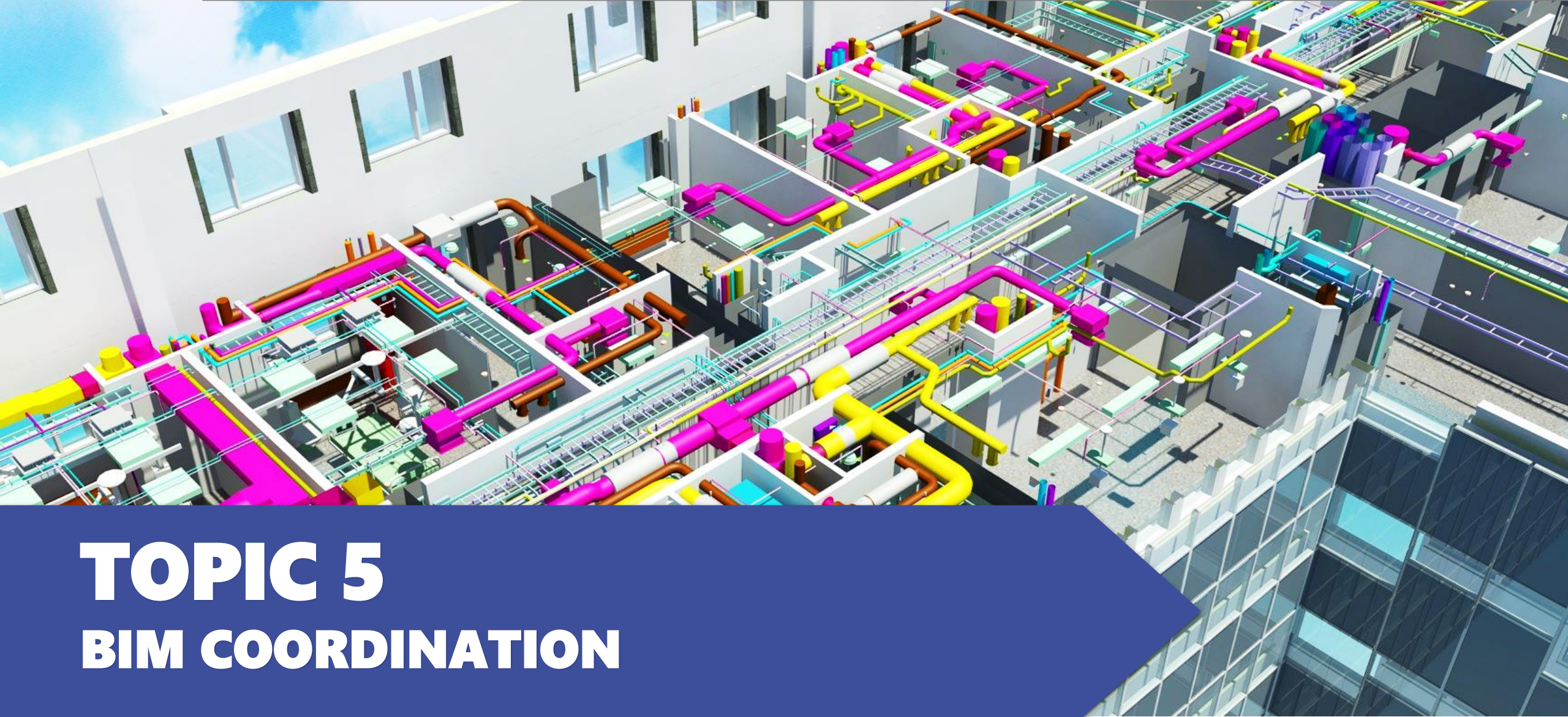




TOPIC 5

BIM COORDINATION

DCC50562 **BIM** COURSE MODULE

TOPIC 5

BIM COORDINATION

This module is prepared for the Polytechnics students to gain better understanding of the introduction to Building Information Modelling (BIM). It is structured in basic fundamental and step by step approach consist of the following:

- Tools and software to start the BIM Coordination
- Compile Architecture, Structure and MEP Projects
- Locate and manage interferences
- Design Review
- Form Clash Analysis
- Report Clash Results

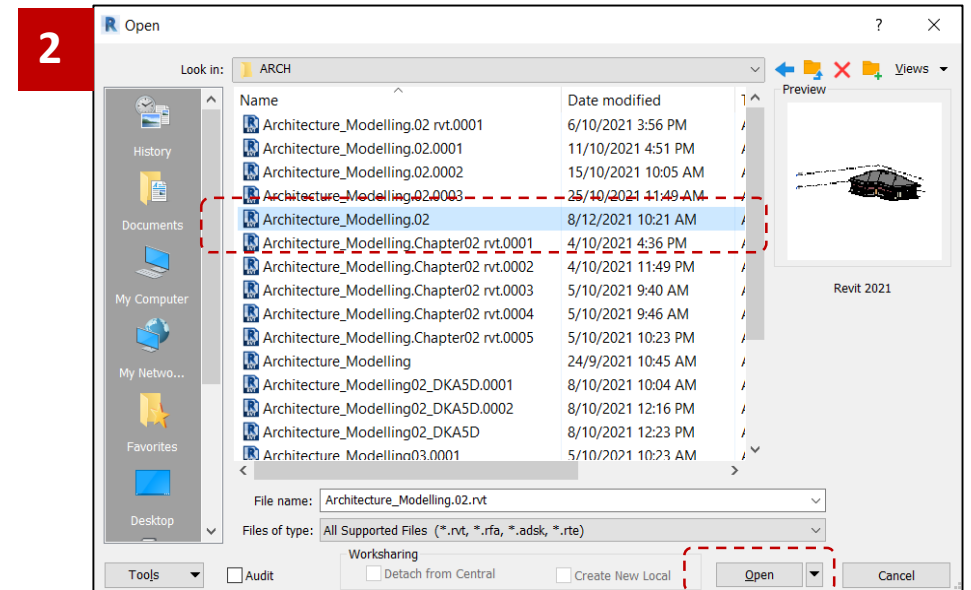
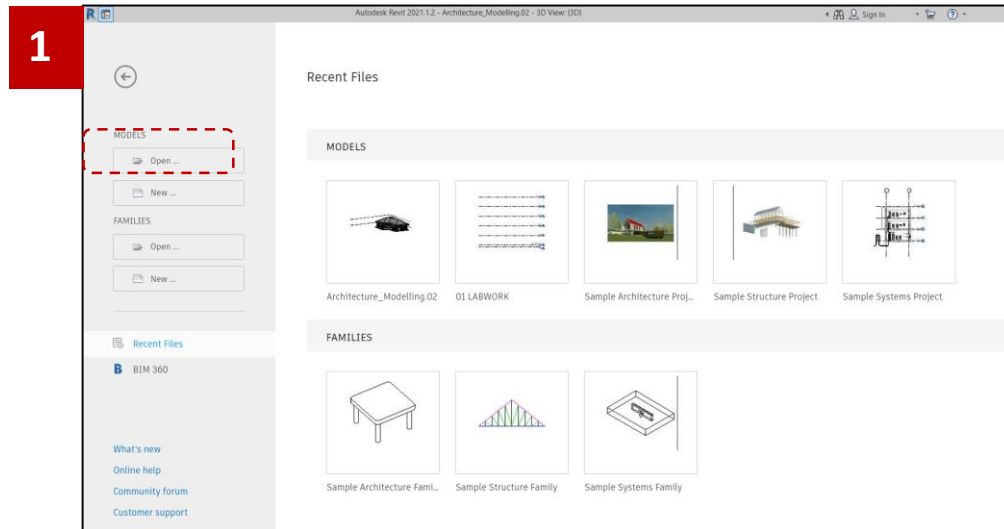


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POLITEKNIK
MALAYSIA

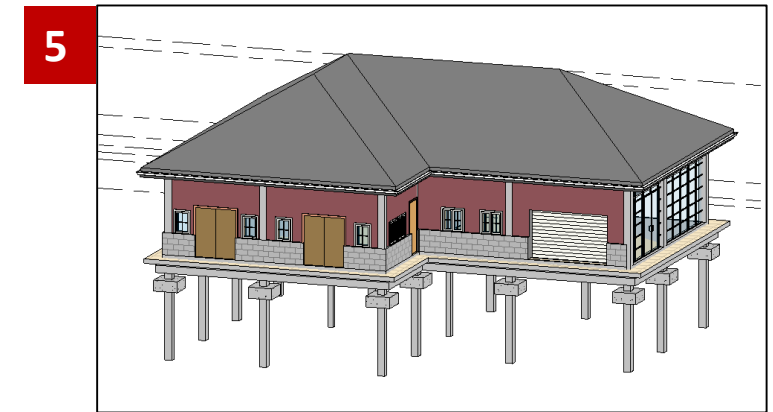
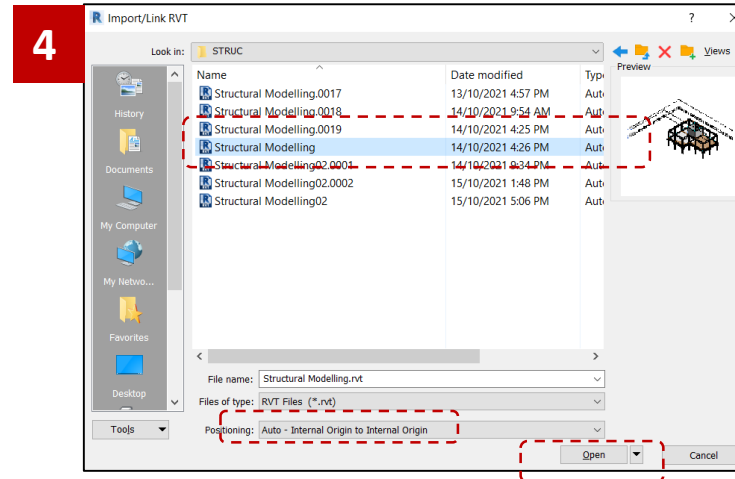
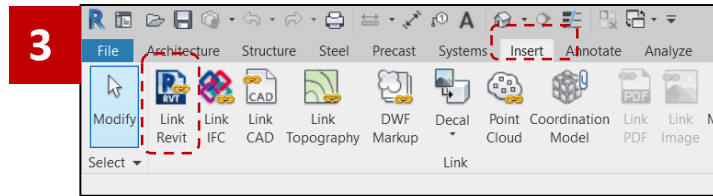
TOOLS AND SOFTWARE TO START THE BIM COORDINATION

