

# Smarter MEP Coordination and MEP Design Verification by Dynamo

**Trang Chau**

Hydraulic Engineer | @Powell Fenwick - Building Services Consultants

# Speaker profile

- Hydraulic Engineer.
- B.E in Water supply and drainage & water environment.
- 5 years experience in building services industry (Hydraulic).
- Currently, full time working at Powell Fenwick Consultant (PFC).
- PFC provides multi-disciplinary services including mechanical, hydraulic, fire, acoustic, civil, structure, swimming pool disciplines.



# Q&A Moderator

- Phuc Le (Ken).
- Digital Consultant, Technologist, BIM expert & Application Developer.
- He currently serves as a Technical Specialist at Autodesk.
- Supporting firms and organizations in the AEC industry to successfully implement BIM, Cloud platform, Automation, and Digital Twin.



# Why do we have this class here today?

- We have a lot of interferences within various disciplines.
- We have numerous engineering rules.

# Class Summary

This class will illustrate two Dynamo tool examples to:

- Automatically detect clashes to coordinate with floor penetration locations.
- Automatically validate the MEP designs in compliance with building codes & standards (namely distances verification).

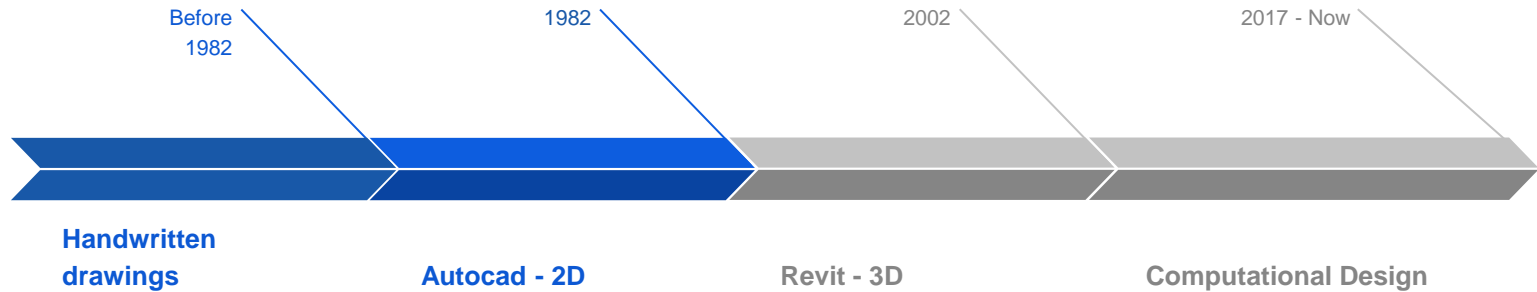
# Learning Objectives

At the end of this class, you will be able to:

