Automation
Series 2025
Work smarter, not harder
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CitA25
Driving Digital Construction
for 25 years

How I Transformed 3 BIM Workflows with AI

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Digital Project Manager (BIM) at Ethos Engineering
MSc in applied BIM Management at TU Dublin
20+ years in construction

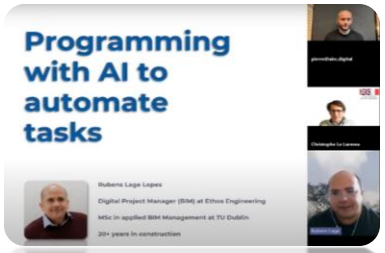
BIM Automation Experience

I started my BIM automation journey at BAM in 2021, learning from scripts my team lead developed. When he left, I took on the responsibility of keeping them running while building my own solutions in Dynamo. As I kept learning and refining my skills, I began using AI to create web applications in JavaScript for broader, more powerful solutions—and I've been sharing these insights at events since 2023

CitA BIM Gathering 2023

BIM Coordinators Summit 2023

BIM Coordinators Summit 2024

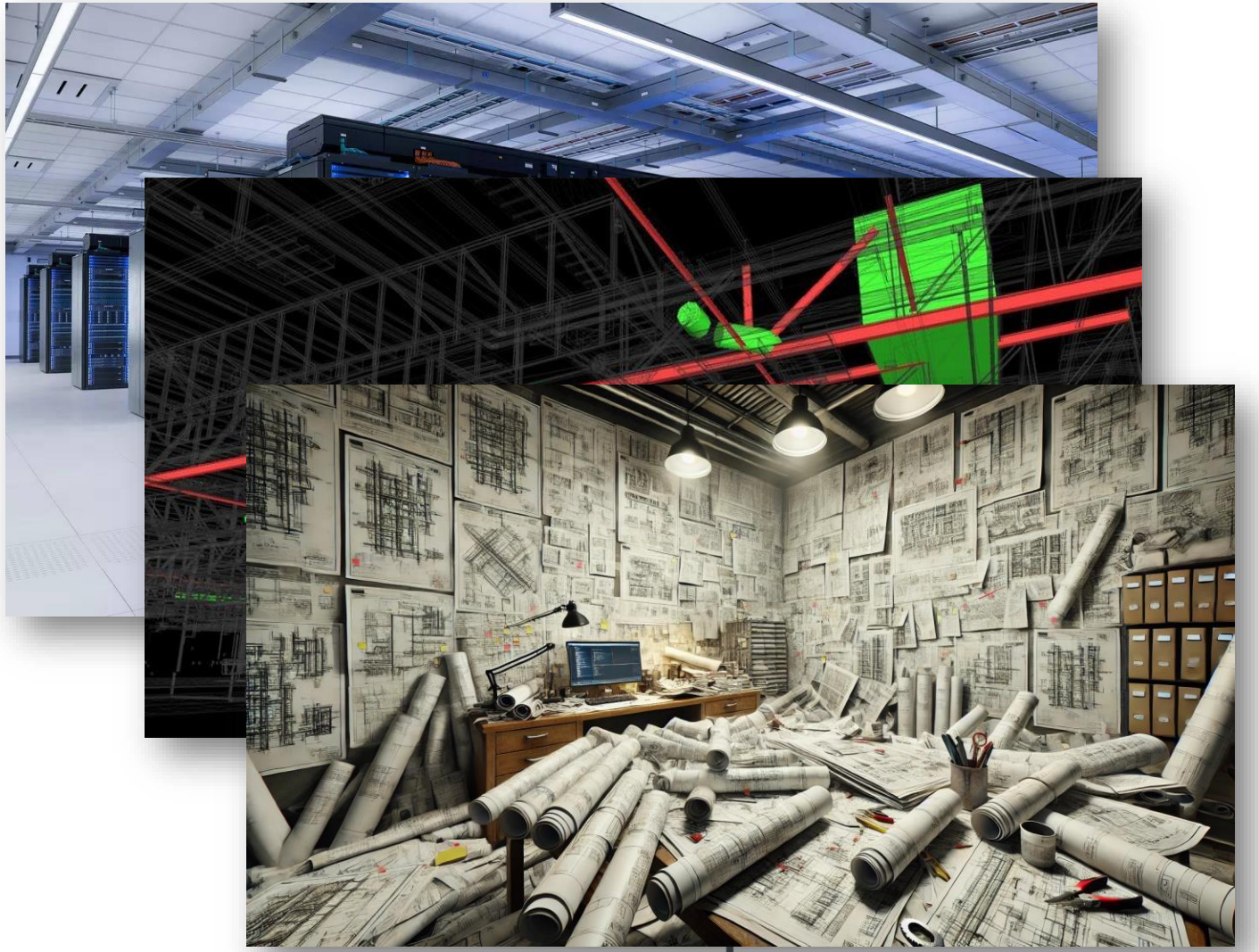


Franco-British Data Society 2024

National Construction Summit 2025

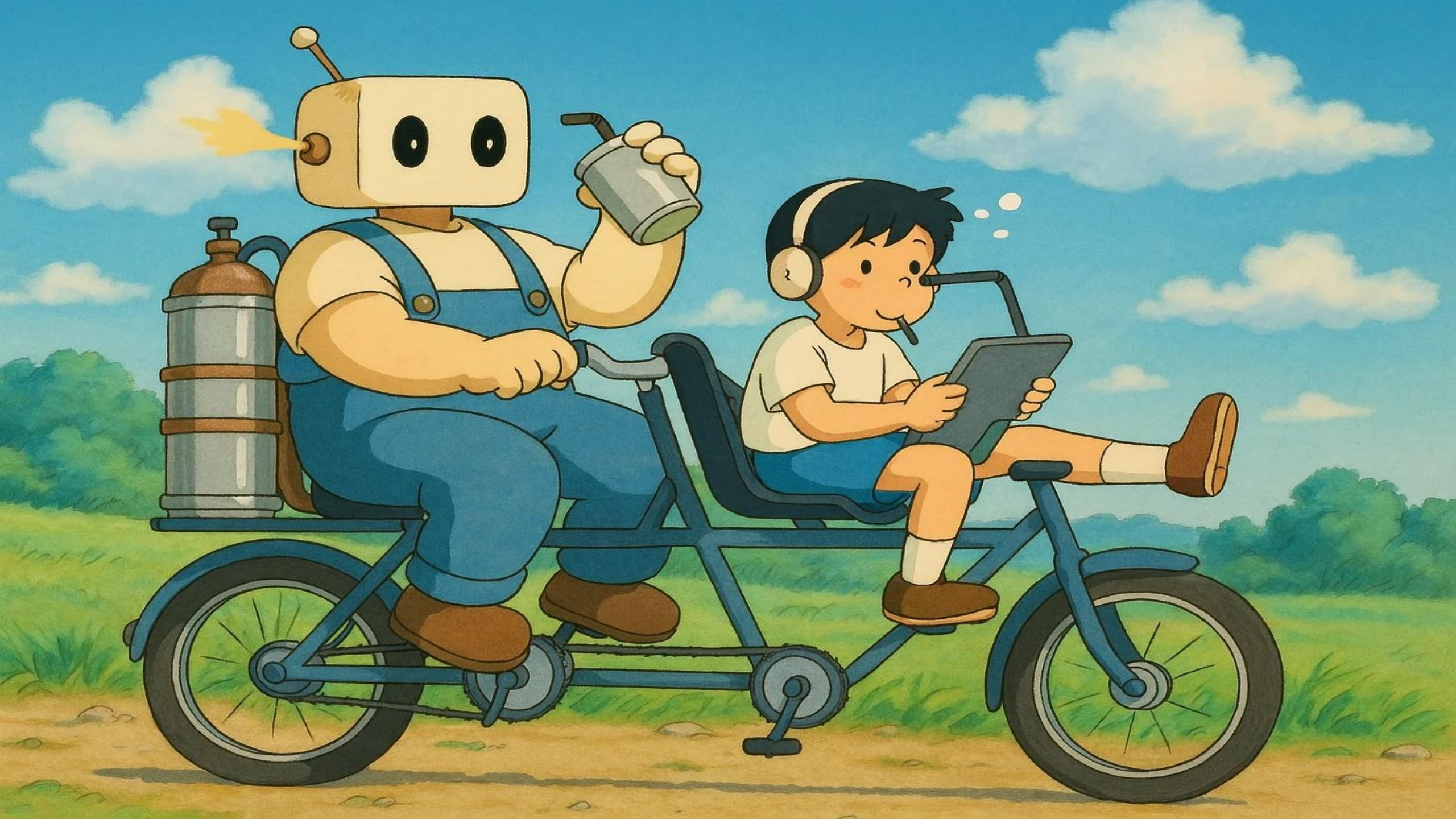
The Challenge

- Complex projects: Data Centers, large industrial facilities
- Multidisciplinary model coordination
- Hundreds of thousands of elements & hundreds of drawings



Why should we automate tasks?

- Because repetitive tasks are boring
- Save time and reduce costs
- Enable advanced analyses for better results



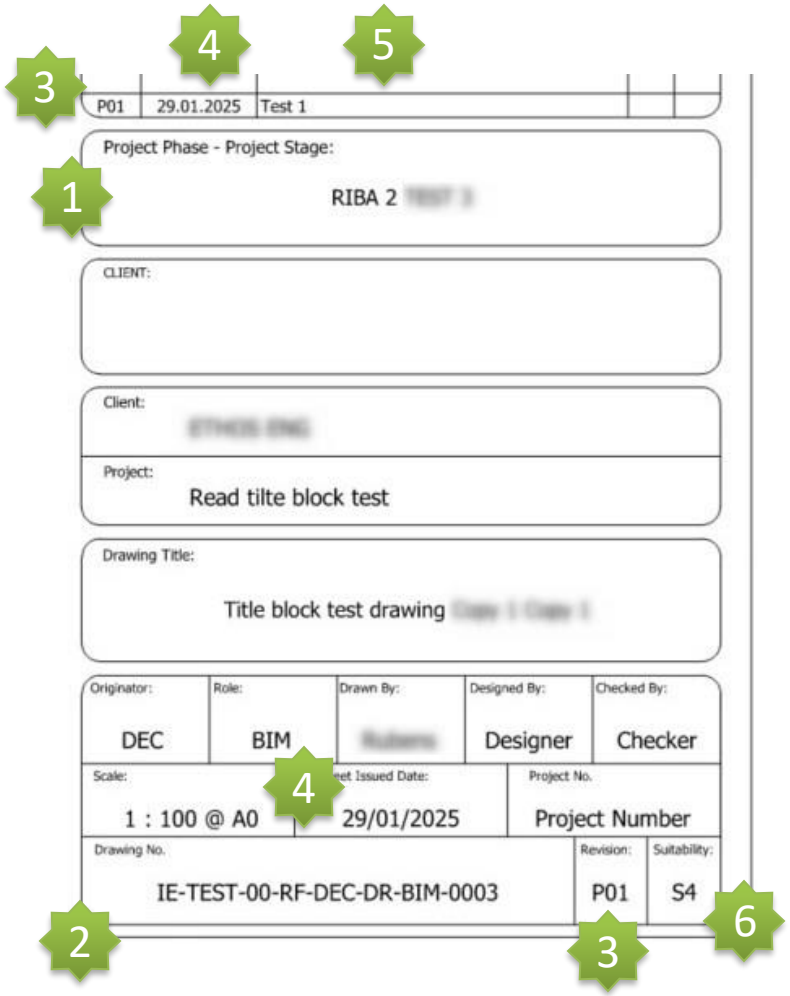
Automation #1 – Title Block Info validation