START THE PROJECT



1. Click **Open Models**.
2. Choose **Architecture Modelling** file as host model *(or other project)*.

START THE PROJECT



3. On Insert Tab, select **Link Revit**.

4. Choose **Structural Modelling** to be linked in Architecture Modelling. *(can be link to other file regarding to project)*

5. The **linked model** shown in drawing area.



KEMENTERIAN PENGAJIAN TINGGI

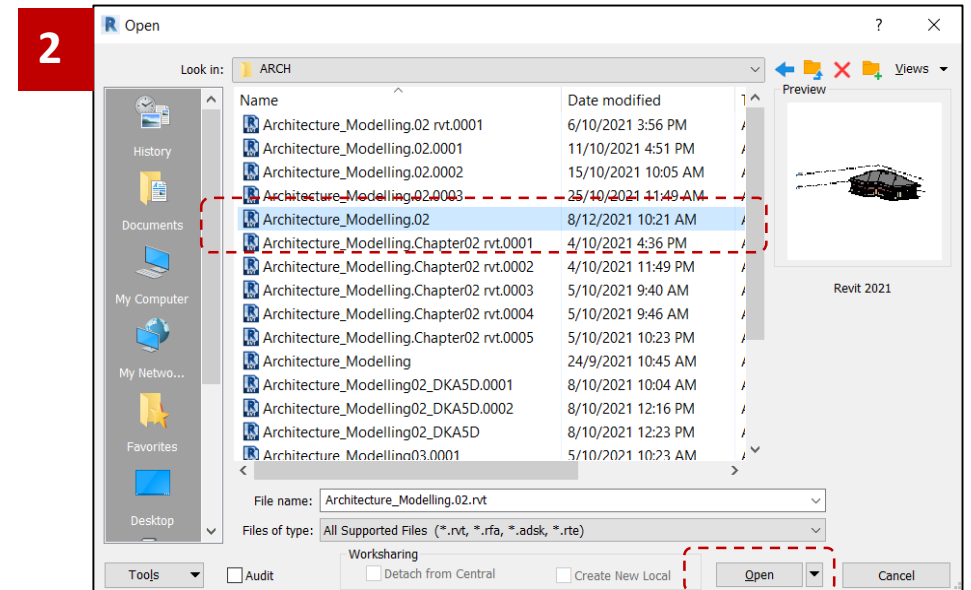
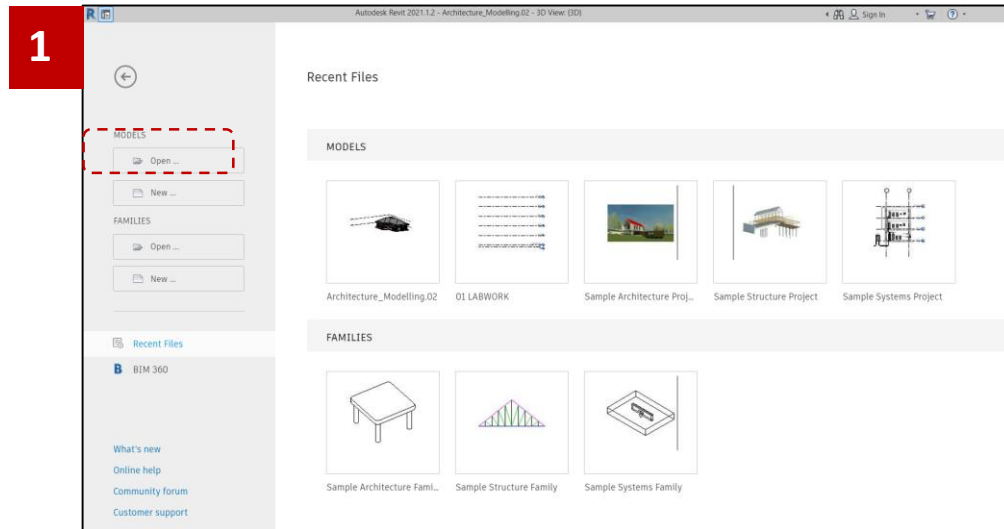


COMPILE ARCHITECTURE, STRUCTURE AND PLUMBING PROJECTS

BIM COORDINATION

- Coordination by interference check and design review is used **to locate invalid intersections between elements in a model.**
- This tool can be used during the design process **to coordinate major building elements and systems.**
- It also can be used **to prevent conflicts and reduce the risk of construction changes and cost overruns.**
- **Interference Check tool** can find intersections amongst a set of selected elements or from all elements in the model. If desired, you can select the required elements in a view.

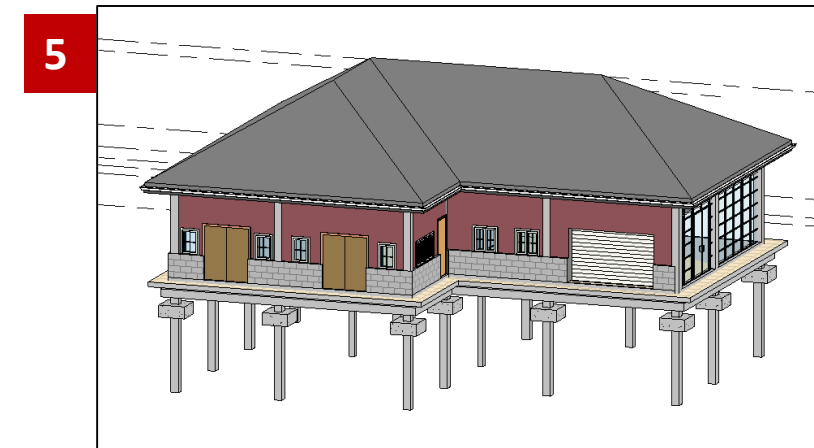
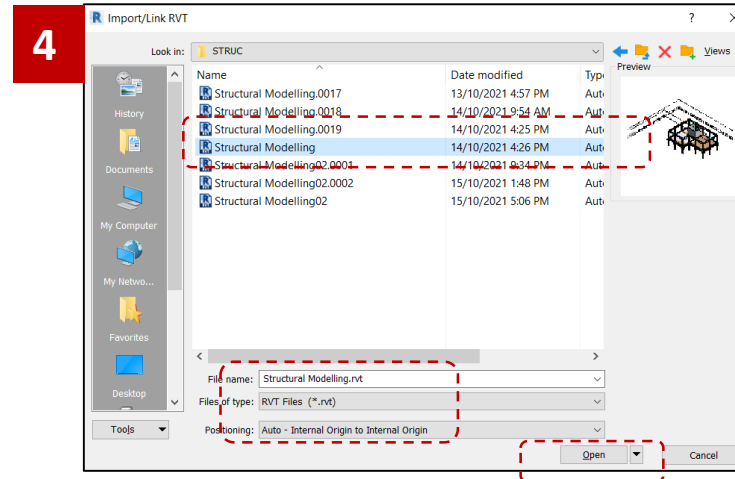
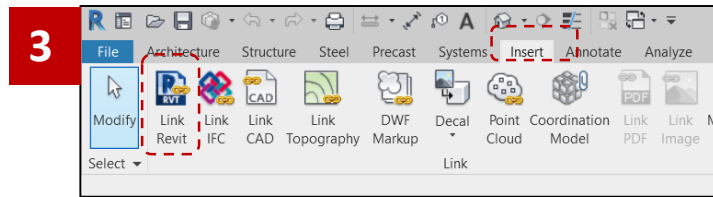
BIM COORDINATION