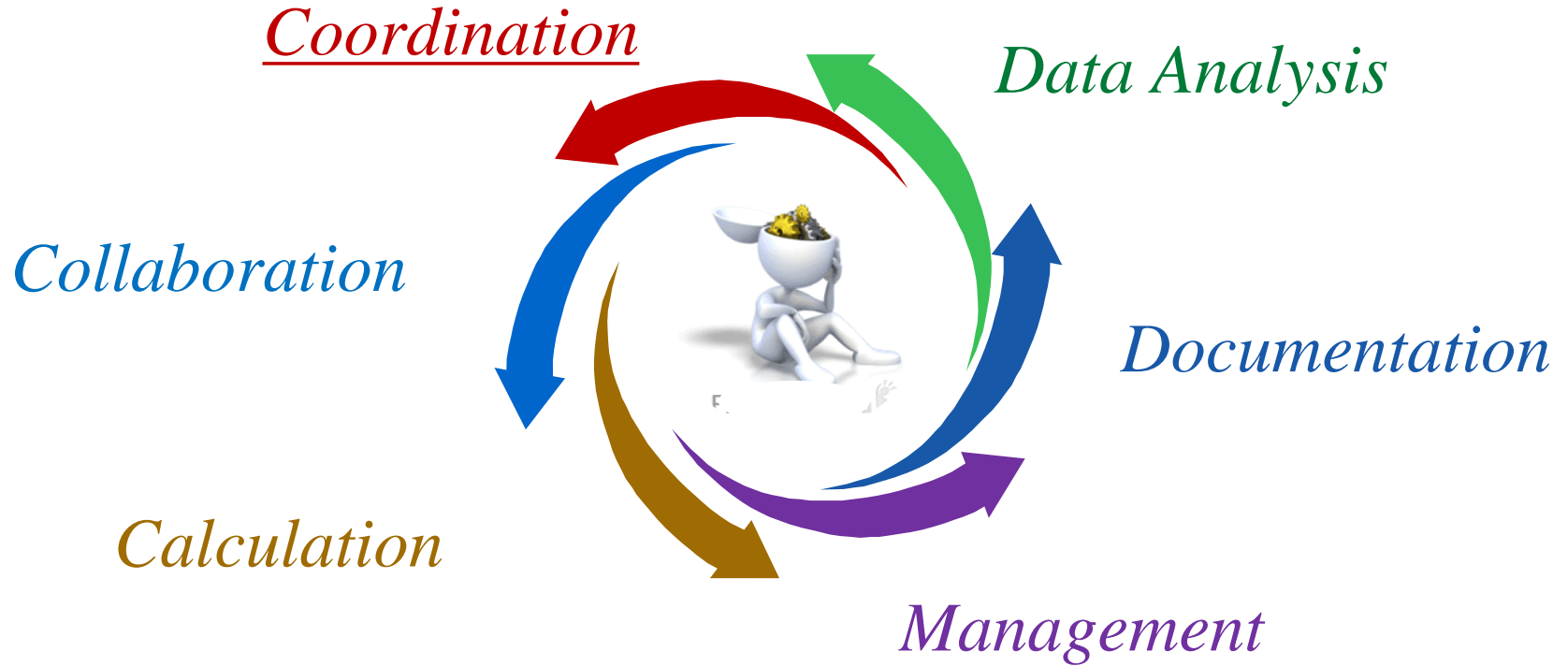
- Understand how Dynamo work fundamentally.
- Understand how to analyze BIM data to enhance interfaces between disciplines.
- Come up with your own ideas to generate your own automation tools.

