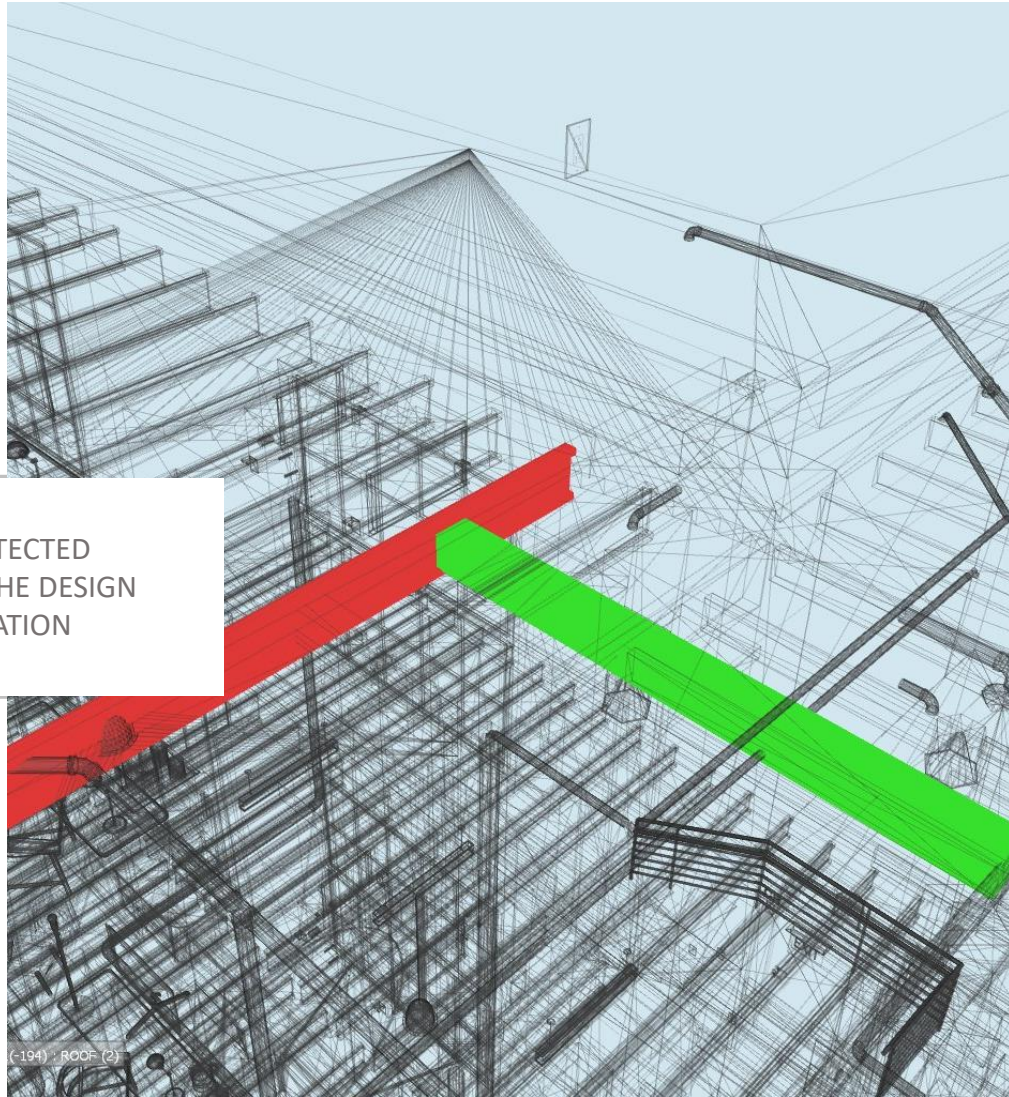




Clash Detection in BIM

Process, Benefits and Future Scope
in Modern Day AEC industry



CLASH DETECTED
DURING THE DESIGN
COORDINATION

Clash Detection in Construction

Engineering design is a dynamic field that requires effective coordination between several stakeholders for desired results. In the current era, any construction design project involves several stakeholders such as structural engineers, architects, contractors, suppliers and vendors, sometimes making the project completion process highly-complex.

On top of it, the whole building design and construction ecosystem are facing the challenge of timely completion of projects. In such a scenario, accuracy and precision are critical elements during the design phase.

Clash detection via Building Information Modeling (BIM) helps in speeding up projects by identifying clashes between several models during the design stage itself, helping architects and contractors eliminate chances of multi-level design changes which can result into budget overshoot and delay in project completion time.