1. Click **Open Model**.

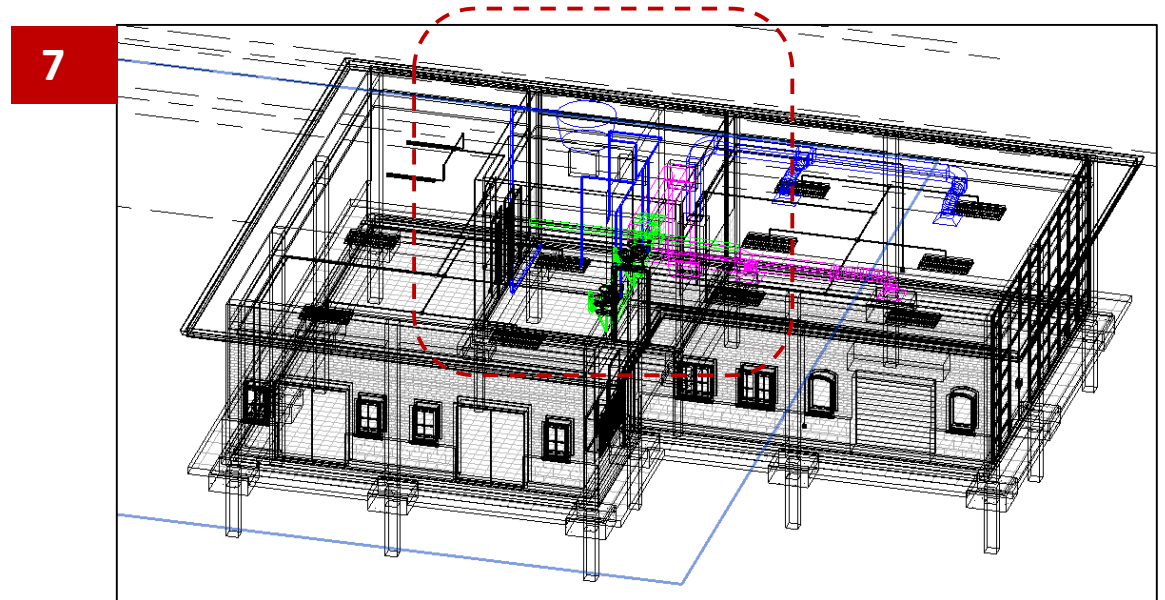
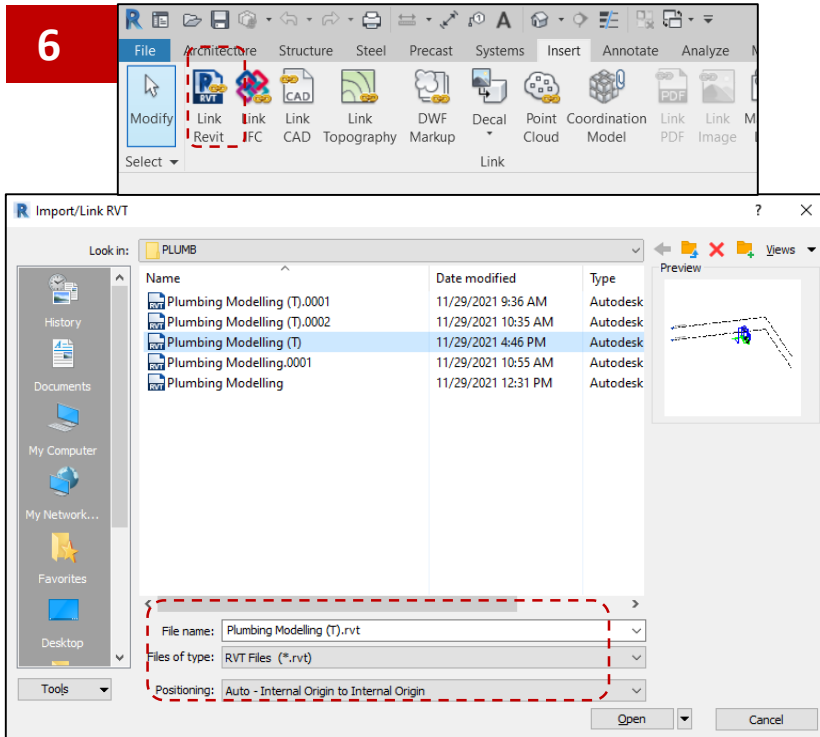
2. Select **Architectural Modelling** and **Open**.

BIM COORDINATION



3. Click **Insert Tab** and **Link Revit**.
4. Select **Structural Modelling** and **Auto: Internal Origin to Internal Origin** then click **Open**.
5. **Linked model** shown in drawing area.

BIM COORDINATION



6. Repeat Step 3 & 4 for Plumbing Modelling.

7. Linked model as shown in drawing area.



LOCATE AND MANAGE INTERFERENCES

TYPICAL WORKFLOW FOR INTERFERENCE CHECKING

- This tool can be used during the design process to coordinate major building elements and systems. Use it **to prevent conflicts and reduce the risk of construction changes and cost overruns.**
- The following is a **common workflow**:
 - i. An architect meets with a client and **creates a basic model.**
 - ii. The building model is sent to a team that includes members from other disciplines, such as structural engineers. They **work on their own version of the model.** Then the architect **links it in and checks for interferences.**
 - iii. Team members from other disciplines return the model to the architect.
 - iv. The architect **runs the Interference Check tool** on the existing model.
 - v. A **report is generated** from the interference check, and **undesired intersections are noted.**
 - vi. The design team **discusses the interferences and creates a strategy** to address them.
 - vii. One or more team members are assigned to **fix any conflicts.**

ELEMENTS REQUIRING INTERFERENCE CHECKING

Some examples of elements that could be checked for interference include the following:

- Structural girders and purlins.
- Structural columns and architectural columns.
- Structural braces and walls.
- Structural braces, doors, and windows.
- Roofs and floors.
- Specialty equipment and floors.
- A linked Revit model and elements in the current model ***(we will focus on this elements)***

Note: MEP fabrication parts and detailed steel modeling elements are not included during interference checking. The recommended workflow is to use Navisworks. ***(But in this course, we only use Autodesk Revit in Interference Checking)***

PROCESS OF INTERFERENCE CHECKING IN REVIT

- Revit features allow its users to **conduct clash test between the model elements of a host model.**
- In other words clashes can be recognized or identified by Revit users **for a single model.**
- And clashes can also be detected and identified **between host model and a linked model.**
- For example **mechanical engineer links electrical model** to his mechanical model in Revit, then he can identify the interference between the model elements of **HVAC systems and wiring system.**
- So when mechanical engineer links electrical model to this mechanical model, '**mechanical model**' is considered as **host model** and **electrical model** will be referred as **linked model.**
- Similarly **electrical engineer can also link plumbing model** to this electrical model in Revit for determining clashes **between model elements of power distribution systems and piping system.**



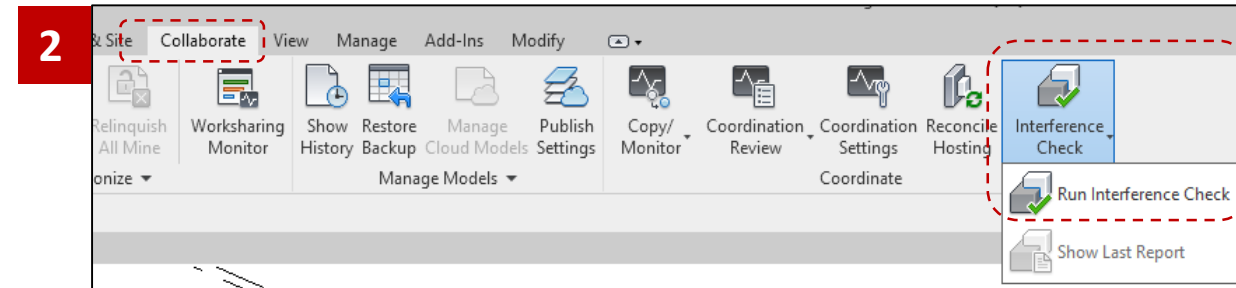
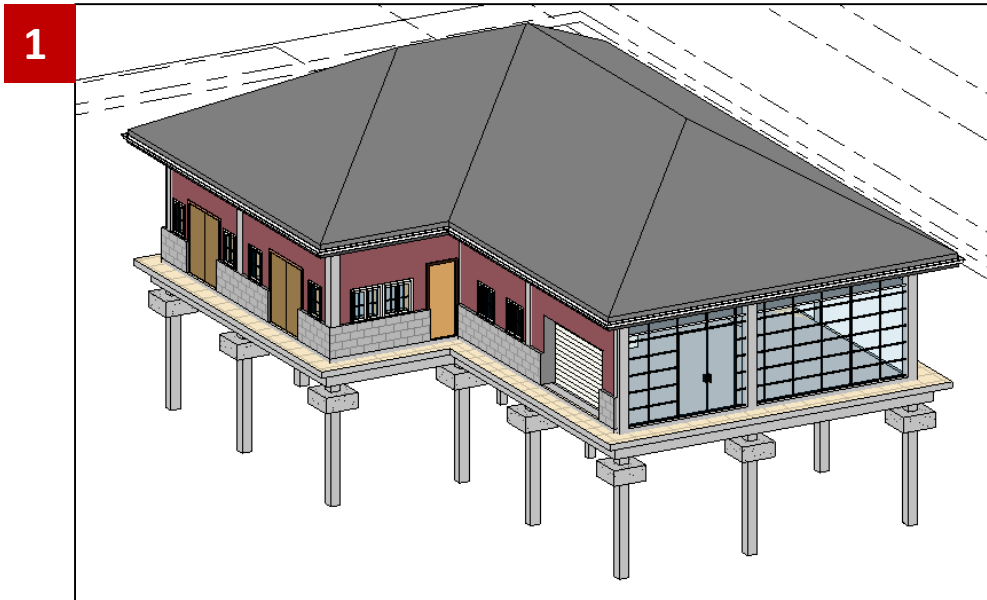
KEMENTERIAN PENGAJIAN TINGGI