# The summary of history - digitization process

*What will happen in the next 10 years???*



# What BIM data can provide?





# How we can analyze BIM data?

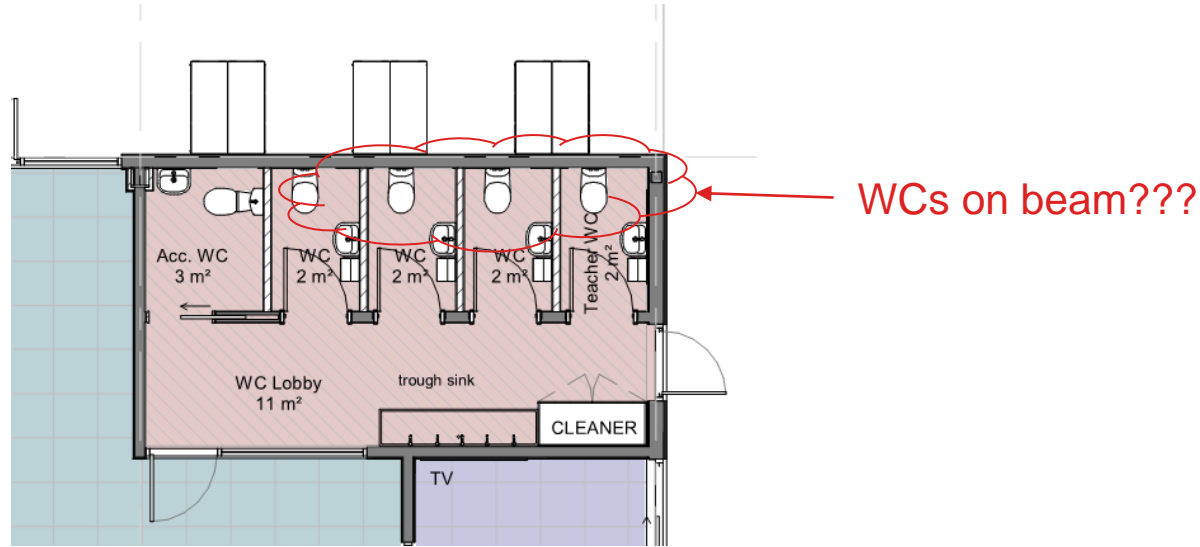


## Idea 1:

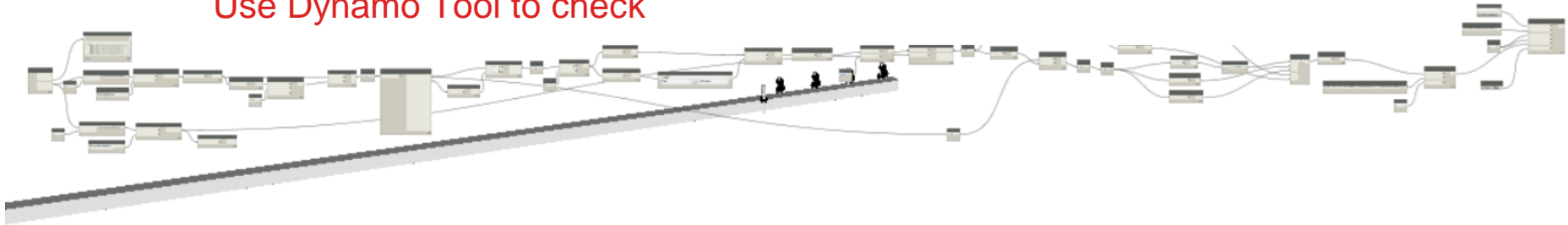


# Slab Penetration Coordination

# Idea one - Floor penetration coordination

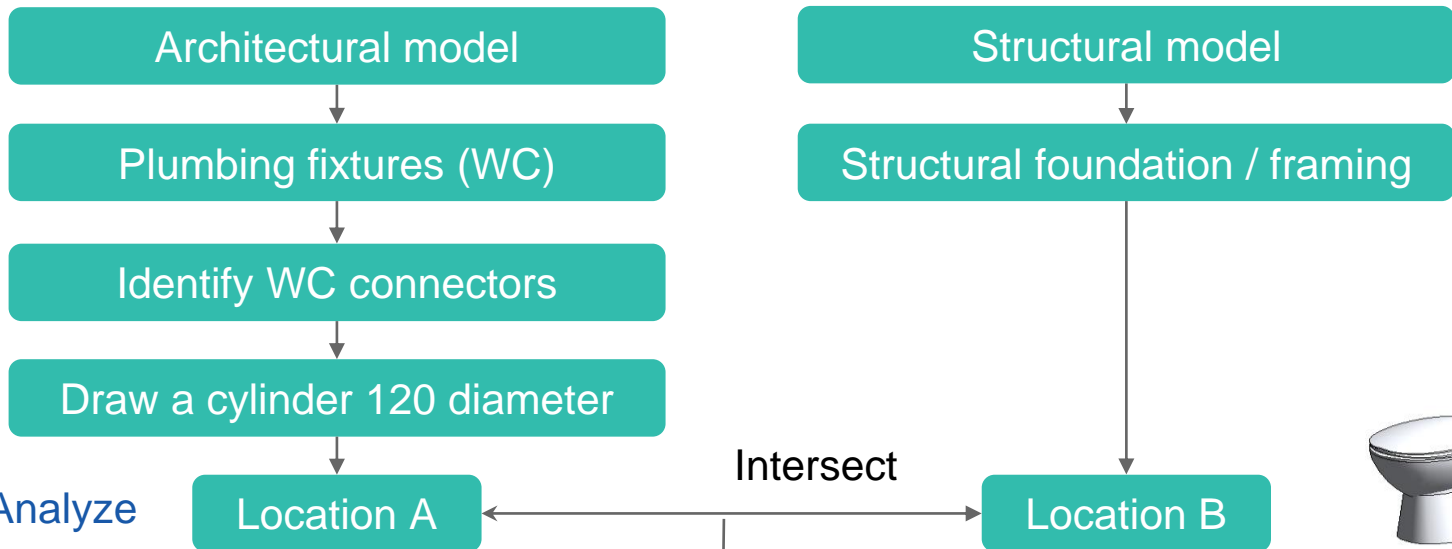