Clash Detection: **What, How & Why?**

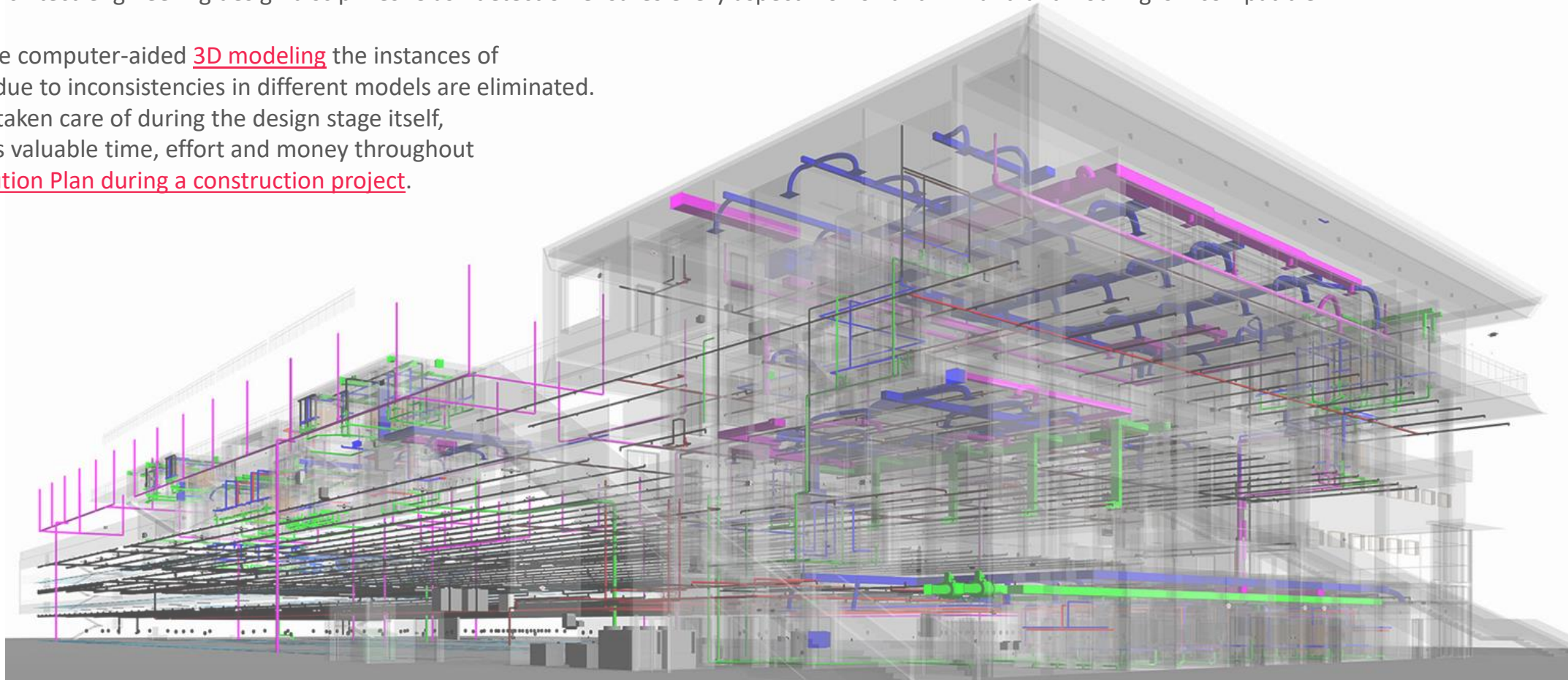
Clash detection is a critical part of the integrated BIM modeling process. BIM modeling involves creating a comprehensive master model that includes design models from different disciplines of engineering design.