- Why it's important:

Title block information ensures each drawing is correctly identified, traceable, and up to date.

- How can you check it?:

Use automated scripts/tools, manual one-by-one or spot-check review



- What you should check:

1. Project name,
2. Drawing number,
3. Revision code
4. Revision date
5. Revision description
6. Suitability Code

—all must match the project's records.

Automation #1 – Title Block Info validation

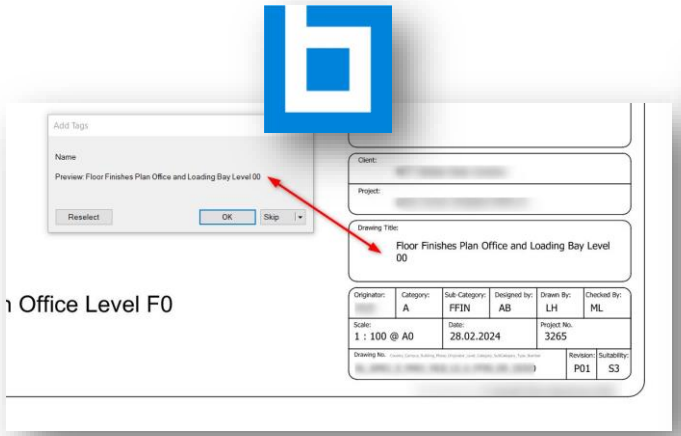
6 x 724 = 4,344

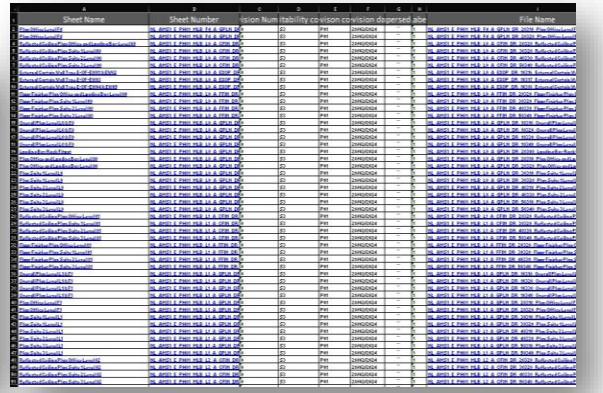
checks

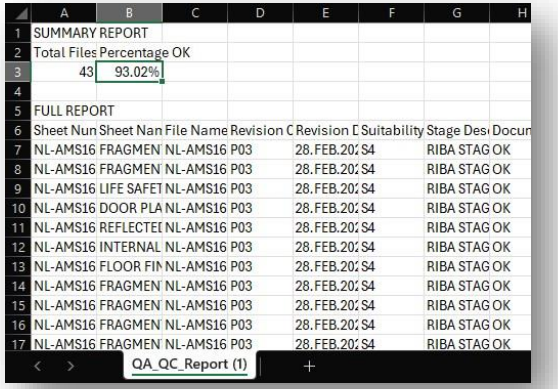
30s (average) / check = 130,320s = **36.2h** No-stop good luck

Automation #1 – Title Block Info validation – How did we solve it?

OCR to read PDFs → Export to Excel → Analise data → Export results







	A	B	C	D	E	F	G	H
1	SUMMARY REPORT							
2	Total Files	Percentage OK						
3	43	93.02%						
4								
5	FULL REPORT							
6	Sheet Nun	Sheet Nan	File Name	Revision C	Revision D	Suitability	Stage Des	Docun
7	NL-AMS16	FRAGMEN	NL-AMS16	P03	28.FEB.20	S4	RIBA STAG	OK
8	NL-AMS16	FRAGMEN	NL-AMS16	P03	28.FEB.20	S4	RIBA STAG	OK
9	NL-AMS16	LIFE SAFET	NL-AMS16	P03	28.FEB.20	S4	RIBA STAG	OK
10	NL-AMS16	DOOR PLA	NL-AMS16	P03	28.FEB.20	S4	RIBA STAG	OK
11	NL-AMS16	REFLECTE	NL-AMS16	P03	28.FEB.20	S4	RIBA STAG	OK
12	NL-AMS16	INTERNAL	NL-AMS16	P03	28.FEB.20	S4	RIBA STAG	OK
13	NL-AMS16	FLOOR FIN	NL-AMS16	P03	28.FEB.20	S4	RIBA STAG	OK
14	NL-AMS16	FRAGMEN	NL-AMS16	P03	28.FEB.20	S4	RIBA STAG	OK
15	NL-AMS16	FRAGMEN	NL-AMS16	P03	28.FEB.20	S4	RIBA STAG	OK
16	NL-AMS16	FRAGMEN	NL-AMS16	P03	28.FEB.20	S4	RIBA STAG	OK
17	NL-AMS16	FRAGMEN	NL-AMS16	P03	28.FEB.20	S4	RIBA STAG	OK