Use Dynamo Tool to check



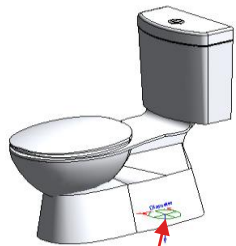
# Summary of the Dynamo Graph

## Step 1: Identify data



## Step 2: Analyze data

Clashes

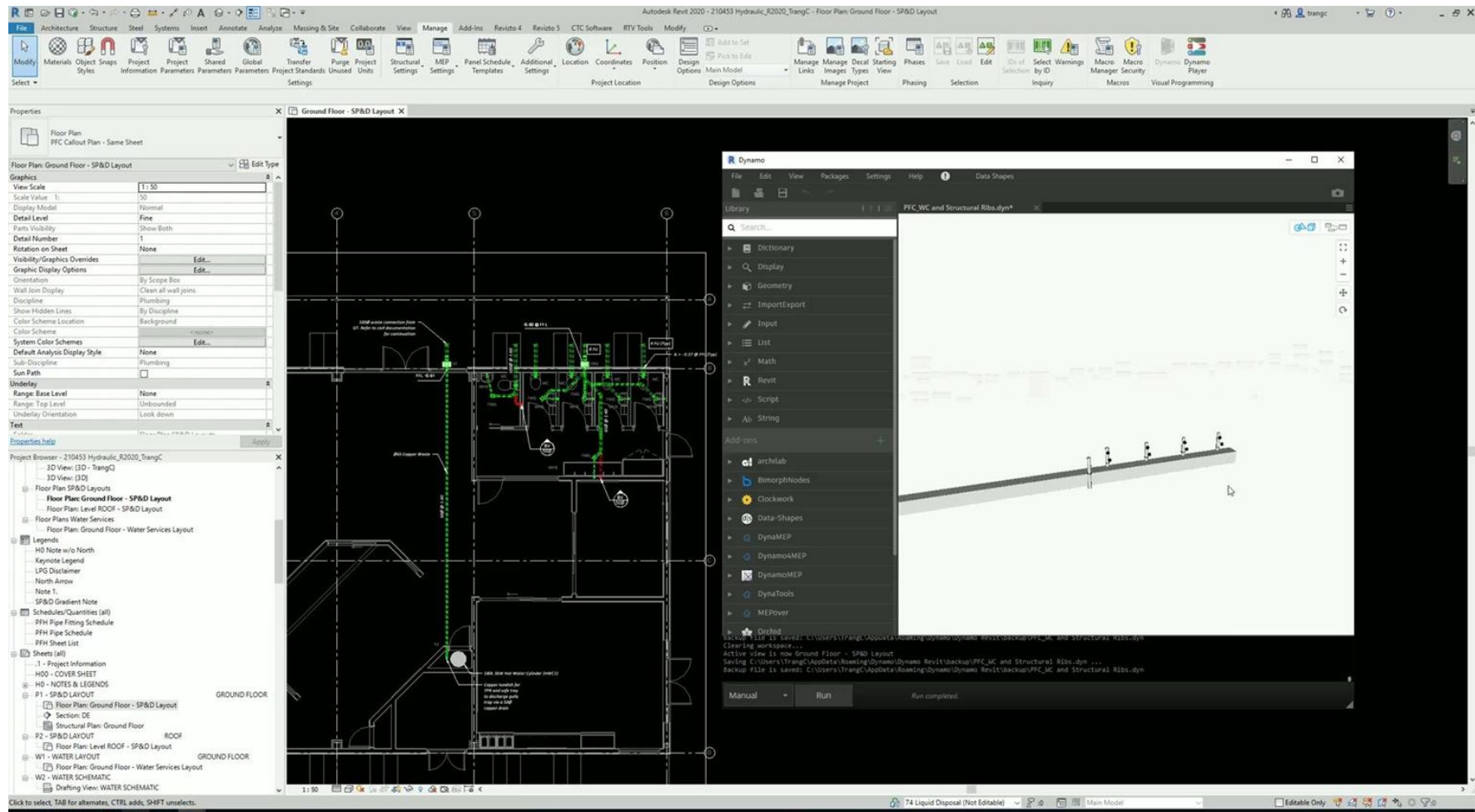


Add Waste  
Connector to  
WC

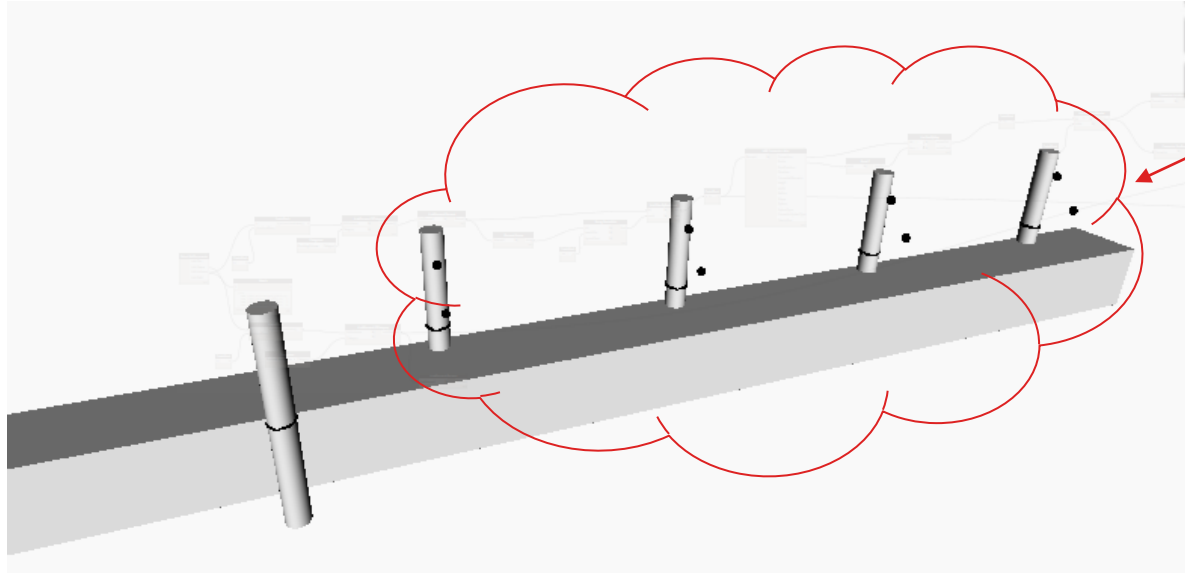
## Step 3: Export information

Export elements  
information (ID, names,  
locations, etc)

# Video simulation



# Slab Penetration - Result



automatically identify  
clashes

No	WC ID	WC Name	Structure ID	Structure Name
1	3843435	Plumbing Fixtures	2918241	Foundation
2	3843526	Plumbing Fixtures	2918241	Foundation
3	3843649	Plumbing Fixtures	2918241	Foundation
4	3843706	Plumbing Fixtures	2918241	Foundation