DESIGN REVIEW

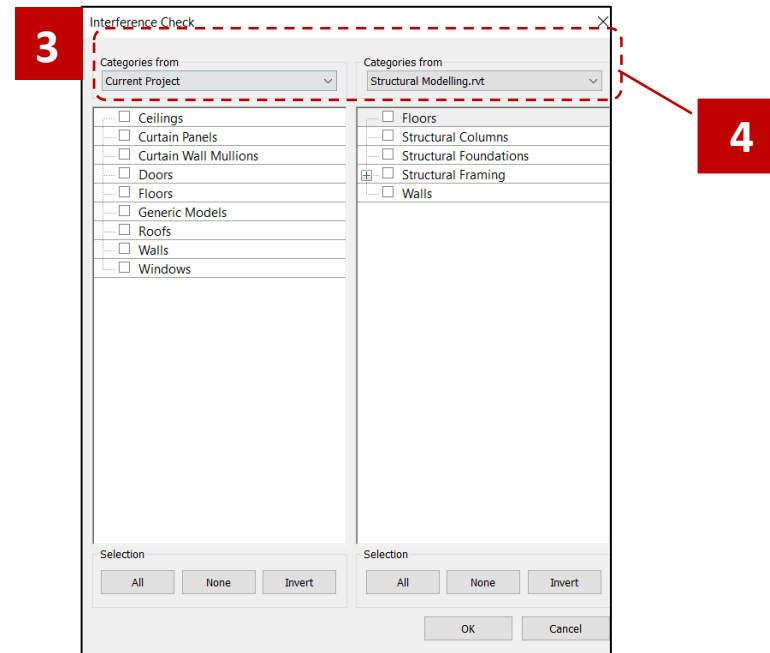
HOW TO RUN INTERFERENCE CHECKING IN REVIT?

For example:



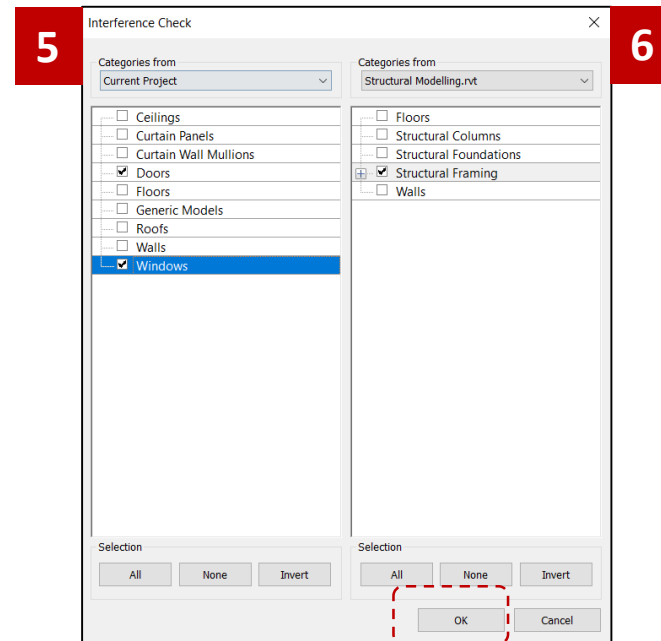
1. Open the Architecture Modelling and linked to Structural Modelling.
2. To get it started, click **Collaborate tab > Coordinate panel > Interference Check drop-down > (Run Interference Check)**

HOW TO RUN INTERFERENCE CHECKING IN REVIT?



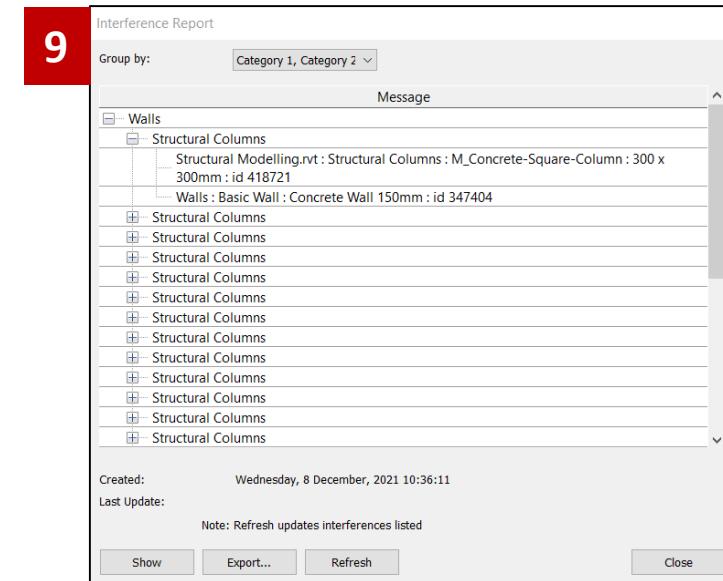
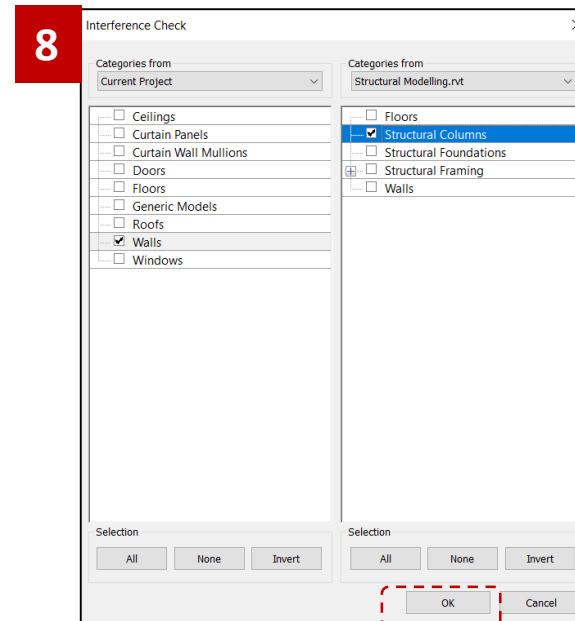
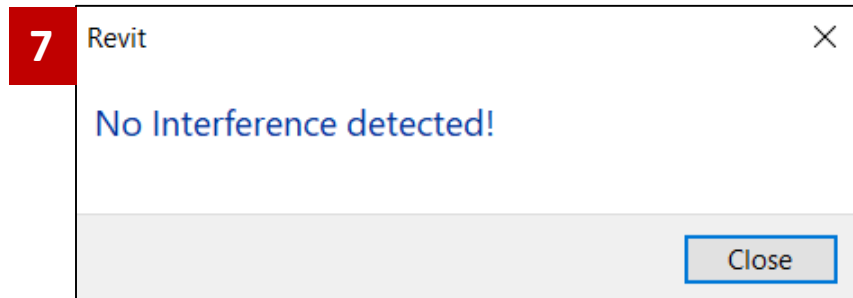
3. When the Interference Check dialog opens, if you selected any elements in the view, the dialog is filtered to display only those element categories. If you did not select any elements, the dialog displays all categories from the current project.
4. For example, **Architecture Modelling** will be the current project (left side) while **Structural Modelling** will be the linked project (right side).

HOW TO RUN INTERFERENCE CHECKING IN REVIT?



5. On the **left side of the dialog**, select Current Project, then select the desired categories. In this example, we'll select **Doors and Windows** as the category.
6. On the **right side of the dialog**, select the second Categories from drop-down. (This value could be a current selection of elements, the current project, or a linked Revit model). **Structural Framing** was selected and click **OK** to run the check.

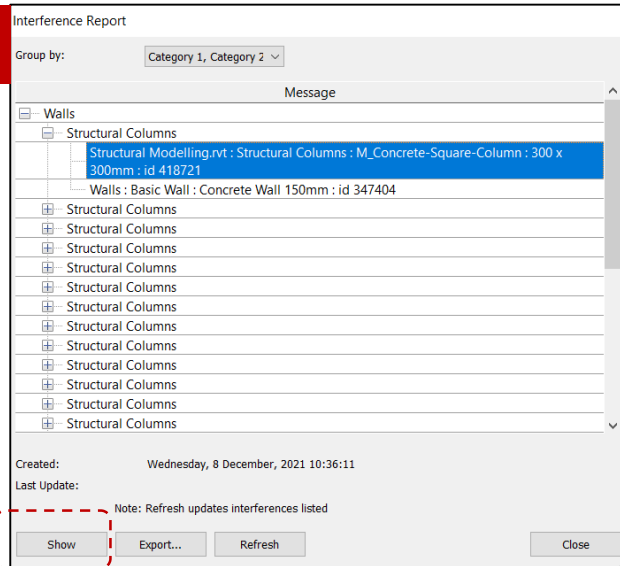
HOW TO RUN INTERFERENCE CHECKING IN REVIT?