QA_QC_Report (1)

QA-QC Validation Application

Upload Excel File: Choose file No file chosen

Expected Values

Expected Revision Code: e.g., P01

Expected Revision Date: e.g., 13.03.2025 or 13/03/2

Expected Suitability Code: e.g., S3

Expected Stage Description: e.g., Issued for Review

Expected Revision Description: e.g., Some description

Separator (Sheet Number - Sheet Name): -

Check only Sheet Number

Process Report

Automation #2 – Clash Report

- Why it's important:

A single chart gives a quick, clear overview of complex data, making insights easier to grasp and share.

- How did I do it?:

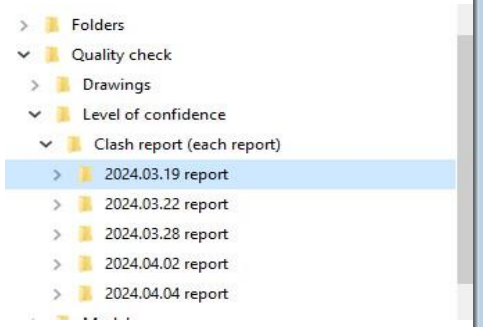
I used AI-generated VBA code in Excel to aggregate all these clash reports into one master sheet.

	2024.03.22	2024.03.28	2024.04.02	2024.04.04
A x C - Stage 3	0	0	0	0
A x MEP - Stage 3	595	859	169	63
A x SE - Stage 3	40	51	51	47
MEP x C - Stage 3	3	3	3	3
MEP x MEP - Stage 3	672	332	335	78
SE x C - Stage 3	0	0	0	0
SE x MEP - Stage 3	1135	152	112	103

- Why it's important:

A single chart gives a quick, clear overview of complex data, making insights easier to grasp and share.

- Prompt to ChatGPT:
  - Situation
    - ➢ Multiple clash
      be consolidate



	A	B	C
1	Clash Report	Total Clashes	Active
2	A x C - Stage 3	30	
3	A x MEP - Stage 3	2365	6
4	A x SE - Stage 3	2802	4
5	MEP x C - Stage 3	17	
6	MEP x MEP - Stage 3	209	7
7	SE x C - Stage 3	16	
8	SE x MEP - Stage 3	849	10
9			

Acceptance Parameter | Clash Summary

Level of confidence summary report.xlsm - Module1 (Code)

(General) | ImportHTMLFilesToSheets

```
Sub ImportHTMLFilesToSheets()
    Dim fd As FileDialog
    Dim FileChosen As Integer
    Dim FileName As String
    Dim ws As Worksheet
    Dim i As Integer

    ' Remove all sheets except "Acceptance Parameter" and "Clash Summary"
    Application.DisplayAlerts = False ' Disable alerts to prevent confirmation dialogs
    For Each ws In ThisWorkbook.Sheets
        If ws.Name <> "Acceptance Parameter" And ws.Name <> "Clash Summary" Then
            ws.Delete
        End If
    Next ws
    Application.DisplayAlerts = True ' Re-enable alerts

    ' Create a FileDialog object as a File Picker dialog box.
    Set fd = Application.FileDialog(msoFileDialogFilePicker)

    ' Allow the user to select multiple files.
    fd.AllowMultiSelect = True

    ' Show the dialog box. -1 means that the user pressed the OK button.
    FileChosen = fd.Show

    If FileChosen <> -1 Then
        ' The user pressed Cancel.
```

Clash Report	Total Clashes	Active	Resolved	Reviewed	Approved	Acceptance %	Current %	Overallowance
A (As-Built) x A						#DIV/0!	0.00%	#DIV/0!
A (As-Built) x ME						#DIV/0!	0.00%	#DIV/0!
A (As-Built) x O						#DIV/0!	0.00%	#DIV/0!
A (As-Built) x S						#DIV/0!	0.00%	#DIV/0!
AxME						#DIV/0!	0.00%	#DIV/0!
AxO						#DIV/0!	0.00%	#DIV/0!
AxS						#DIV/0!	0.00%	#DIV/0!
ME (As-Built) x A						#DIV/0!	0.00%	#DIV/0!
ME (As-Built) x ME						#DIV/0!	0.00%	#DIV/0!
ME (As-Built) x O						#DIV/0!	0.00%	#DIV/0!
ME (As-Built) x S						#DIV/0!	0.00%	#DIV/0!
MExME						#DIV/0!	0.00%	#DIV/0!
MExO						#DIV/0!	0.00%	#DIV/0!
NxA						#DIV/0!	0.00%	#DIV/0!
NxME						#DIV/0!	0.00%	#DIV/0!
NxO						#DIV/0!	0.00%	#DIV/0!
NxS						#DIV/0!	0.00%	#DIV/0!
S (As-Built) x A						#DIV/0!	0.00%	#DIV/0!
S (As-Built) x ME						#DIV/0!	0.00%	#DIV/0!
S (As-Built) x O						#DIV/0!	0.00%	#DIV/0!
S (As-Built) x S						#DIV/0!	0.00%	#DIV/0!
SxME						#DIV/0!	0.00%	#DIV/0!
SxO						#DIV/0!	0.00%	#DIV/0!

