



Co-located with:



Introducing:



18 – 21 FEBRUARY 2023

RIYADH FRONT EXHIBITION AND
CONFERENCE CENTER (RFECC)

10 STEPS FOR SUCCESSFUL BIM COORDINATION

Amr Essam Abdelhai

BIM Manager - Dar Al-Handasah

Technology Talks/21st February/ **20:30 – 21:00**

www.thebig5saudi.com



Not A BIM Model!

There is a saying, “Every time you use the term **BIM Model**, God kills a Cat.”



RE: Ground Floor
Contract - BIM Model (DarRef: Not Referenced)
Contract - BIM Model
Contractor's Request for an Updated BIM Model
FW

What is your BIM awareness level?

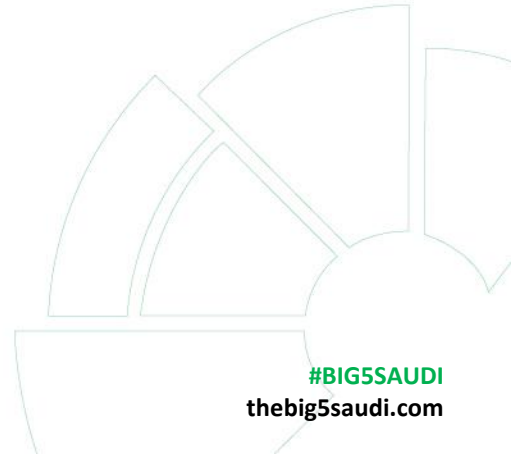


- Aware and currently using BIM.
- Just aware of BIM
- Neither aware nor using



SCAN ME or Visit
www.menti.com and use the code **6610 2768**

#BIG5SAUDI
thebig5saudi.com



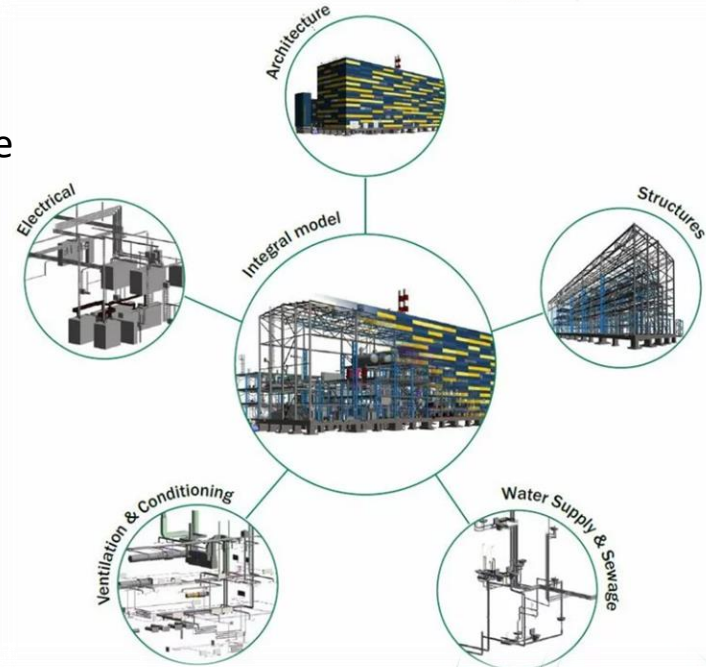
#BIG5SAUDI
thebig5saudi.com

What is BIM coordination?

BIM coordination is a process that involves **combining models of several disciplines** and checking whether there are collisions between these models. BIM coordination also includes **sending collision reports** and conducting **coordination meetings**.

The goal of the 3D Coordination is to reduce **Risk** and **Improve** efficiencies in the construction processes.

3D model coordination is one of a construction project's highest-value **ROI** activities. A single clash can cost over **10.000\$**.



BIM Coordination Roadmap



Define the
required
Resources

The Models
Segregation

Define the
System
Hierarchy

Model Checking &
Type of Clashes

Tracking the
Issues

01

03

05

07

09

02

04

06

08

10

BIM
Coordination
Meetings

Unique Reference
System (URS) File

Create Priority
& Clash Matrix

Grouping
the Clashes

Analysis
the Results

BIM Coordination Roadmap



Define the
required
Resources

01

The Models
Segregation

03

Define the
System
Hierarchy

05

Model Checking &
Type of Clashes

07

Tracking the
Issues

09

02

BIM
Coordination
Meetings

04

Unique Reference
System (URS) File

06

Create Priority
& Clash Matrix

08

Grouping
the Clashes

10

Analysis
the Results

Step 01: Define the Required Resources



- Design Authoring (Revit, Civil 3D,)



- Model Review (Navisworks)



- Tracking the Issues (BIMcollab)



BIMcollab

- Visualize the Results (Power BI Desktop)