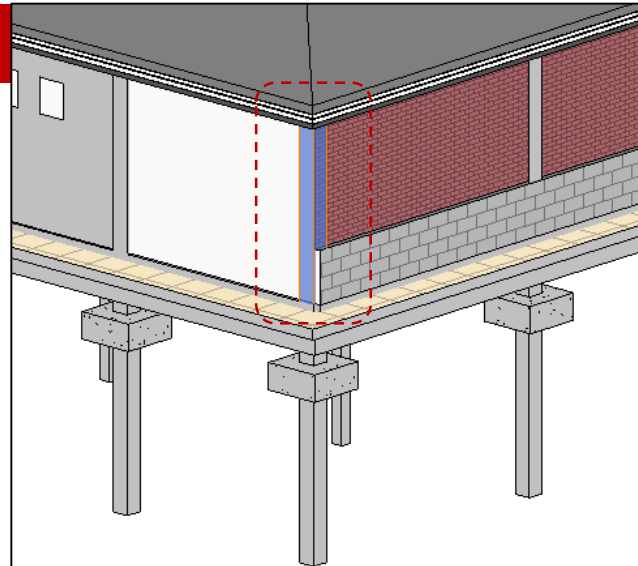
7. If there are **no interferences** a **dialog window** informs you of this.
8. **Choose** another categories for Interference Checks. For example **Walls and Structural Column (or any categories)**.
9. If there are interferences to report, the **Interference Report dialog displays**. This dialog lists all elements that conflict with one another.

HOW TO RUN INTERFERENCE CHECKING IN REVIT?

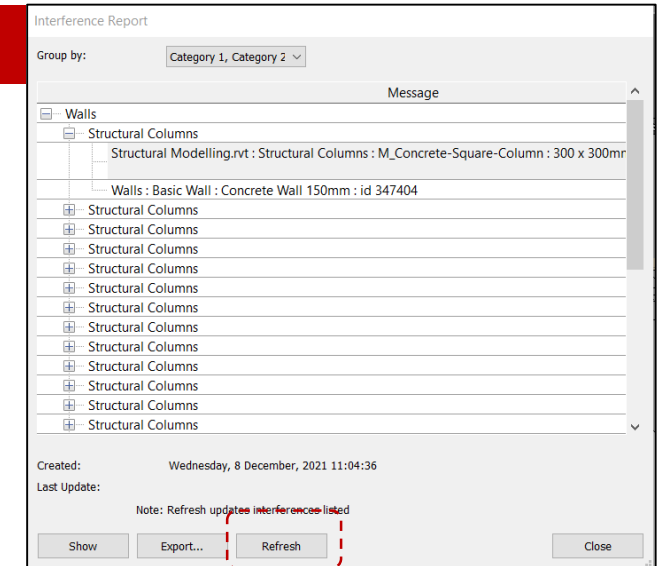
10



11



12



10. **Click** any element to show interference in model.

11. The **highlighted element** in the model is representing the clashing element. (***There is no issue in the interference because it is a valid connection/intersection between Structural Column and Basic Wall***)

12. After **fix** the interference, **click refresh** to update the interference report.

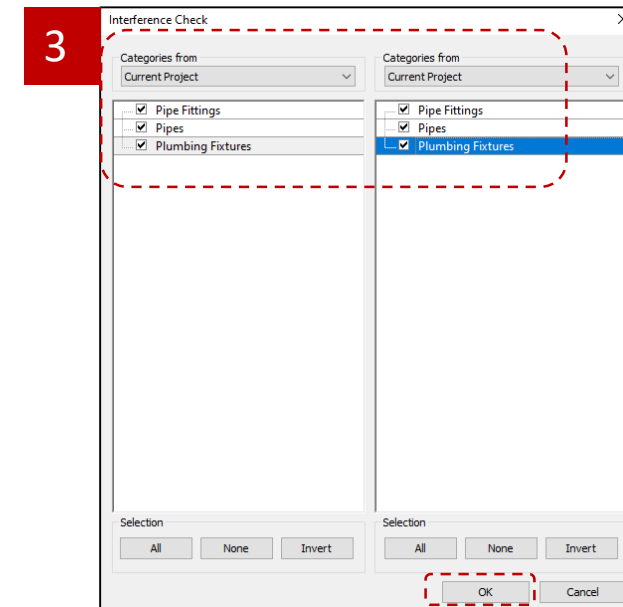
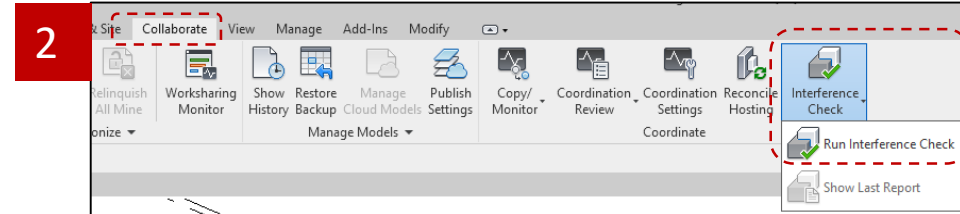
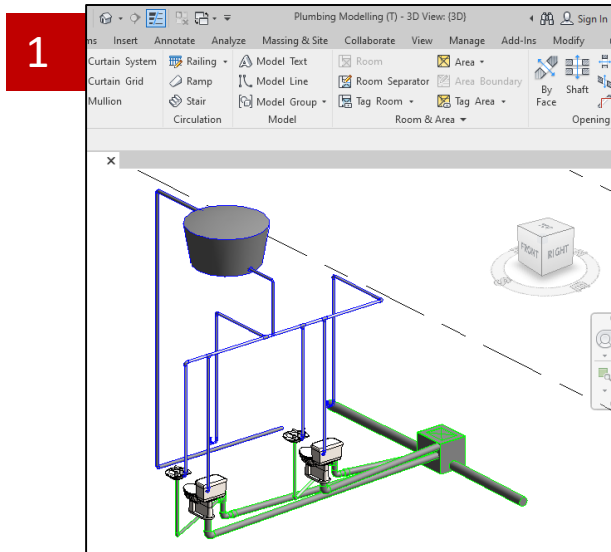
INTERFERENCE CHECK TIPS

- Processing time for interference checks **can vary greatly**.
- In a large model, **checking all categories against each other can take a long time** and is not recommended.
- **To reduce** processing time, select a limited set of elements or a limited number of categories.
- **To run** a check on all available categories, click All in the Interference Check dialog, and then select one of the check boxes next to a category.
- **Click None** to clear the selection of any categories.
- **Click Invert** to change the selection between categories that are currently selected and those that are not.

DESIGN REVIEW

Plumbing – CWS & SPS

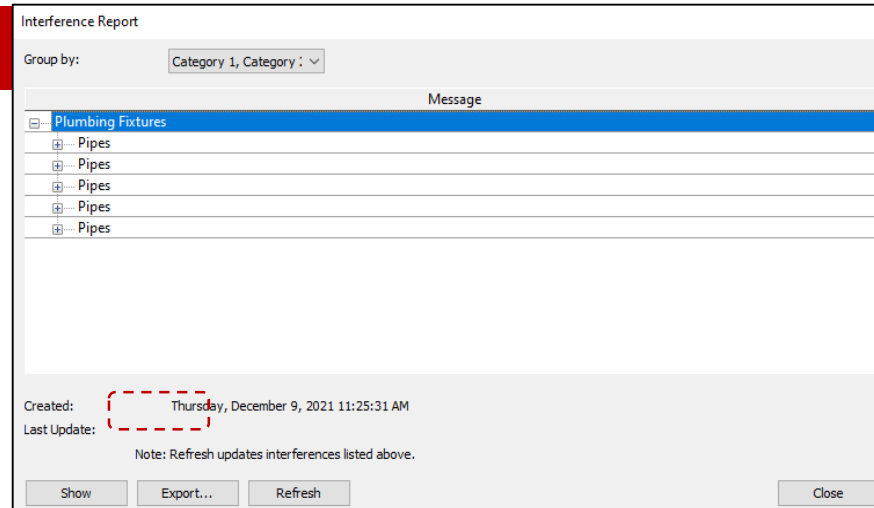
FORM CLASH ANALYSIS (PLUMBING SYSTEM – CWS & SPS)



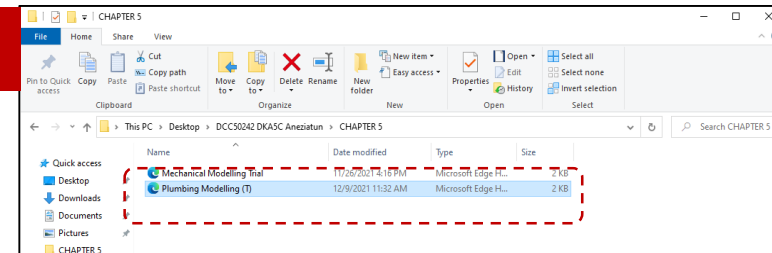
1. Open **Plumbing System**.
2. In **Collaborate Tab**, click **Interference Check > Run Interference Check**.
3. On dialog box, check **all component** in categories. Then **OK**.