100.00%

Import Clash reports

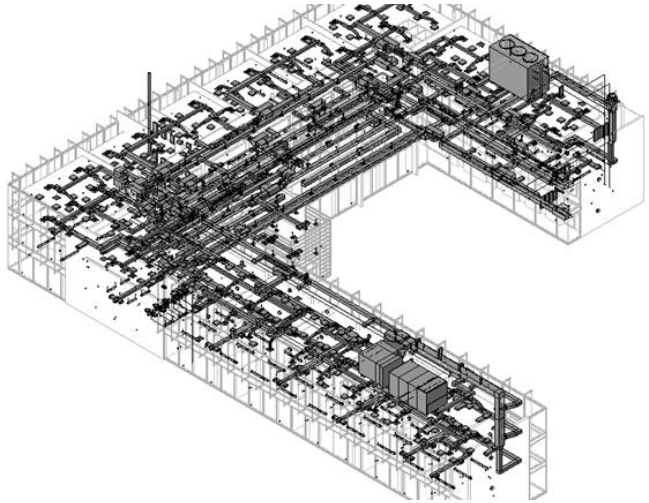
Summarize Clashes

Acceptance Parameter | Clash Summary

Automation #3 – Model Data Validation

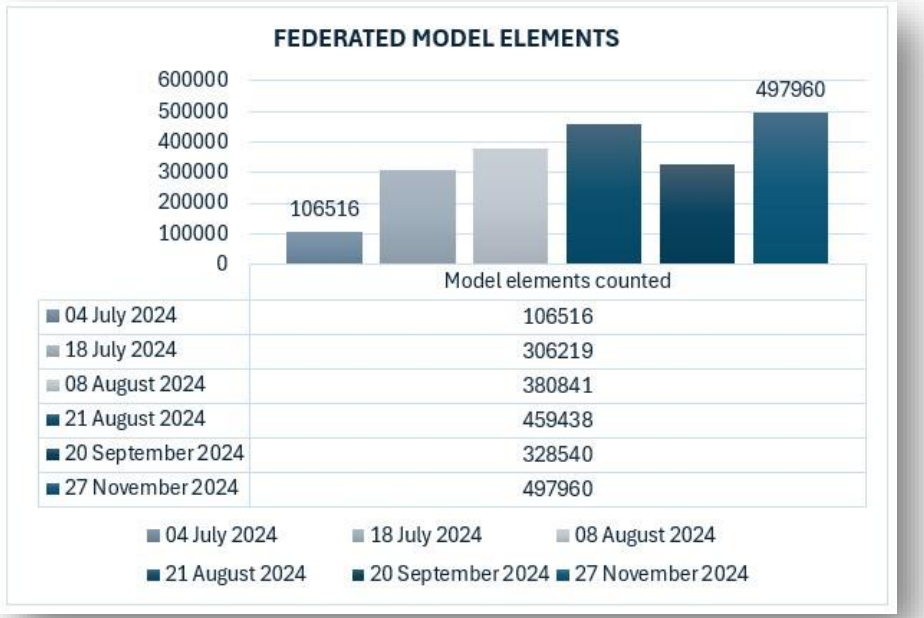
- Why it's important:

Automated model data validation ensures accuracy and consistency, reducing manual errors and keeping projects aligned with standards.

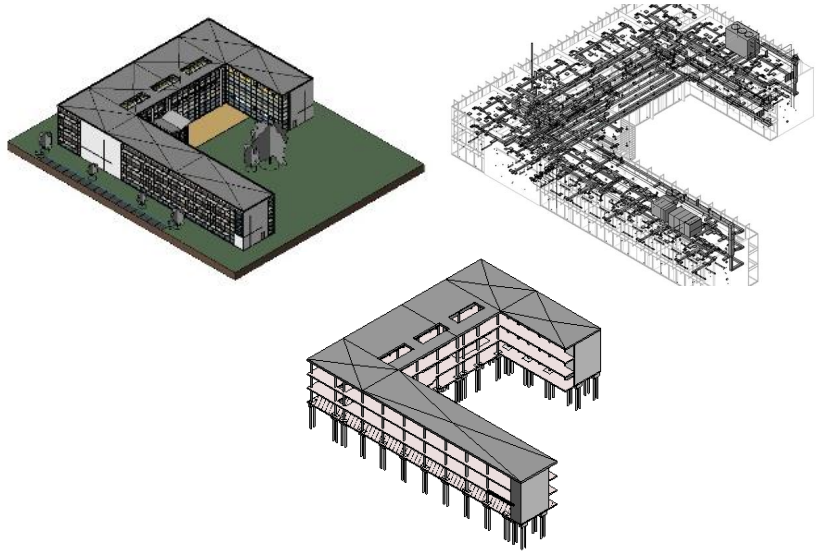


- How did I do it?:

I create a Dynamo script and used AI-generated Python node to enhance the Data Validation process.