BIM Coordination Roadmap



Define the
required
Resources

01

The Models
Segregation

03

Define the
System
Hierarchy

05

Model Checking &
Type of Clashes

07

Tracking the
Issues

09

02

BIM
Coordination
Meetings

04

Unique Reference
System (URS) File

06

Create Priority
& Clash Matrix

08

Grouping
the Clashes

10

Analysis
the Results

Step 02: BIM Meetings

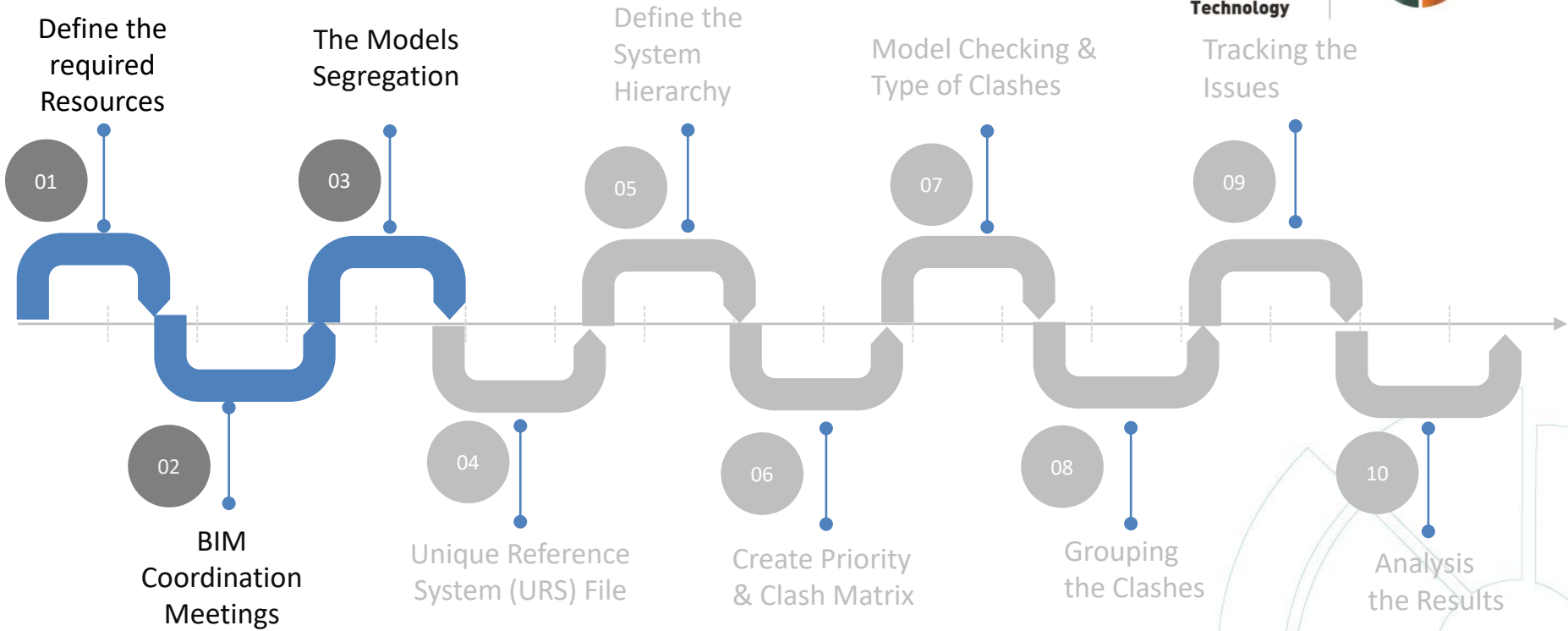


Four types of meetings:

- 1- Kick-off meeting
- 2- Bi-weekly progress meeting.
- 3- 3D Coordination meeting.
- 4- BIM Room.



BIM Coordination Roadmap



Define the required Resources

The Models Segregation

Define the System Hierarchy

Model Checking & Type of Clashes

Tracking the Issues

01

03

05

07

09

02

04

06

08

10

BIM Coordination Meetings

Unique Reference System (URS) File

Create Priority & Clash Matrix

Grouping the Clashes

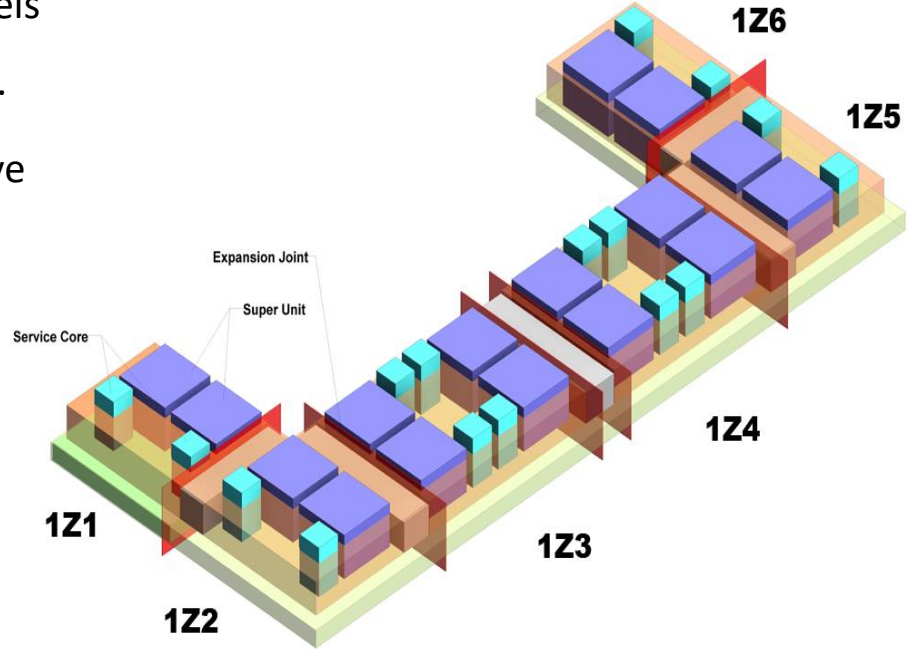
Analysis the Results

Step 03: The Models Segregation

For smooth coordination, we divide the models into small pieces to easily control the clashes.

The modelling strategy is designed to improve the exchange and coordination of project information during the construction phase.

A typical Revit file size for a project in construction is **between 100 MB to 500 MB.**



Step 03: The Models Segregation



Project Type	Project Size	Model Segregation	BUA
Parking and Tunnels	Large	Sub-discipline/Part /Floor/Sheet	1,000,000 sqm
Mall	Medium /Complex	Sub-discipline /Function	70,000 sqm
Land port	Medium /Simple	Building /Discipline	55,000 sqm

BIM Coordination Roadmap



Define the
required
Resources

The Models
Segregation

Define the
System
Hierarchy

Model Checking &
Type of Clashes

Tracking the
Issues

01

03

05

07

09

02

04

06

08

10

BIM
Coordination
Meetings

Unique Reference
System (URS) File

Create Priority
& Clash Matrix

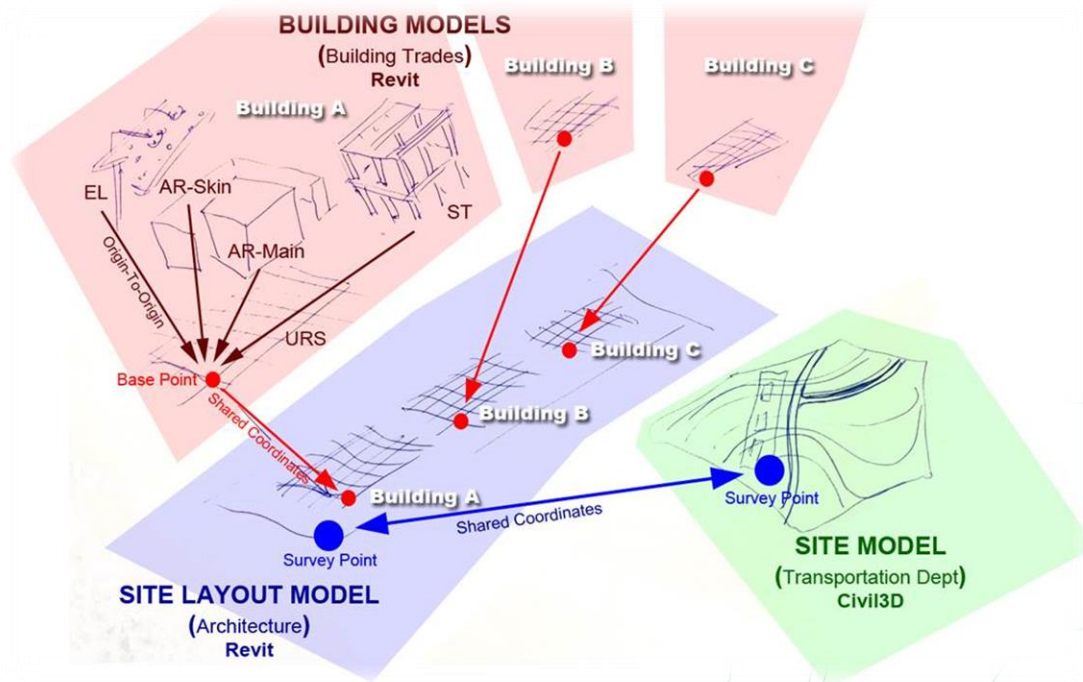
Grouping
the Clashes

Analysis
the Results

Step 04: Using a Unique Reference System (URS)



All BIM models shall be set up from the Coordination file, which defines the **model origin**, location (**Survey Point** and **Project Base Point**) and orientation (True and Project North). All project information shall be derived from the respective information models.