REPORT CLASH RESULT (PLUMBING SYSTEM – CWS & SPS)

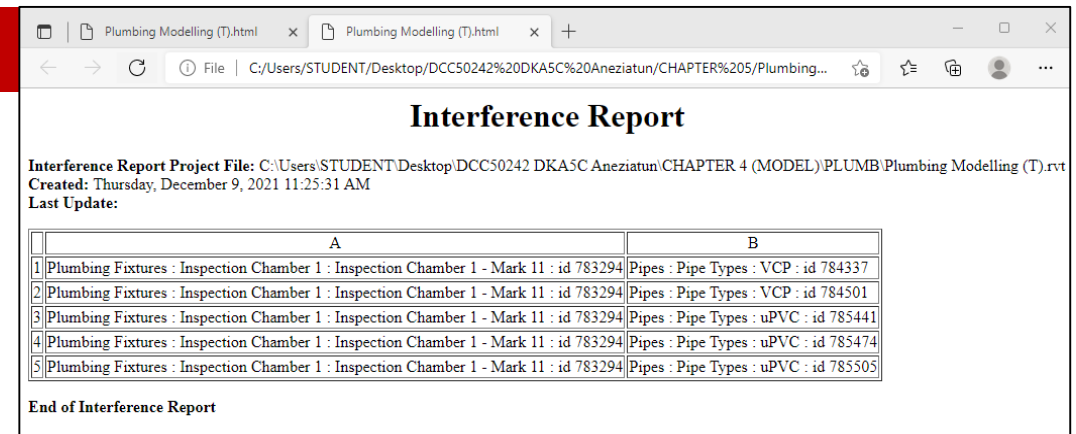
4



5



6

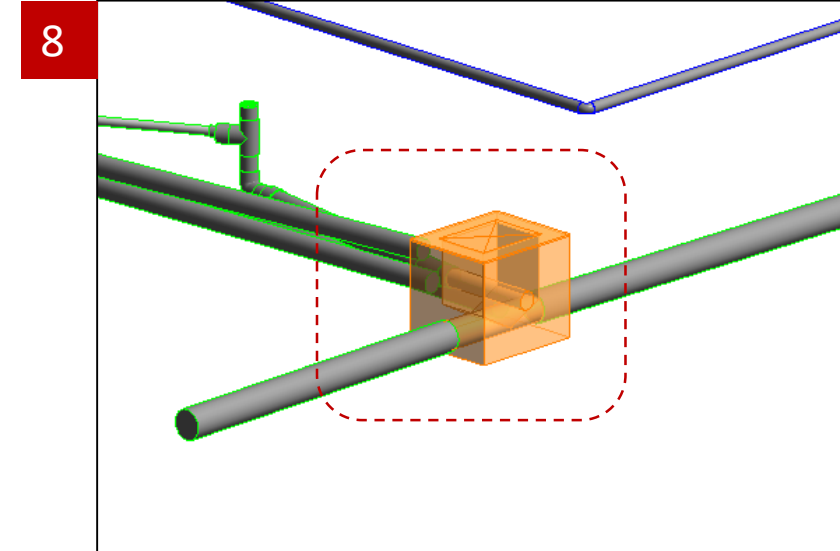
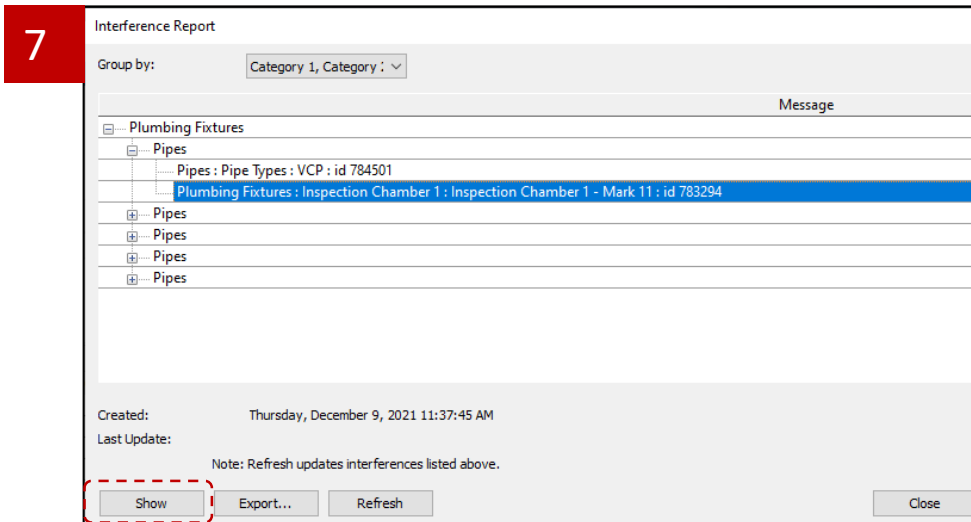


4. Interference Report generated and click **Export**.

5. Enter a name, navigate to the desired folder to save the report, and click **Save**.

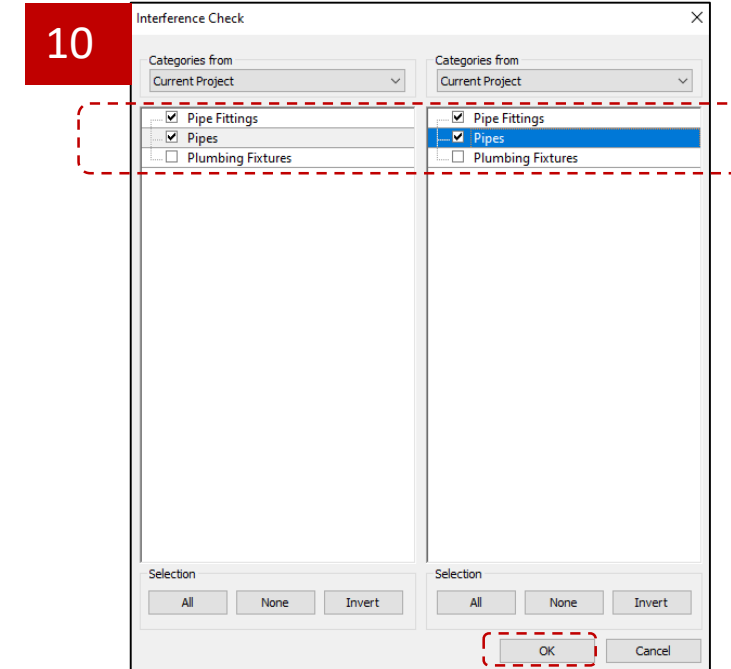
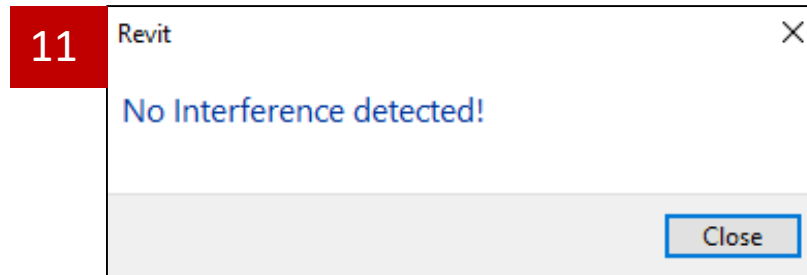
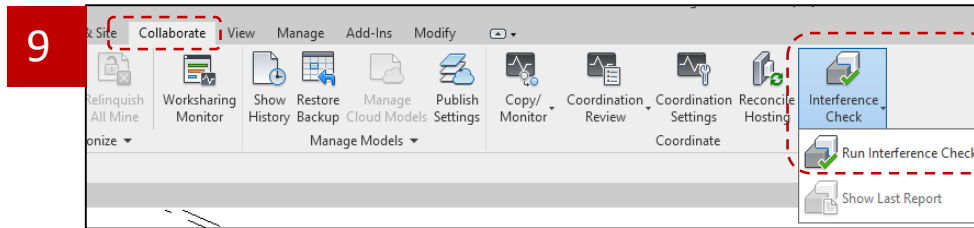
6. **Open** the interference report and **review**.

FORM CLASH ANALYSIS (PLUMBING SYSTEM – CWS & SPS)



7. **Select** any component in report and **Show**.
8. Clashed item will be **highlighted** as shown in diagram. *(There is no issue in the interference because it is a valid connection/intersection between Pipes and Inspection Chamber)*