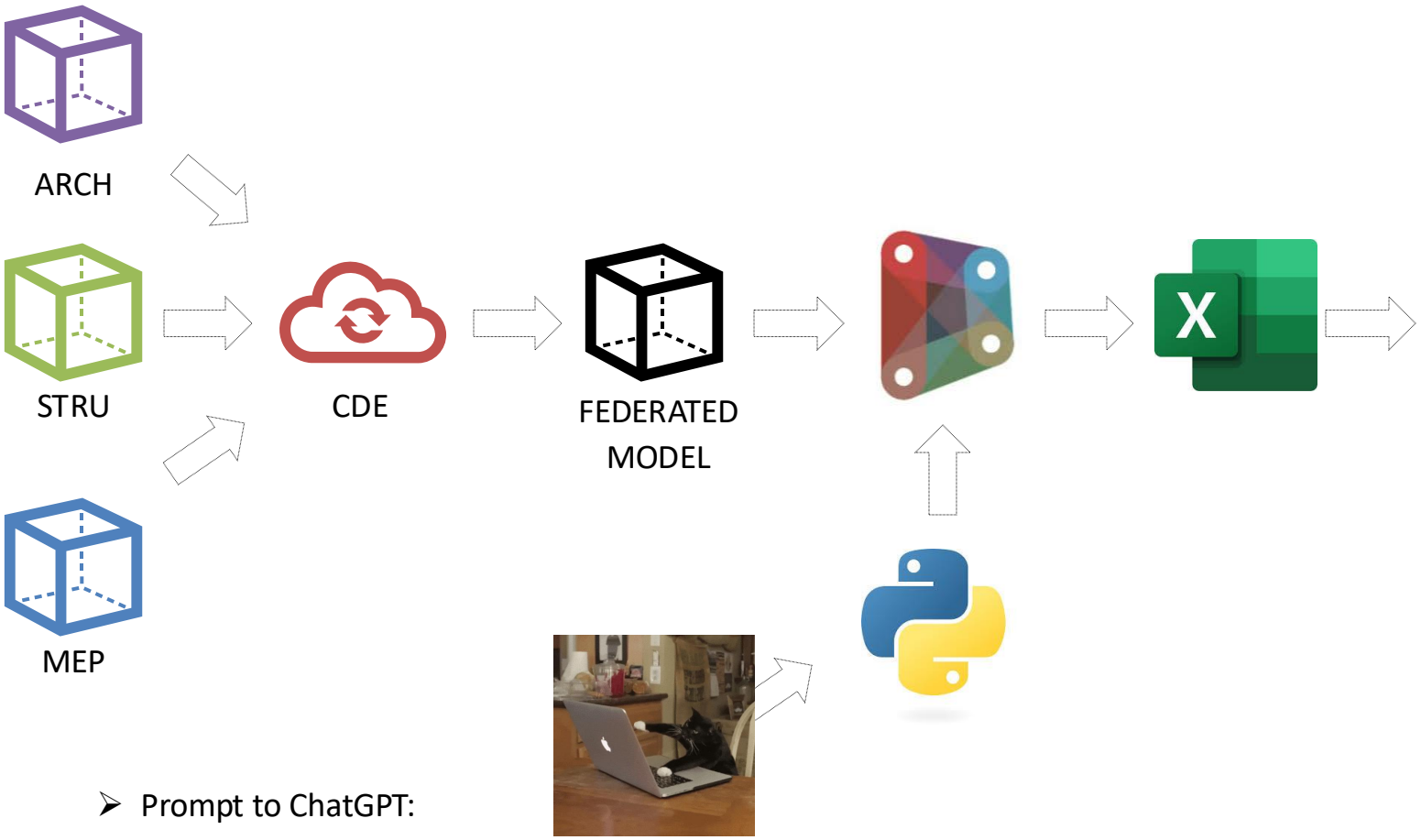


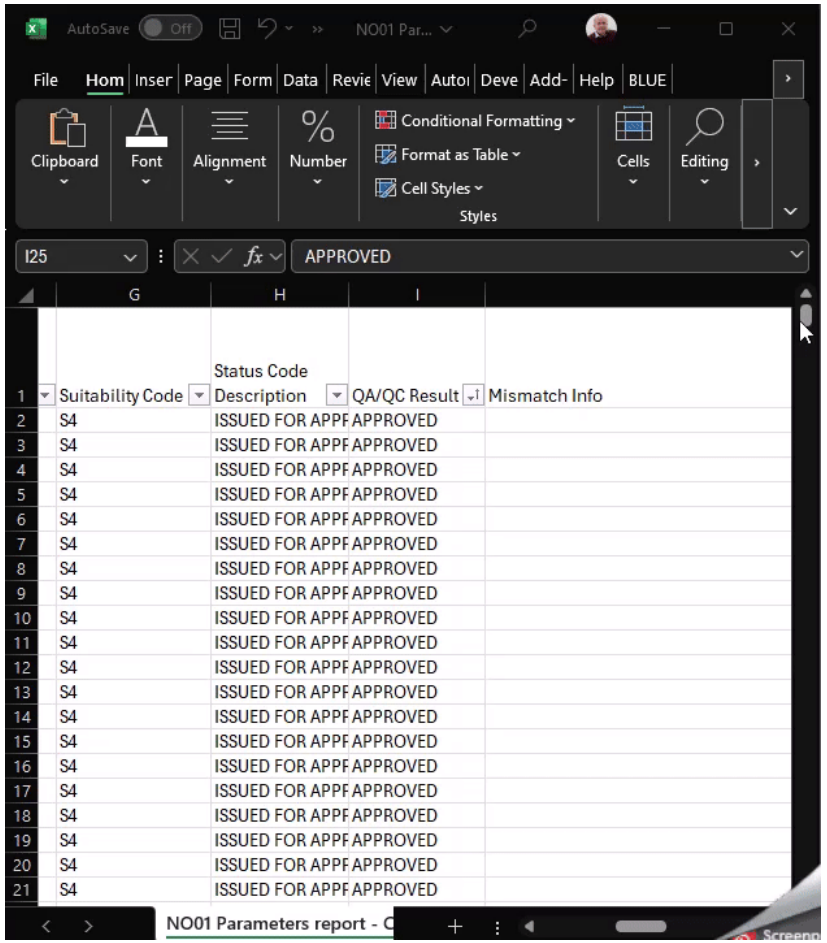
Automation #3 – Model Data Validation



What Can Reliable Model Data Do for You?

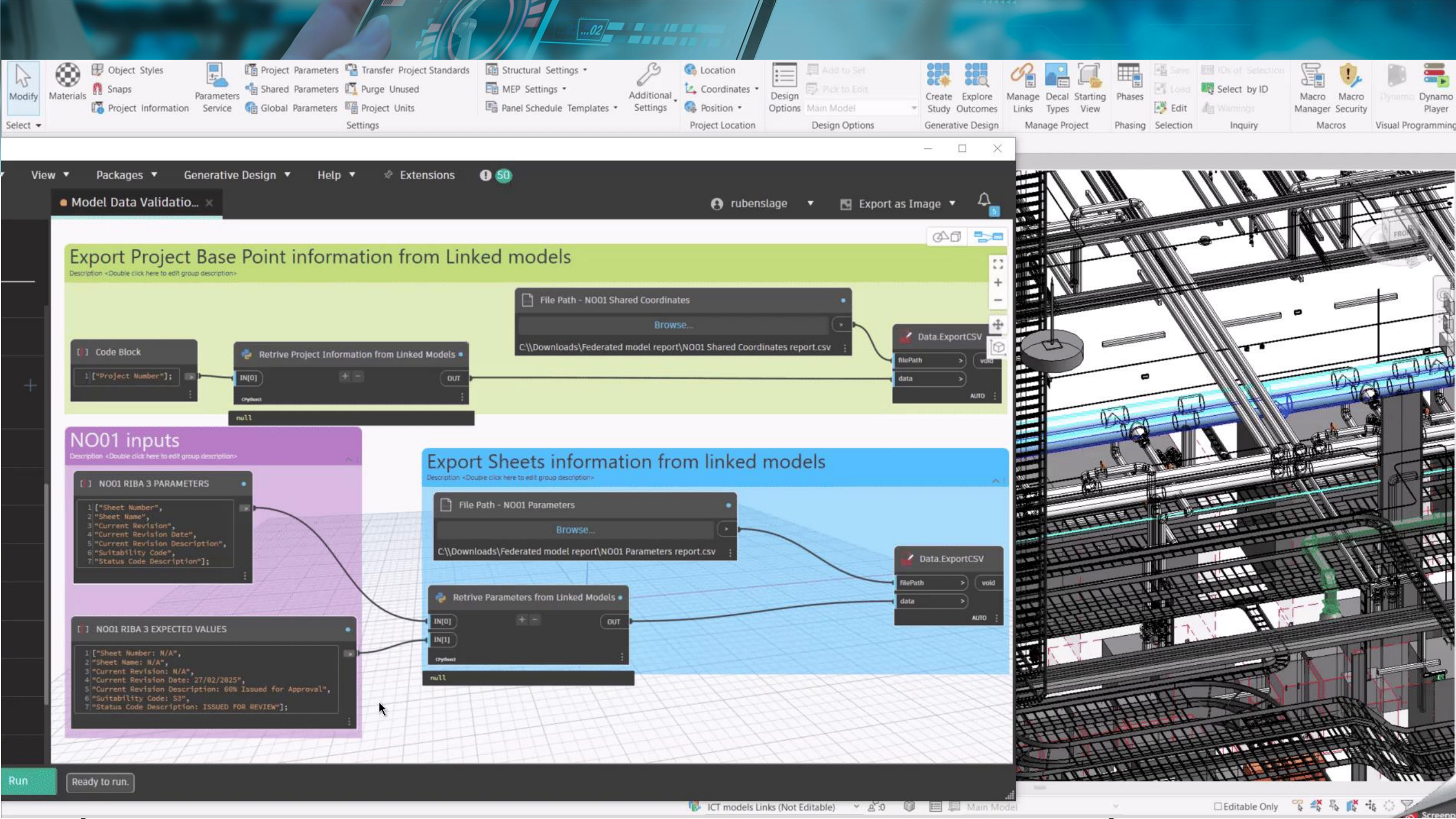
- A. Real-Time QTO & Cost: Instantly update materials and budgets.
- B. Energy Analysis: Evaluate usage and optimize sustainability.
- C. 4D Scheduling: Align model with timelines for accurate planning
- D. Health & Safety: Spot hazards early and refine designs.
- E. Operational Simulations: Preview functionality for smoother handovers.