BIM Coordination Roadmap



Define the
required
Resources

The Models
Segregation

Define the
System
Hierarchy

Model Checking &
Type of Clashes

Tracking the
Issues

01

03

05

07

09

02

04

06

08

10

BIM
Coordination
Meetings

Unique Reference
System (URS) File

Create Priority
& Clash Matrix

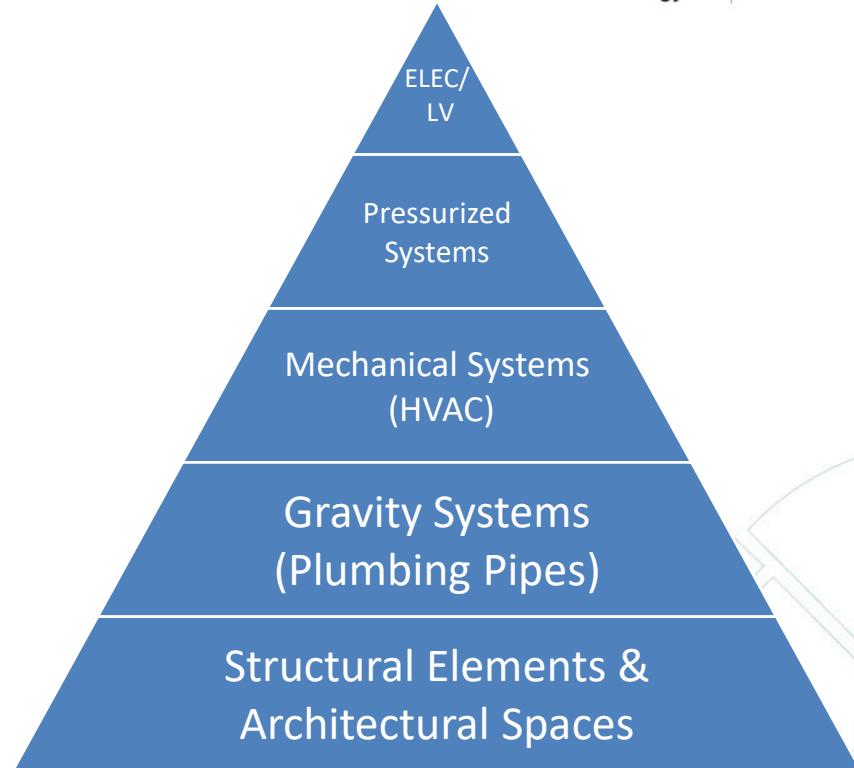
Grouping
the Clashes

Analysis
the Results

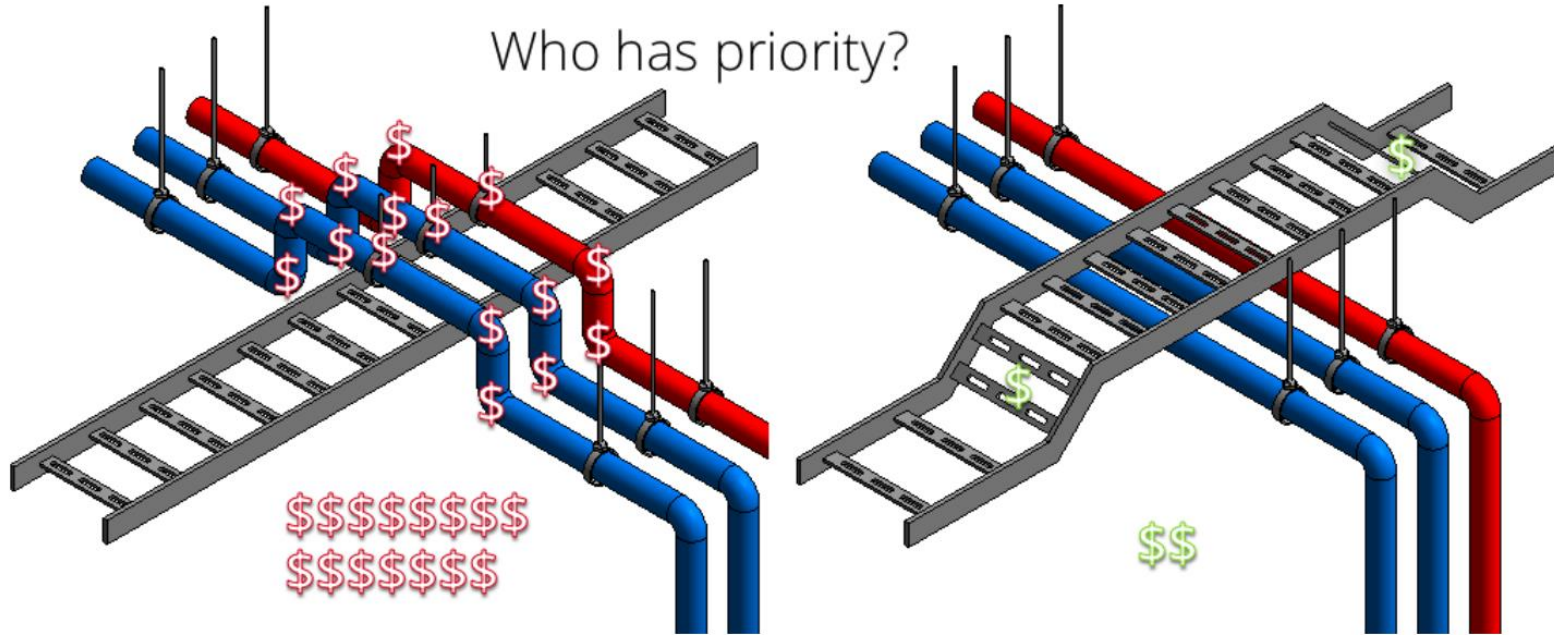
Step 05: Define the System Hierarchy



This hierarchy is nothing more than a way to divide the various building systems in order, from those most difficult or expensive to move to those with the greatest freedom of movement.