automatically export  
element information

# What else can apply ?

## Element A

From Architecture Model

WC set out

Floor waste set out

Shower set out

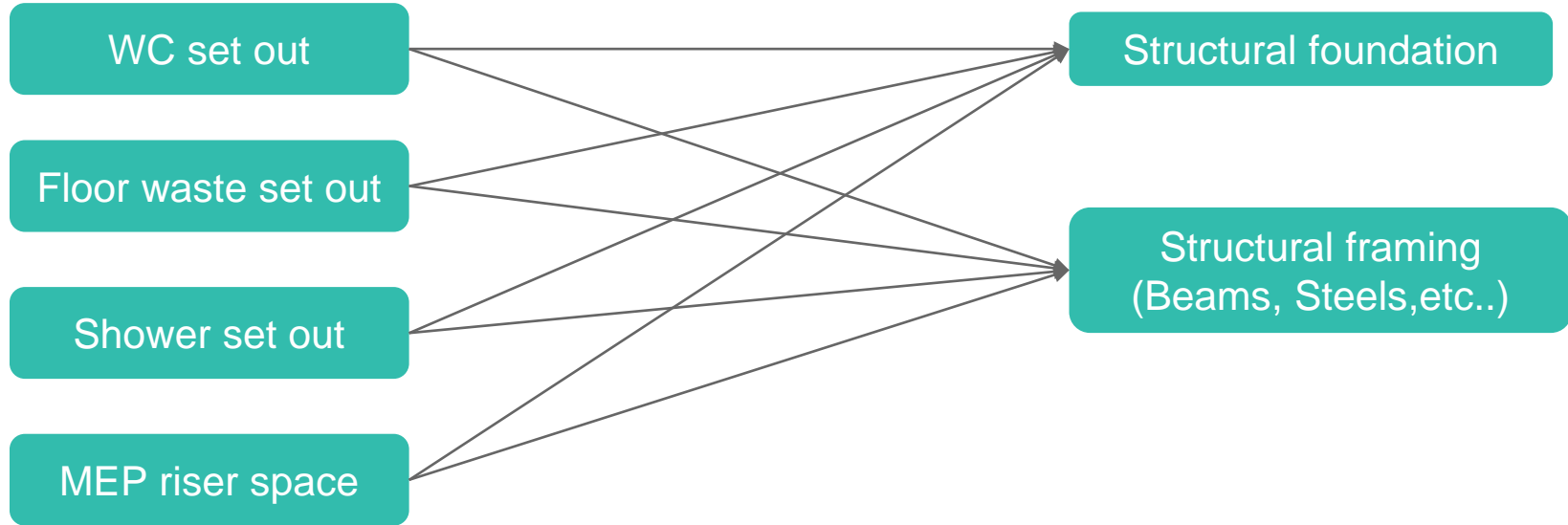
MEP riser space

## Element B

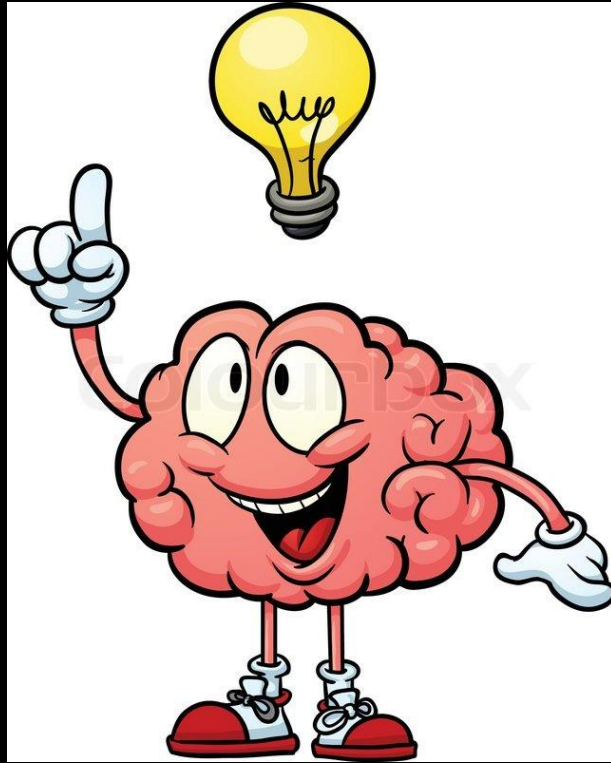
From Structural Model

Structural foundation

Structural framing  
(Beams, Steels, etc..)