	G	H	I
1	Suitability Code	Status Code Description	QA/QC Result	Mismatch Info
2	S4	ISSUED FOR APPF	APPROVED	
3	S4	ISSUED FOR APPF	APPROVED	
4	S4	ISSUED FOR APPF	APPROVED	
5	S4	ISSUED FOR APPF	APPROVED	
6	S4	ISSUED FOR APPF	APPROVED	
7	S4	ISSUED FOR APPF	APPROVED	
8	S4	ISSUED FOR APPF	APPROVED	
9	S4	ISSUED FOR APPF	APPROVED	
10	S4	ISSUED FOR APPF	APPROVED	
11	S4	ISSUED FOR APPF	APPROVED	
12	S4	ISSUED FOR APPF	APPROVED	
13	S4	ISSUED FOR APPF	APPROVED	
14	S4	ISSUED FOR APPF	APPROVED	
15	S4	ISSUED FOR APPF	APPROVED	
16	S4	ISSUED FOR APPF	APPROVED	
17	S4	ISSUED FOR APPF	APPROVED	
18	S4	ISSUED FOR APPF	APPROVED	
19	S4	ISSUED FOR APPF	APPROVED	
20	S4	ISSUED FOR APPF	APPROVED	
21	S4	ISSUED FOR APPF	APPROVED	

- Prompt to ChatGPT:
  - Situation + Desired outcome + data sample


Modify
Select
Materials
Object Styles
Snaps
Project Information
Parameters Service
Project Parameters
Shared Parameters
Global Parameters
Transfer Project Standards
Purge Unused
Project Units
Settings
Structural Settings
MEP Settings
Panel Schedule Templates
Additional Settings
Location
Coordinates
Position
Project Location
Design Options
Main Model
Design Options
Create Study
Explore Outcomes
Generative Design
Manage Links
Decal Types
Starting View
Manage Project
Phases
Phasing
Edit
Selection
Select by ID
Inquiry
Macro Manager
Macro Security
Macros
Dynamo Player
Visual Programming
View
Packages
Generative Design
Help
Extensions
Model Data Validatio...
rubenslage
Export as Image
Export Project Base Point information from Linked models
Description <Double click here to edit group description>
File Path - NO01 Shared Coordinates
Browse...
C:\Downloads\Federated model report\NO01 Shared Coordinates report.csv
Code Block
["Project Number"];
Retrive Project Information from Linked Models
IN[0]
OUT
null
Data.ExportCSV
filePath
data
void
AUTO
NO01 inputs
Description <Double click here to edit group description>
NO01 RIBA 3 PARAMETERS
["Sheet Number",
"Sheet Name",
"Current Revision",
"Current Revision Date",
"Current Revision Description",
"Suitability Code",
"Status Code Description"];
NO01 RIBA 3 EXPECTED VALUES
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"Sheet Name: N/A",
"Current Revision: N/A",
"Current Revision Date: 27/02/2025",
"Current Revision Description: 60% Issued for Approval",
"Suitability Code: S3",
"Status Code Description: ISSUED FOR REVIEW"];
Export Sheets information from linked models
Description <Double click here to edit group description>
File Path - NO01 Parameters
Browse...
C:\Downloads\Federated model report\NO01 Parameters report.csv
Retrive Parameters from Linked Models
IN[0]
IN[1]
OUT
null
Data.ExportCSV
filePath
data
void
AUTO
Run
Ready to run.
ICT models Links (Not Editable)
Main Model
Editable Only

Automation Series 2025

Work smarter, not harder

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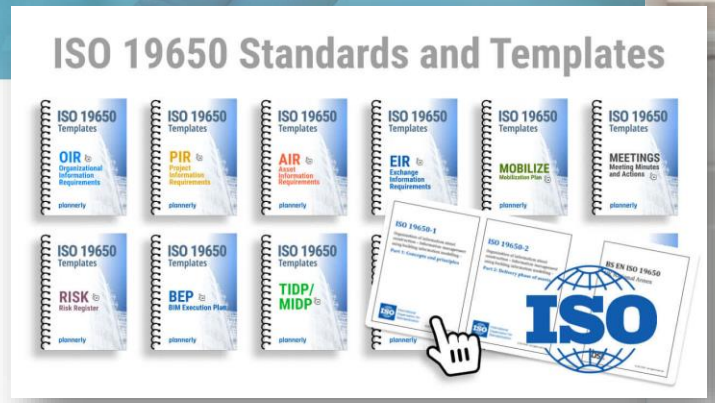

Keys to Successful BIM Automation

- Standards
- Team Collaboration
- Training
- The Right Tools

How I Transformed 3 BIM Workflows with AI

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CitA25

Driving Digital Construction for 25 years

Want faster, smarter BIM? Let's talk

Rubens Lage Lopes
Digital Project Manager | BIM Manager | MSc in BIM Management | BIM Automation

- Would you like me to send you this presentation?

Feel free to reach out:
https://www.linkedin.com/in/rubenslage/

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Thank you for your time
and contributions