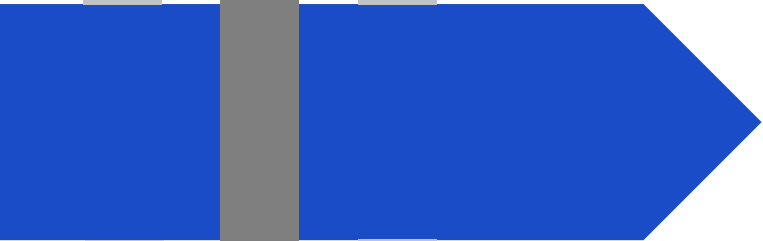
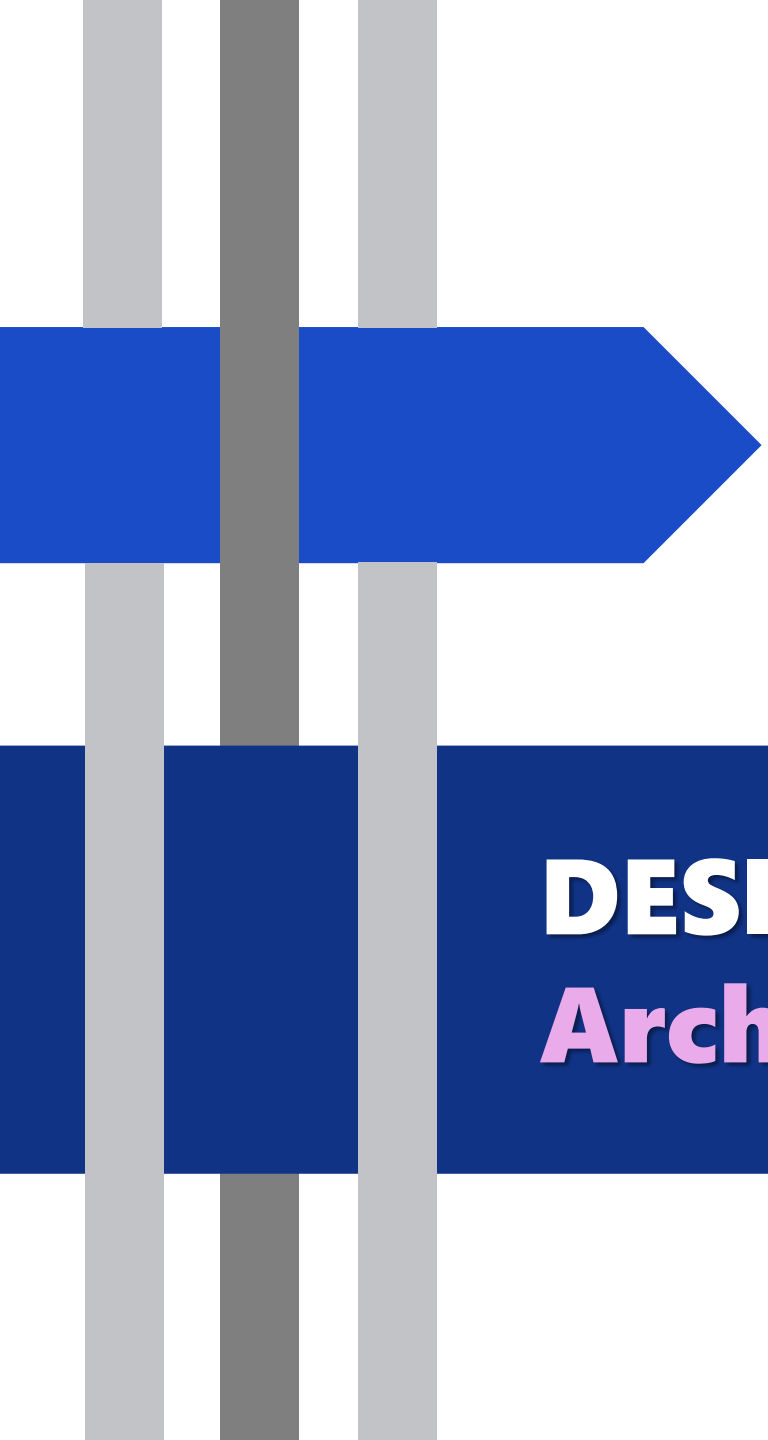
FORM CLASH ANALYSIS (PLUMBING SYSTEM – CWS & SPS)



9. **Repeat** for other categories.

10. **Select** categories as shown.

11. It shows **No interference detected** between CWS and SPS piping system.

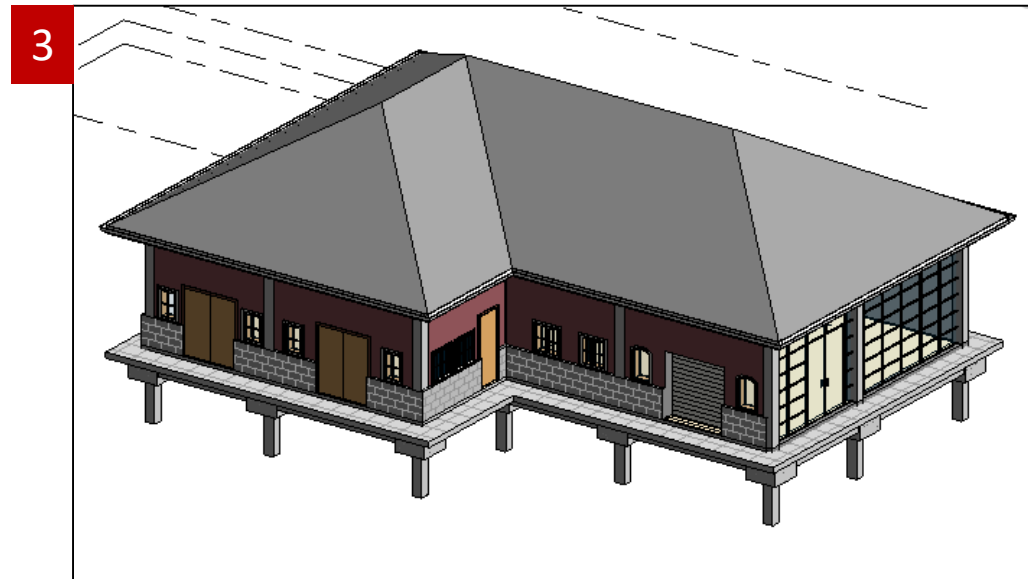
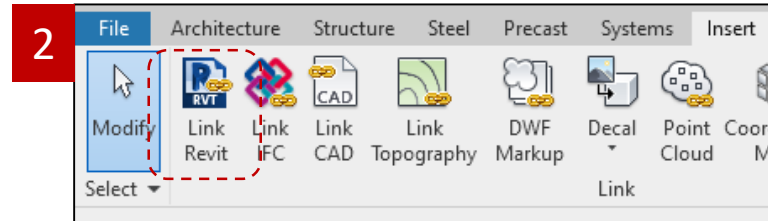
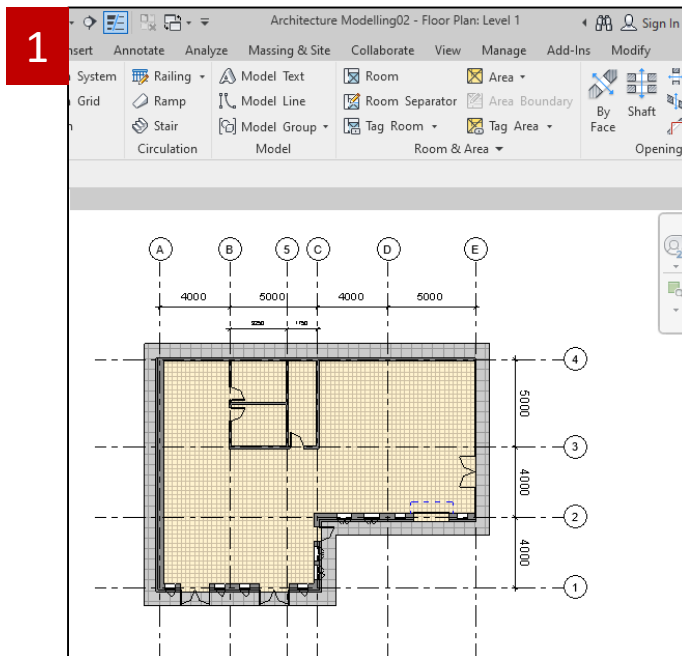


DESIGN REVIEW

Architectural - Structural



BIM COORDINATION (ARCHITECTURAL PROJECT – STRUCTURAL PROJECT)



1. **Open** Architecture Modelling.
2. On **Insert Tab**, click **Link Revit**.
3. **Linked model** shown in drawing area.

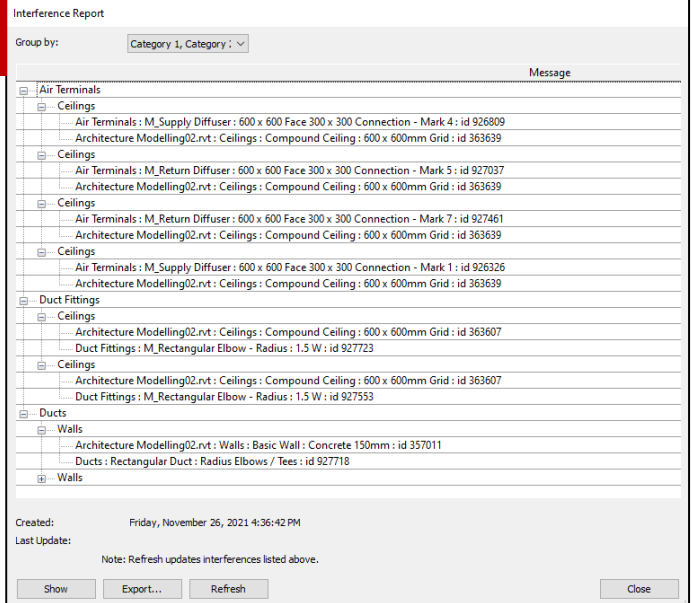
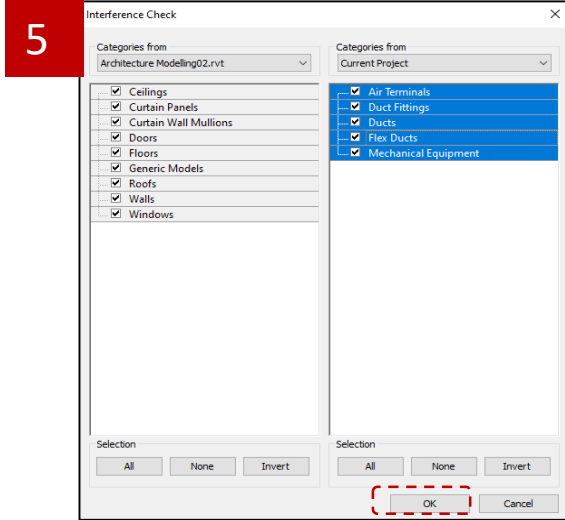
FORM CLASH ANALYSIS (ARCHITECTURAL PROJECT – STRUCTURAL PROJECT)