Step 05: Define the System Hierarchy



BIM Coordination Roadmap



Define the
required
Resources

The Models
Segregation

Define the
System
Hierarchy

Model Checking &
Type of Clashes

Tracking the
Issues

01

03

05

07

09

02

04

06

08

10

BIM
Coordination
Meetings

Unique Reference
System (URS) File

Create Priority
& Clash Matrix

Grouping
the Clashes

Analysis
the Results

Step 06: Priority & Clash Matrix



The clash matrix is a table showing the checks to be carried out in the different coordination phases.

It should indicate the set of elements to be analyzed and what will not be analyzed. In addition, it includes the Clash Type, priorities and tolerance value.

Trade Code1	Priority	Trade1	Search set1	Trade 2	Search set 2	Clash name	SelectionA	Selection B	Clash Type	Tolerance
031	P2	ME	AirTerminal	FP	PipeSystem	031-P2-ME-AirTerminal-VS-FP-PipeSystem	ME-AirTerminal	FP-PipeSystem	Hard	0.01
031	P2	ME	AirTerminal	PL	Equipment	031-P2-ME-AirTerminal-VS-PL-Equipment	ME-AirTerminal	PL-Equipment	Hard	0.01
031	P2	ME	AirTerminal	PL	PipeSystemL1	031-P2-ME-AirTerminal-VS-PL-PipeSystemL1	ME-AirTerminal	PL-PipeSystemL1	Clearance	0.03
031	P2	ME	DuctSystem	AR	CurtainWall	031-P2-ME-DuctSystem-VS-AR-CurtainWall	ME-DuctSystem	AR-CurtainWall	Clearance	0.05
031	P2	ME	DuctSystem	AR	Wall	031-P2-ME-DuctSystem-VS-AR-Wall	ME-DuctSystem	AR-Wall	Clearance	0.05
031	P2	ME	DuctSystem	EL	Equipment	031-P2-ME-DuctSystem-VS-EL-Equipment	ME-DuctSystem	EL-Equipment	Clearance	0.05
031	P2	ME	DuctSystem	EL	RecessedFixt	031-P2-ME-DuctSystem-VS-EL-RecessedFixt	ME-DuctSystem	EL-RecessedFixt	Clearance	0.05
031	P2	ME	DuctSystem	FP	PipeSystem	031-P2-ME-DuctSystem-VS-FP-PipeSystem	ME-DuctSystem	FP-PipeSystem	Clearance	0.05
031	P2	ME	DuctSystem	ME	PipeSystemL1	031-P2-ME-DuctSystem-VS-ME-PipeSystemL1	ME-DuctSystem	ME-PipeSystemL1	Clearance	0.05
031	P2	ME	DuctSystem	PL	PipeSystemL1	031-P2-ME-DuctSystem-VS-PL-PipeSystemL1	ME-DuctSystem	PL-PipeSystemL1	Clearance	0.05
031	P2	ME	DuctSystem	ST	Beam	031-P2-ME-DuctSystem-VS-ST-Beam	ME-DuctSystem	ST-Beam	Clearance	0.05
031	P2	ME	DuctSystem	ST	Wall	031-P2-ME-DuctSystem-VS-ST-Wall	ME-DuctSystem	ST-Wall	Clearance	0.05
031	P2	ME	Equipment	FP	PipeSystem	031-P2-ME-Equipment-VS-FP-PipeSystem	ME-Equipment	FP-PipeSystem	Hard	0.01
031	P2	ME	Equipment	ME	PipeSystemL1	031-P2-ME-Equipment-VS-ME-PipeSystemL1	ME-Equipment	ME-PipeSystemL1	Hard	0.01
031	P2	ME	Equipment	PL	PipeSystemL1	031-P2-ME-Equipment-VS-PL-PipeSystemL1	ME-Equipment	PL-PipeSystemL1	Hard	0.01
031	P2	ME	PipeSystemL1	AR	Column	031-P2-ME-PipeSystemL1-VS-AR-Column	ME-PipeSystemL1	AR-Column	Clearance	0.05
031	P2	ME	PipeSystemL1	AR	CurtainWall	031-P2-ME-PipeSystemL1-VS-AR-CurtainWall	ME-PipeSystemL1	AR-CurtainWall	Clearance	0.05
031	P2	ME	PipeSystemL1	AR	Floor	031-P2-ME-PipeSystemL1-VS-AR-Floor	ME-PipeSystemL1	AR-Floor	Clearance	0.05
031	P2	ME	PipeSystemL1	AR	Ramp	031-P2-ME-PipeSystemL1-VS-AR-Ramp	ME-PipeSystemL1	AR-Ramp	Clearance	0.05
031	P2	ME	PipeSystemL1	AR	Roof	031-P2-ME-PipeSystemL1-VS-AR-Roof	ME-PipeSystemL1	AR-Roof	Clearance	0.05
031	P2	ME	PipeSystemL1	AR	Stair	031-P2-ME-PipeSystemL1-VS-AR-Stair	ME-PipeSystemL1	AR-Stair	Clearance	0.05
031	P2	ME	PipeSystemL1	AR	Wall	031-P2-ME-PipeSystemL1-VS-AR-Wall	ME-PipeSystemL1	AR-Wall	Clearance	0.05
031	P2	ME	PipeSystemL1	EL	CableTray	031-P2-ME-PipeSystemL1-VS-EL-CableTray	ME-PipeSystemL1	EL-CableTray	Clearance	0.05
031	P2	ME	PipeSystemL1	EL	Equipment	031-P2-ME-PipeSystemL1-VS-EL-Equipment	ME-PipeSystemL1	EL-Equipment	Clearance	0.05
031	P2	ME	PipeSystemL1	EL	RecessedFixt	031-P2-ME-PipeSystemL1-VS-EL-RecessedFixt	ME-PipeSystemL1	EL-RecessedFixt	Clearance	0.05
031	P2	ME	PipeSystemL1	TL	CableTray	031-P2-ME-PipeSystemL1-VS-TL-CableTray	ME-PipeSystemL1	TL-CableTray	Clearance	0.05
031	P2	ME	PipeSystemL1	FP	Equipment	031-P2-ME-PipeSystemL1-VS-FP-Equipment	ME-PipeSystemL1	FP-Equipment	Clearance	0.05
031	P2	ME	PipeSystemL1	FP	PipeSystem	031-P2-ME-PipeSystemL1-VS-FP-PipeSystem	ME-PipeSystemL1	FP-PipeSystem	Clearance	0.05
031	P2	ME	PipeSystemL1	ME	PipeSystemL1	031-P2-ME-PipeSystemL1-VS-ME-PipeSystemL1	ME-PipeSystemL1	ME-PipeSystemL1	Clearance	0.05
031	P2	ME	PipeSystemL1	PL	Equipment	031-P2-ME-PipeSystemL1-VS-PL-Equipment	ME-PipeSystemL1	PL-Equipment	Clearance	0.05
031	P2	ME	PipeSystemL1	PL	PipeSystemL1	031-P2-ME-PipeSystemL1-VS-PL-PipeSystemL1	ME-PipeSystemL1	PL-PipeSystemL1	Clearance	0.05
031	P2	ME	PipeSystemL1	ST	Beam	031-P2-ME-PipeSystemL1-VS-ST-Beam	ME-PipeSystemL1	ST-Beam	Clearance	0.05
031	P2	ME	PipeSystemL1	ST	Column	031-P2-ME-PipeSystemL1-VS-ST-Column	ME-PipeSystemL1	ST-Column	Clearance	0.05
031	P2	ME	PipeSystemL1	ST	Floor	031-P2-ME-PipeSystemL1-VS-ST-Floor	ME-PipeSystemL1	ST-Floor	Clearance	0.05
031	P2	ME	PipeSystemL1	ST	Foundation	031-P2-ME-PipeSystemL1-VS-ST-Foundation	ME-PipeSystemL1	ST-Foundation	Clearance	0.05
031	P2	ME	PipeSystemL1	ST	Stair	031-P2-ME-PipeSystemL1-VS-ST-Stair	ME-PipeSystemL1	ST-Stair	Clearance	0.05
031	P2	ME	PipeSystemL1	ST	Wall	031-P2-ME-PipeSystemL1-VS-ST-Wall	ME-PipeSystemL1	ST-Wall	Clearance	0.05