## Idea 2:



Validate distances within MEP models

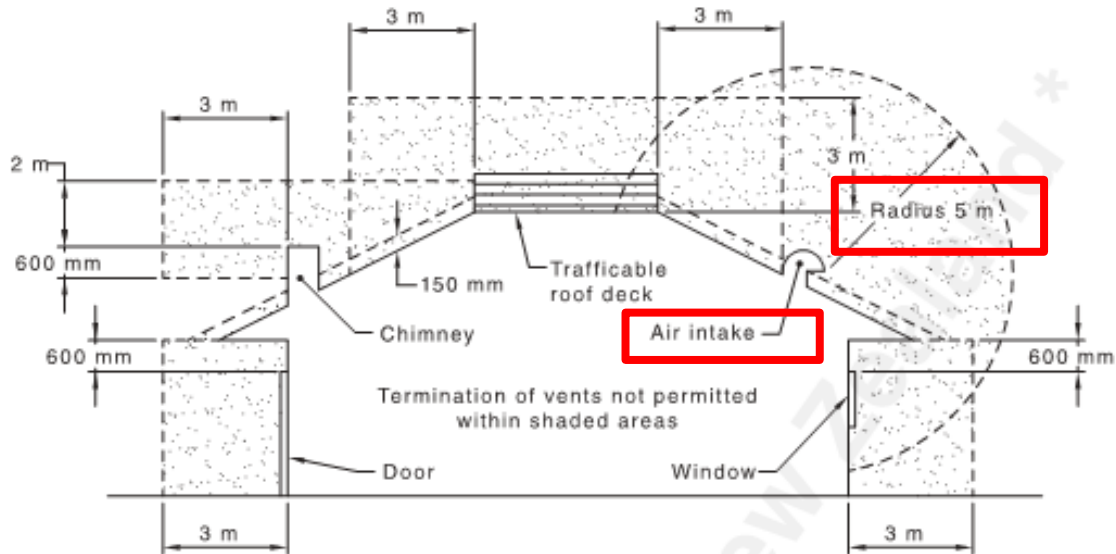


# MEP Standards & Rules

## Example 2: Vent Cowls vs Mechanical Air Intake

85

AS/NZS 3500.2:2018

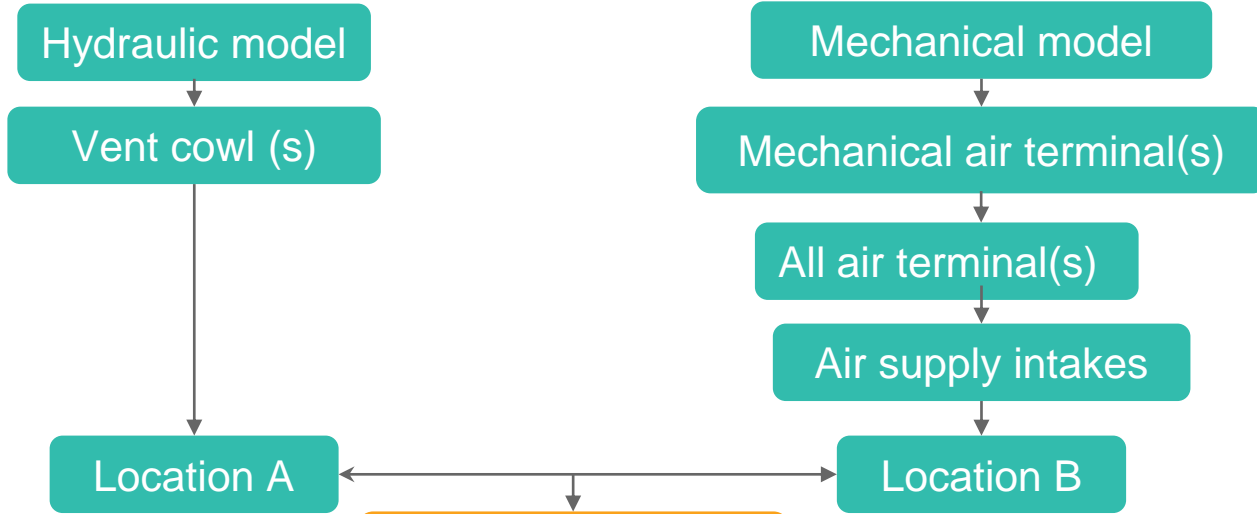


NOTE: Trafficable decks exclude access workways and work platforms.