4 On **Collaborate Tab**, click **Interference Check** > **Run Interference Check**.

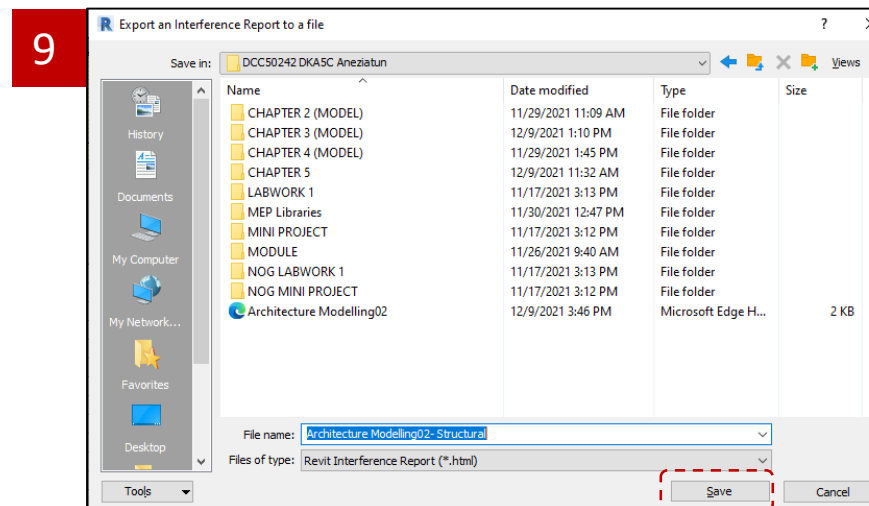
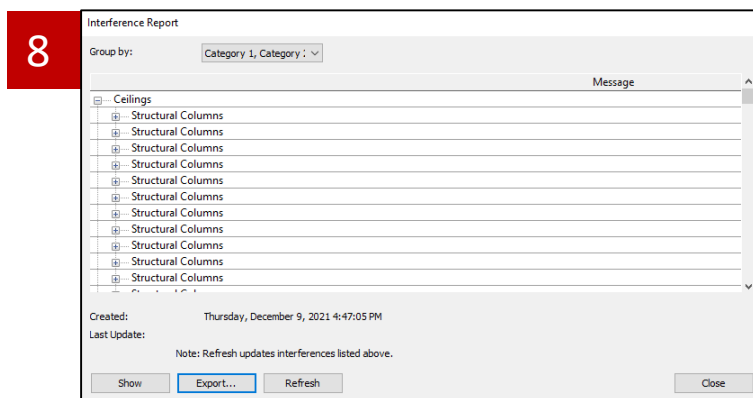
5 On **Interference Check Dialog Box**, for left sided **Categories from**, choose **Architecture Modelling02.rvt** on the drop down and **check all items**.

6 On the **right sided Categories from**, select **Current Project** on the drop down. **Check all items** as shown and click **OK**.

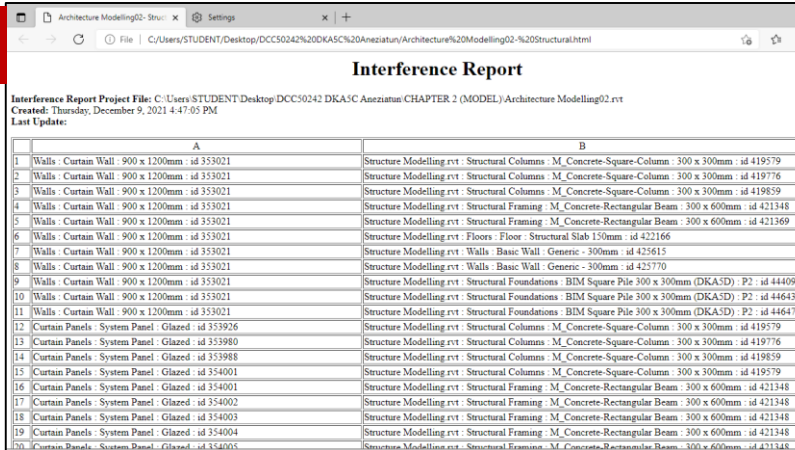
7 The **Interference report** was generated.



REPORT CLASH RESULT (ARCHITECTURAL PROJECT – STRUCTURAL PROJECT)



10



	A	B
1	Walls : Curtain Wall : 900 x 1200mm : id 353021	Structure Modelling.rvt : Structural Columns : M_Concrete-Square-Column : 300 x 300mm : id 419579
2	Walls : Curtain Wall : 900 x 1200mm : id 353021	Structure Modelling.rvt : Structural Columns : M_Concrete-Square-Column : 300 x 300mm : id 419776
3	Walls : Curtain Wall : 900 x 1200mm : id 353021	Structure Modelling.rvt : Structural Columns : M_Concrete-Square-Column : 300 x 300mm : id 419859
4	Walls : Curtain Wall : 900 x 1200mm : id 353021	Structure Modelling.rvt : Structural Framing : M_Concrete-Rectangular Beam : 300 x 600mm : id 421348
5	Walls : Curtain Wall : 900 x 1200mm : id 353021	Structure Modelling.rvt : Structural Framing : M_Concrete-Rectangular Beam : 300 x 600mm : id 421369
6	Walls : Curtain Wall : 900 x 1200mm : id 353021	Structure Modelling.rvt : Floors : Floor : Structural Slab 150mm : id 422166
7	Walls : Curtain Wall : 900 x 1200mm : id 353021	Structure Modelling.rvt : Walls : Basic Wall : Generic : 300mm : id 421615
8	Walls : Curtain Wall : 900 x 1200mm : id 353021	Structure Modelling.rvt : Walls : Basic Wall : Generic : 300mm : id 421570
9	Walls : Curtain Wall : 900 x 1200mm : id 353021	Structure Modelling.rvt : Structural Foundations : BIM Square Pile 300 x 300mm (DKA5D) : P2 : id 444098
10	Walls : Curtain Wall : 900 x 1200mm : id 353021	Structure Modelling.rvt : Structural Foundations : BIM Square Pile 300 x 300mm (DKA5D) : P2 : id 446430
11	Walls : Curtain Wall : 900 x 1200mm : id 353021	Structure Modelling.rvt : Structural Foundations : BIM Square Pile 300 x 300mm (DKA5D) : P2 : id 446474
12	Curtain Panels : System Panel : Glazed : id 353926	Structure Modelling.rvt : Structural Columns : M_Concrete-Square-Column : 300 x 300mm : id 419579
13	Curtain Panels : System Panel : Glazed : id 353980	Structure Modelling.rvt : Structural Columns : M_Concrete-Square-Column : 300 x 300mm : id 419776
14	Curtain Panels : System Panel : Glazed : id 353988	Structure Modelling.rvt : Structural Columns : M_Concrete-Square-Column : 300 x 300mm : id 419859
15	Curtain Panels : System Panel : Glazed : id 354001	Structure Modelling.rvt : Structural Columns : M_Concrete-Square-Column : 300 x 300mm : id 419579
16	Curtain Panels : System Panel : Glazed : id 354001	Structure Modelling.rvt : Structural Framing : M_Concrete-Rectangular Beam : 300 x 600mm : id 421348
17	Curtain Panels : System Panel : Glazed : id 354002	Structure Modelling.rvt : Structural Framing : M_Concrete-Rectangular Beam : 300 x 600mm : id 421348
18	Curtain Panels : System Panel : Glazed : id 354003	Structure Modelling.rvt : Structural Framing : M_Concrete-Rectangular Beam : 300 x 600mm : id 421348
19	Curtain Panels : System Panel : Glazed : id 354004	Structure Modelling.rvt : Structural Framing : M_Concrete-Rectangular Beam : 300 x 600mm : id 421348
20	Curtain Panels : System Panel : Glazed : id 354005	Structure Modelling.rvt : Structural Framing : M_Concrete-Rectangular Beam : 300 x 600mm : id 421348

8. Click **Export** to generate the report.

9. Enter a name, navigate to the desired folder to save the report, and click **Save**.

10. **View** the report to gain a better understanding.

REFERENCES

- Autodesk (2021), accessed 1 December 2021,
<https://help.autodesk.com/view/RVT/2015/ENU/?guid=GUID-890A9FE0-EFF4-4CFB-9E81-B0DE1A132BEC>
- Fundamental Modelling of Mechanical & Plumbing (2019). Training Module TBMA. CIDB Malaysia
- Yori R. et al., (2020). Mastering Autodesk® Revit® 2020. John Wiley & Sons, Inc.

An aerial, isometric view of a complex building structure, possibly a data center or industrial facility. The building is composed of numerous interconnected blocks and corridors. A dense network of colorful pipes and conduits, in shades of pink, yellow, orange, and blue, runs throughout the structure, connecting various components. The overall aesthetic is clean and modern, with a focus on the intricate layout of the infrastructure.

DCC50562 **BIM** COURSE MODULE

THANK YOU