BIM Coordination Roadmap



Define the
required
Resources

The Models
Segregation

Define the
System
Hierarchy

Model Checking &
Type of Clashes

Tracking the
Issues

01

03

05

07

09

02

04

06

08

10

BIM
Coordination
Meetings

Unique Reference
System (URS) File

Create Priority
& Clash Matrix

Grouping
the Clashes

Analysis
the Results

Step 07: Model Checking & Type of Clashes



After creating the federated model, search sets and clash tests are created based on the Clash Matrix.

The screenshot displays the Clash Detective software interface. At the top, the window title is "Clash Detective" and the project name is "2121-P3-ST-Beam-VS-ST-Beam". The status bar indicates "Last Run: Sunday, January 22, 2023 9:19:08 AM" and "Clashes - Total: 278 (Open: 278 Closed: 0)".

Name	Status	Clashes	New	Active	Reviewed	Approved	Reso
1222-P3-AI-Railing-VS-SS-Beam	Old	0	0	0	0	0	0
1222-P3-AI-SpecialtyEq-VS-SS-Beam	Old	0	0	0	0	0	0
1313-P2-AG-Sign-VS-AG-Sign	Old	0	0	0	0	0	0
1321-P2-AG-Sign-VS-ST-Beam	Old	0	0	0	0	0	0
1321-P2-AG-Sign-VS-ST-Wall	Old	0	0	0	0	0	0
1321-P3-AG-Sign-VS-ST-Column	Old	0	0	0	0	0	0
1321-P3-AG-Sign-VS-ST-Floor	Old	0	0	0	0	0	0

Below the table are buttons for "Add Test", "Reset All", "Compact All", "Delete All", and "Update All".

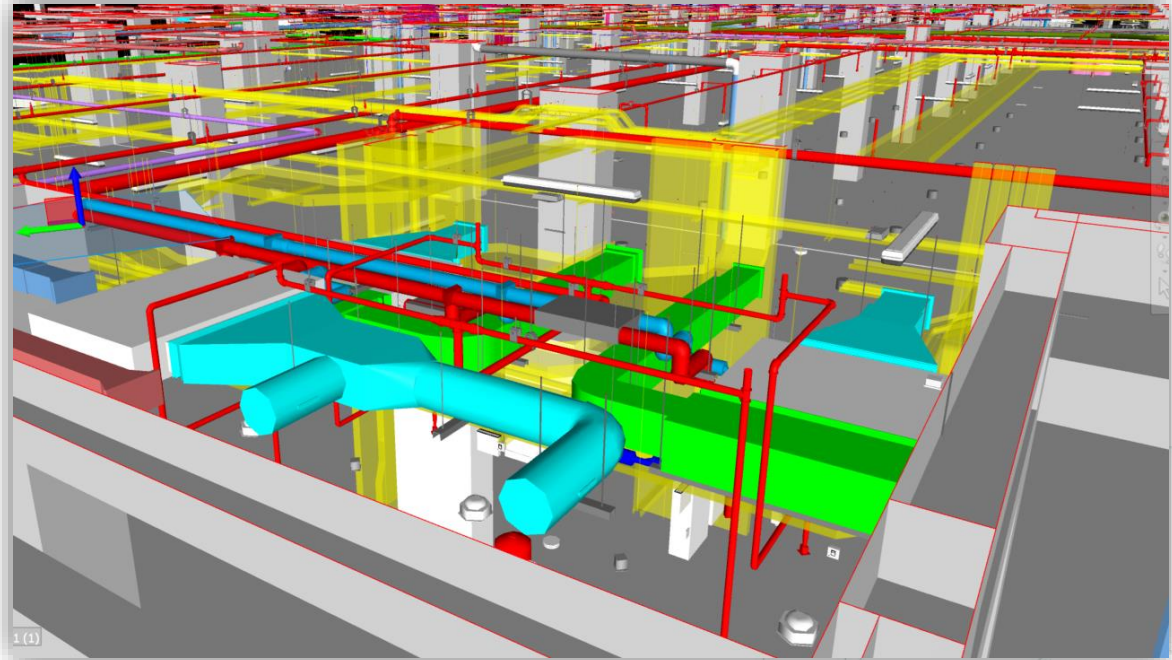
The interface also features two "Selection" panels (A and B) and a "Sets" tree view on the right. Selection A includes sets like "013-Signage (B03-P01.xml)", "021-Structural Concrete (B03-P01.xml)", "022-Structural Steel (B03-P01.xml)", "031-Mechanical HVAC (B03-P01.xml)", "032-Mechanical Plumbing (B03-P01.xml)", "033-Mechanical Fire (B03-P01.xml)", and "034-Mechanical Industrial (B03-P01.xml)". Selection B includes sets like "021-Structural Concrete (B03-P01.xml)", "022-Structural Steel (B03-P01.xml)", "031-Mechanical HVAC (B03-P01.xml)", "032-Mechanical Plumbing (B03-P01.xml)", "033-Mechanical Fire (B03-P01.xml)", "034-Mechanical Industrial (B03-P01.xml)", and "041-Electrical (B03-P01.xml)".