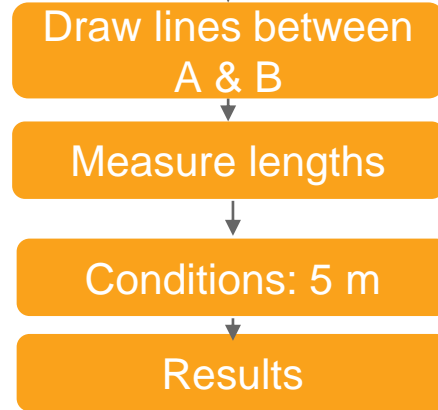
FIGURE 6.9.4 TERMINATION OF VENTS

# Idea 2: Summary of the Dynamo Graph

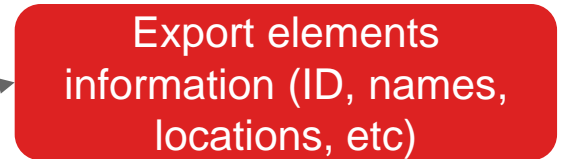
Step 1:  
Identify data



Step 2: Analyze data

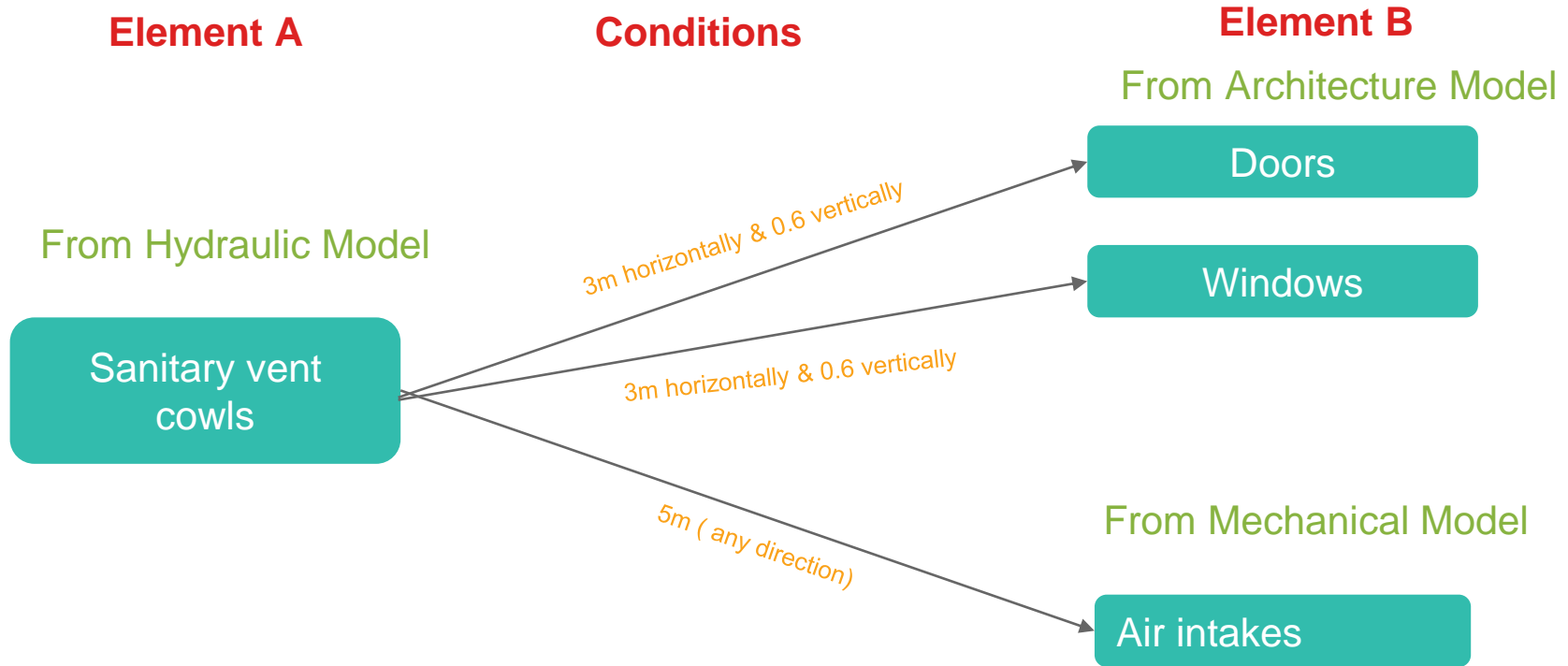


Step 3: Export information



The screenshot displays the Autodesk Revit 2020 interface. The top ribbon shows various toolsets including Architecture, Structure, Steel, Systems, Insert, Annotate, Analyze, Massing & Site, Collaborate, View, Manage, Add-Ins, Revit 4, Revit 5, CTC Software, RTV Tools, Modify, and Design Options. The main view is a 3D perspective of a mechanical model, likely a duct system, with a 3D view cube in the top right corner. On the left, the Properties panel is open, showing the 3D View (3D) settings, including View Scale (1:100), Scale Value (100), Detail Level (Fine), and Visibility/Graphics Overrides. The Project Browser on the left lists various views, including 2D Drafting Views, 3D Views, and 3D Views (3D). A data table is overlaid on the 3D view, showing a list of elements with columns for Hyd Element ID, Hyd Element Name, Mech Element ID, and Mech Name. The table contains one row of data: Hyd Element ID 1, Hyd Element Name 2083405 SV321 (Black) - 82mm Inlet, Mech Element ID 847259 CHL-F-45 Air Termi, and Mech Name 4053.906134. A Dynamo player is visible on the right side of the screen, showing a script titled 'PFC\_Air Terminal Vs Vent Cowl\_Linked Mech Model From...'. The script is running, and the output shows a list of elements, including 'PFC\_Vent Terminals - Marley SV321 (Black) - 82mm Inlet' and '210454 Mechanical\_R2020.rvt: 7: location Internal'. The bottom status bar shows the current view is '3D View (3D)' and the scale is '1:100'.

# What else can apply?



# Advantages



- No need to model simple elements from Revit (e.g idea 1).
- Identify clashes at the beginning of the project (e.g. idea 1).
- Quickly update when input data or conditions change.
- Especially suitable for large-scale projects with numerous elements.
- Can apply to many similar projects when the script is written.
- Export results to spreadsheets and record documents automatically.



**BIM projects contain a huge  
database of various information**

# How can we develop these automation tools?

- Your ideas are important. Start from your own disciplines.
- Divide ideas into smaller ideas, start with baby steps first.
- Start with common ideas first, then specific ones.
- Look beyond traditional ideas and workflows.
- Work closely with the digital team to optimize your ideas.
- Your involvement and commitment to implementing ideas is important.

# Conclusion

## Lessons learned

- How Dynamo works fundamentally.
- How to analyze BIM data to enhance coordination between disciplines.
- How to evaluate and implement new automation tools.

# Thank You



The background of the slide features four abstract, dark, metallic-looking geometric shapes in the corners. These shapes are composed of sharp, angular planes that reflect light, creating a sense of depth and modernity. They appear to be parts of larger, unseen structures, possibly representing architectural or industrial design elements.

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