The "Sets" tree view on the right shows a hierarchical structure of sets, including "011-Architecture", "012-Architecture Interior", "013-Signage", "021-Structural Concrete", "022-Structural Steel", "031-Mechanical HVAC", "032-Mechanical Plumbing", "033-Mechanical Fire", "034-Mechanical Industrial", "041-Electrical", "042-Telecom", "101-Electrical", "102-Telecom", "201-Water&Environment", "301-Landscape", and "401-Transportation".

Step 07: Model Checking & Type of Clashes

The BIM Coordination Process shall address the following major types of Coordination Checks:

- **Visual Checking**
 - Constructability and Installation requirements.
- **Clash Detection**
 - Hard Clashes.
 - Soft Clashes (Space Clearance Requirements).

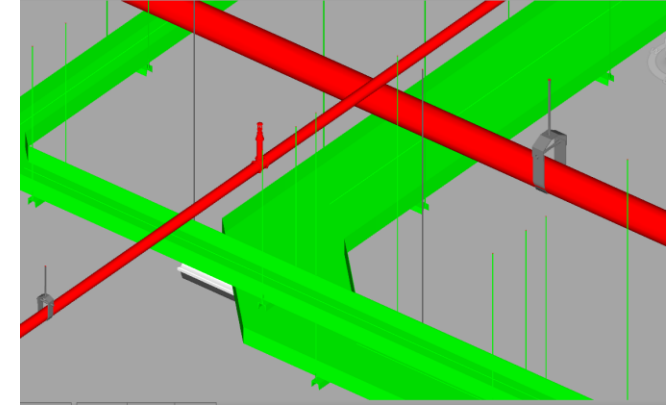
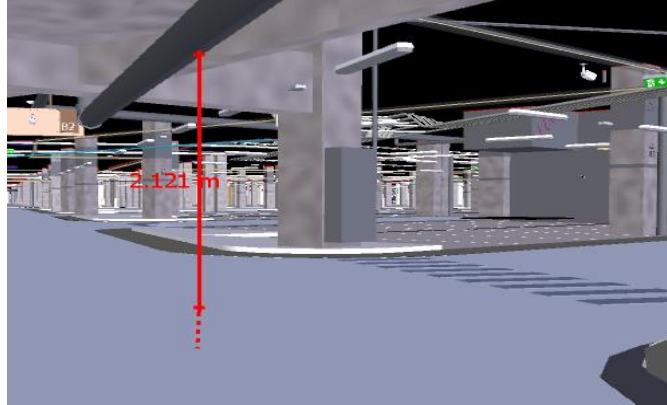


Step 07: Model Checking & Type of Clashes



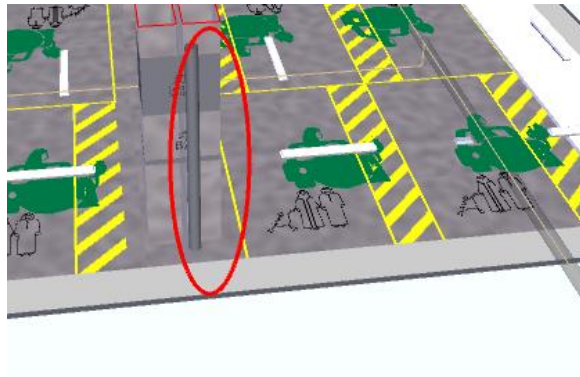
Visual checking

The clear height below the pipe is less than the minimum (2.5m)



Fire sprinkler above Cable Tray.

Mechanical pipe hides the Signage message.



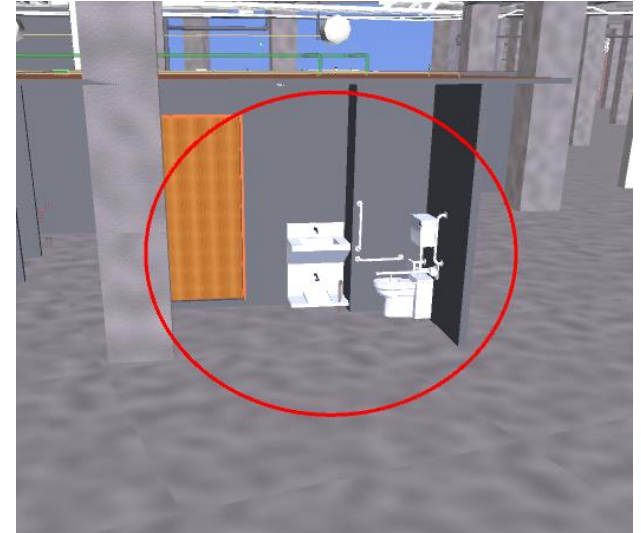
Step 07: Model Checking & Type of Clashes



Visual checking



Floating Elements

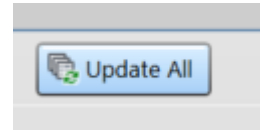


Missing Walls

Step 07: Model Checking & Type of Clashes



Finally, We are ready to Run the Clash Detection.



shutterstock.com • 698686168

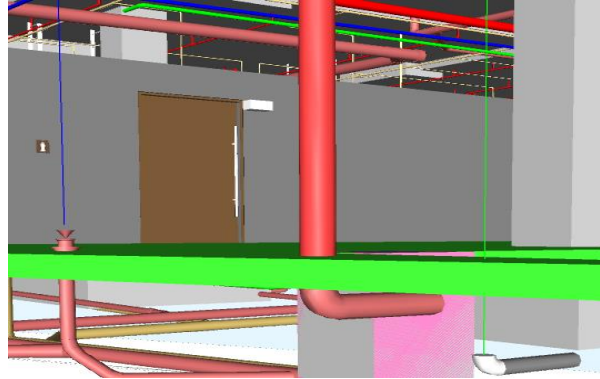
#BIG5SAUDI
thebig5saudi.com

Step 07: Model Checking & Type of Clashes

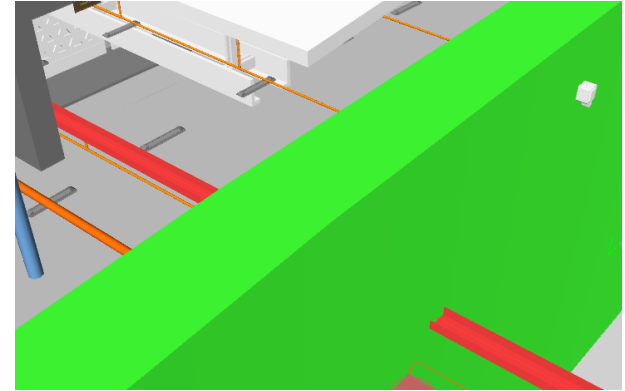


Hard Clashes

Hard clashes occur when two or more components occupy the same space or interfere with each other.



Clash Between Mechanical pipe (Red) and Concrete foundation (Green)



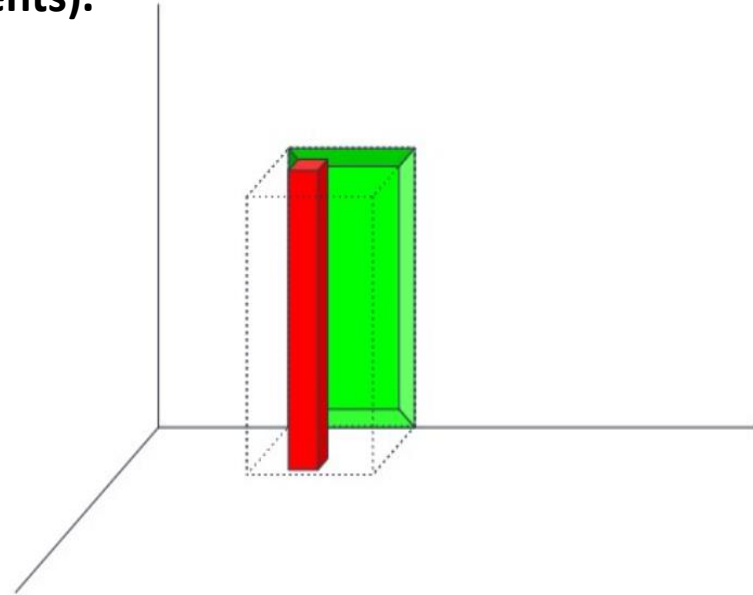
Clash between Cable Tray (Red) and Structural Wall (Green)

Step 07: Model Checking & Type of Clashes



Soft clashes (Space Clearance Requirements).

A soft clash indicates that an object has not been given sufficient geometric tolerances in the design phase or that its buffer zone has been violated.



BIM Coordination Roadmap



Define the
required
Resources

The Models
Segregation

Define the
System
Hierarchy

Model Checking &
Type of Clashes

Tracking the
Issues

01

03

05

07

09

02

04

06

08

10

BIM
Coordination
Meetings

Unique Reference
System (URS) File

Create Priority
& Clash Matrix

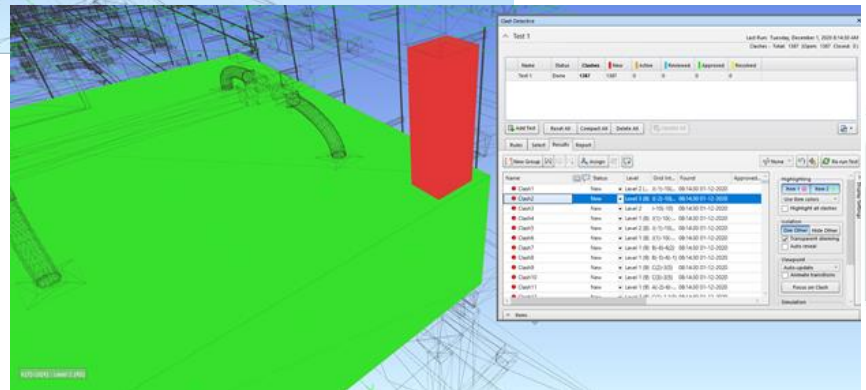
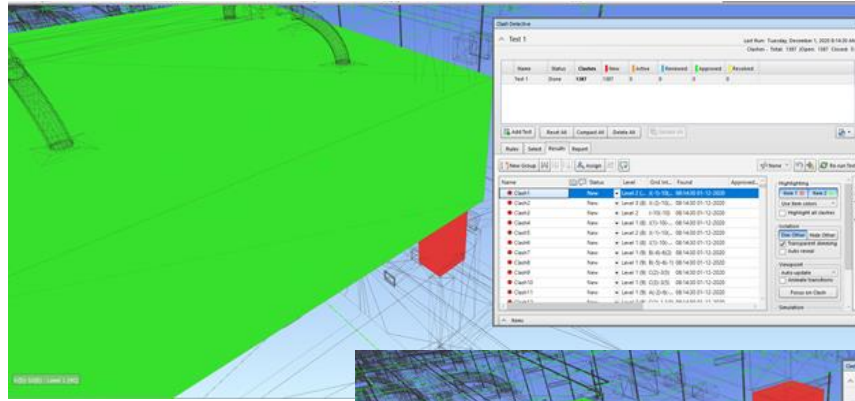
Grouping
the Clashes

Analysis
the Results

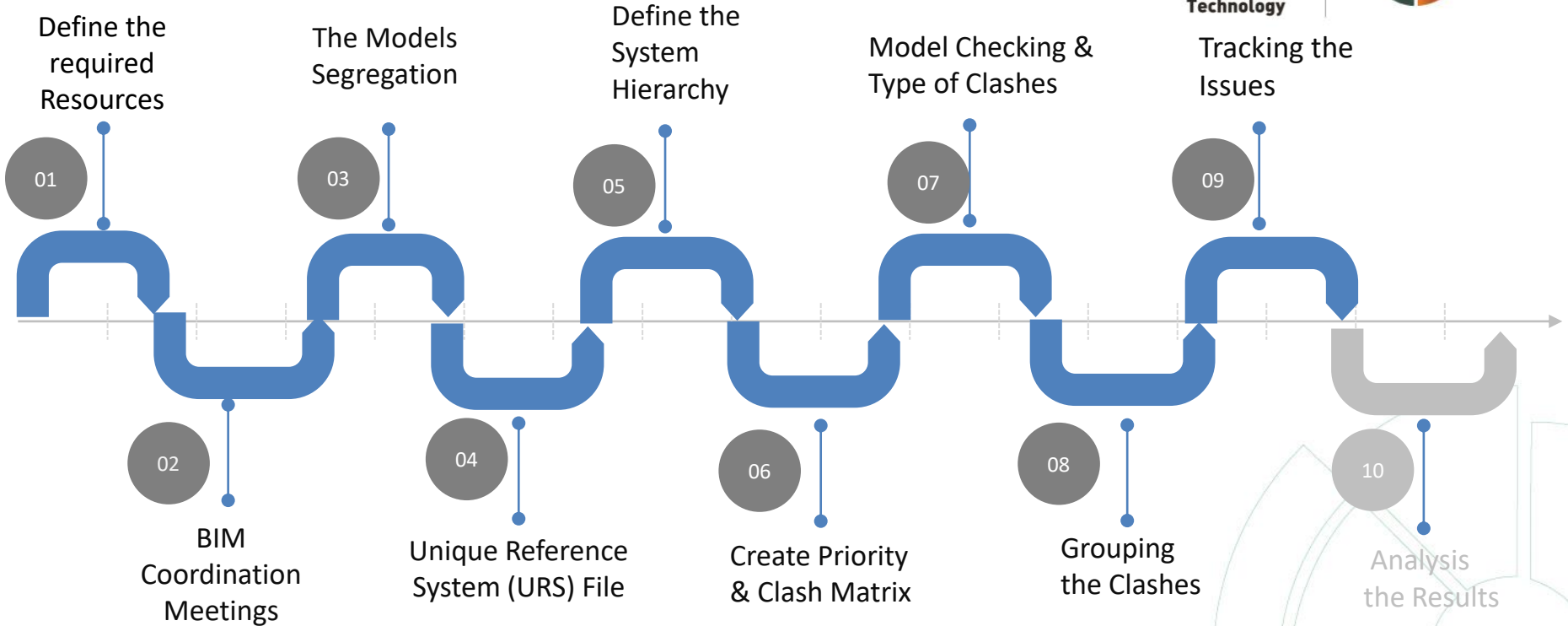
Step 08: Grouping Clashes



If a piece of air duct is going through a wall, Navisworks will see the front and back sides of the wall as two different clashes, even though it is a single clash. In this scenario, grouping clashes will come in handy, **making the list of clashes more manageable.**



BIM Coordination Roadmap



Step 09: Tracking Issues “BIM Collab”



To coordinate is to detect
but also to **Resolve**.

An issue is solved sooner if
it’s easier to consume by
the person who must
solve it.

Snapshot	Nr	Title	Assigned to	Area	Milestone	Deadline	Labels	Approval	Priority	Type	Status	
	1	Coordination needed for infra	Islam Youssef	Model	Design phase	20-03-2022		Ahmed Sayed, /	Critical	Clash	Closed	
	2	Clash between pipe network and manhole	Islam Youssef	Model	Design phase	17-03-2022			Normal	Issue	Closed	
	3	Broken segment need to be fixed	DPU Admin	Model	Undecided	22-01-2023			Normal	Inquiry	Resolved	
	4	None engineering clash solving	DPU Admin	Model	Undecided	22-01-2023			Normal	Issue	Closed	
	5	TELECOM DUCT BANK IS NOT INSIDE THE MAN HOLE	DPU Admin	Model	Undecided	22-01-2023			Normal	Issue	Resolved	
	6	Clash between fire network and telecoma network	DPU Admin	Model	Design phase	22-01-2023			Normal	Clash	Active	
	7	Clash between pipe and curtain wall	Ahmed Sayed	Model	Design phase	22-01-2023			Critical	Clash	Resolved	
	8	Clash between electrical conduit and curtain wall	Ahmed Sayed	Model	Design phase	22-01-2023			Critical	Clash	Resolved	
	9	Clash between electrical TE network and SE network	Ahmed Sayed	Model	Design phase	22-01-2023			Normal	Clash	Closed	
	10	Clash between ET & SW network	Ahmed Sayed	Model	Design phase	22-01-2023			Critical	Clash	Closed	
	11	Trees clash with the building	Aya Ahmed	Model	Design phase	22-01-2023			Critical	Clash	Closed	
	12	Trees clash with the building	Aya Ahmed	Model	Design phase	22-01-2023			Normal	Clash	Closed	

BIM Coordination Roadmap



Define the
required
Resources

The Models
Segregation

Define the
System
Hierarchy

Model Checking &
Type of Clashes

Tracking the
Issues

01

03

05

07

09

02

04

06

08

10

BIM
Coordination
Meetings

Unique Reference
System (URS) File

Create Priority
& Clash Matrix

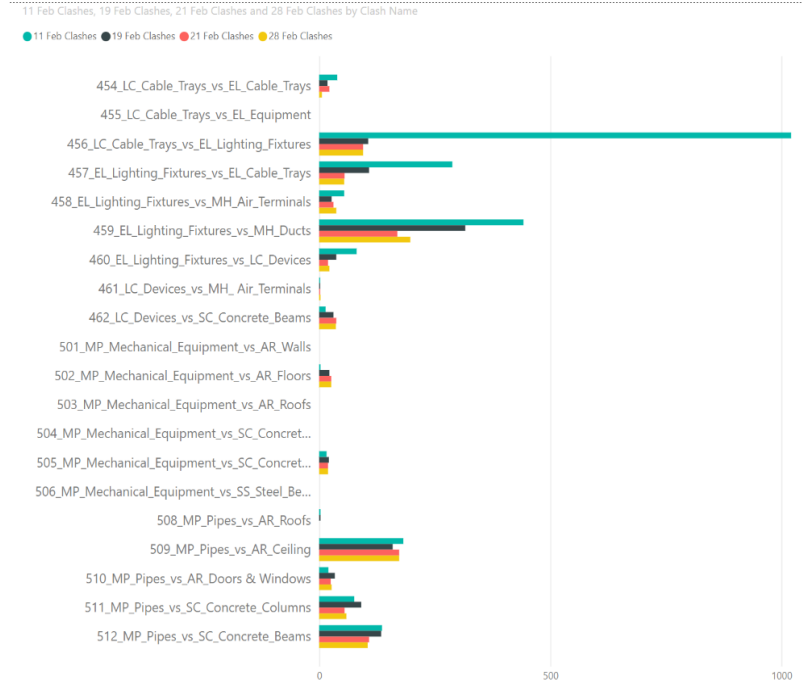
Grouping
the Clashes

Analysis
the Results

Step 10: Analysis of the Results (Power BI)

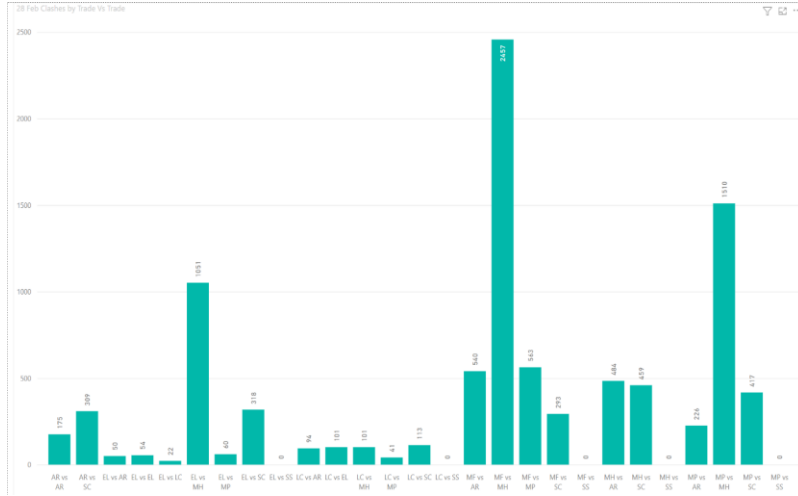


BIM is about creating and analysing data and planning appropriate actions based on the information received.



The Clashes Numbers for the last 3 runs.

Step 10: Analysis of the Results (Power BI)



Trade Vs Trade



Cash Resolution Weekly Progress



Questions and Hopefully Good Answers



THANK YOU