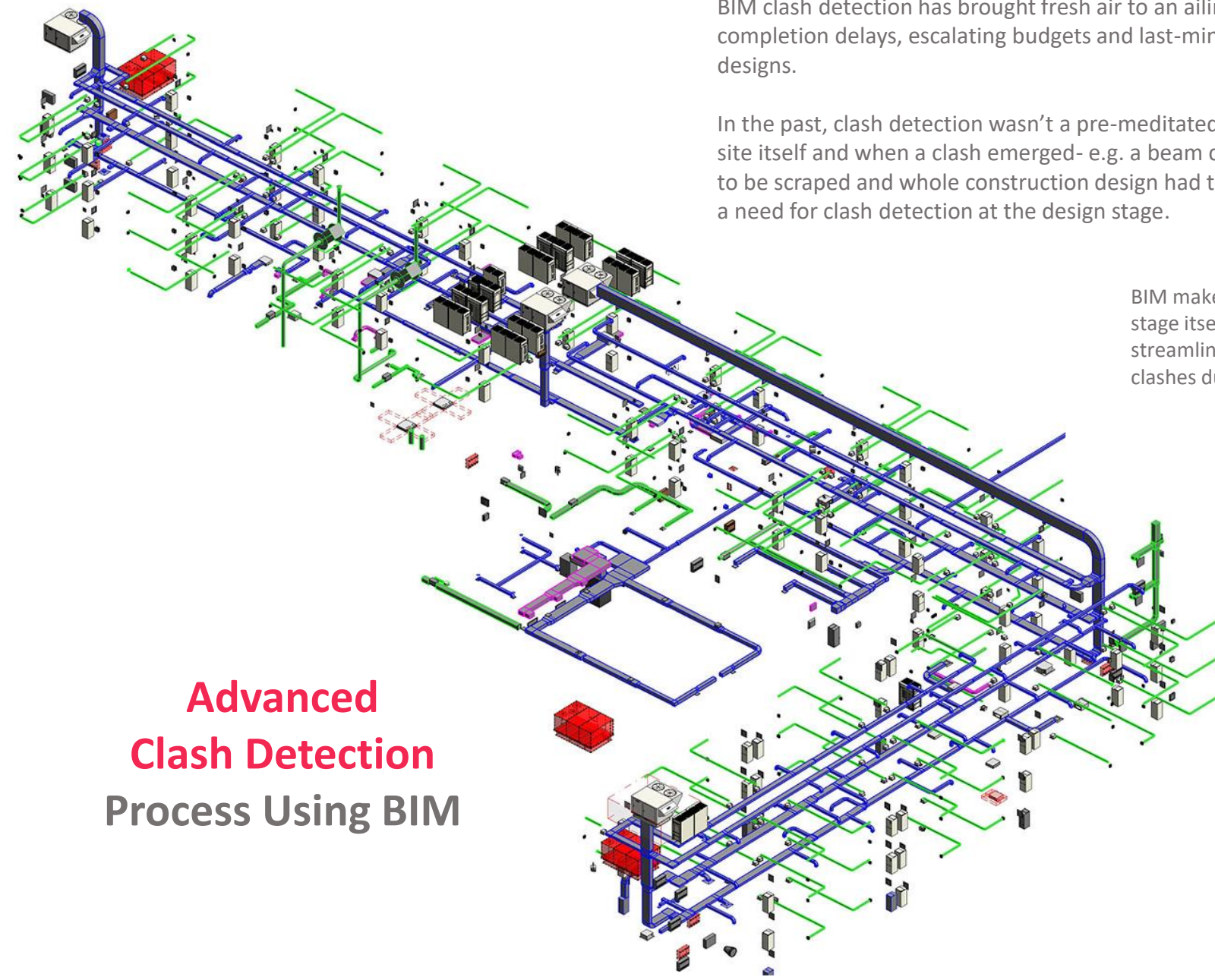
Architects, Structural engineers, MEP engineers (HVAC, Electrical and Plumbing), Environmental engineers and other professionals create design models, independent from each other. Once all the models are integrated into the BIM modeling process, clash detection comes into the picture.

Clash detection process identifies where the independent models clash with each other- finding where elements from one model overlap the elements of models from other architect-engineering design disciplines. Clash detection ensures every aspect works hand-in-hand and nothing is incompatible.

Using advanced-stage computer-aided [3D modeling](#) the instances of last-minute hurdles due to inconsistencies in different models are eliminated.

As all the things are taken care of during the design stage itself, clash detection saves valuable time, effort and money throughout the entire [BIM Execution Plan during a construction project](#).





Advanced Clash Detection Process Using BIM

BIM clash detection has brought fresh air to an ailing industry which often faced issues like project completion delays, escalating budgets and last-minute surprises due to incompatibility between various designs.

In the past, clash detection wasn't a pre-meditated endeavor. Engineers would supervise construction on the site itself and when a clash emerged- e.g. a beam coming in the path of air conditioning unit, everything had to be scraped and whole construction design had to be refined on the spot. This led to costly delays, creating a need for clash detection at the design stage.

BIM makes it possible to create detailed clash reports during the designs stage itself. Modern 3D graphics truly made the clash detection process streamlined and full-proof. Architects and designers can now detect clashes during the earliest stages of design.

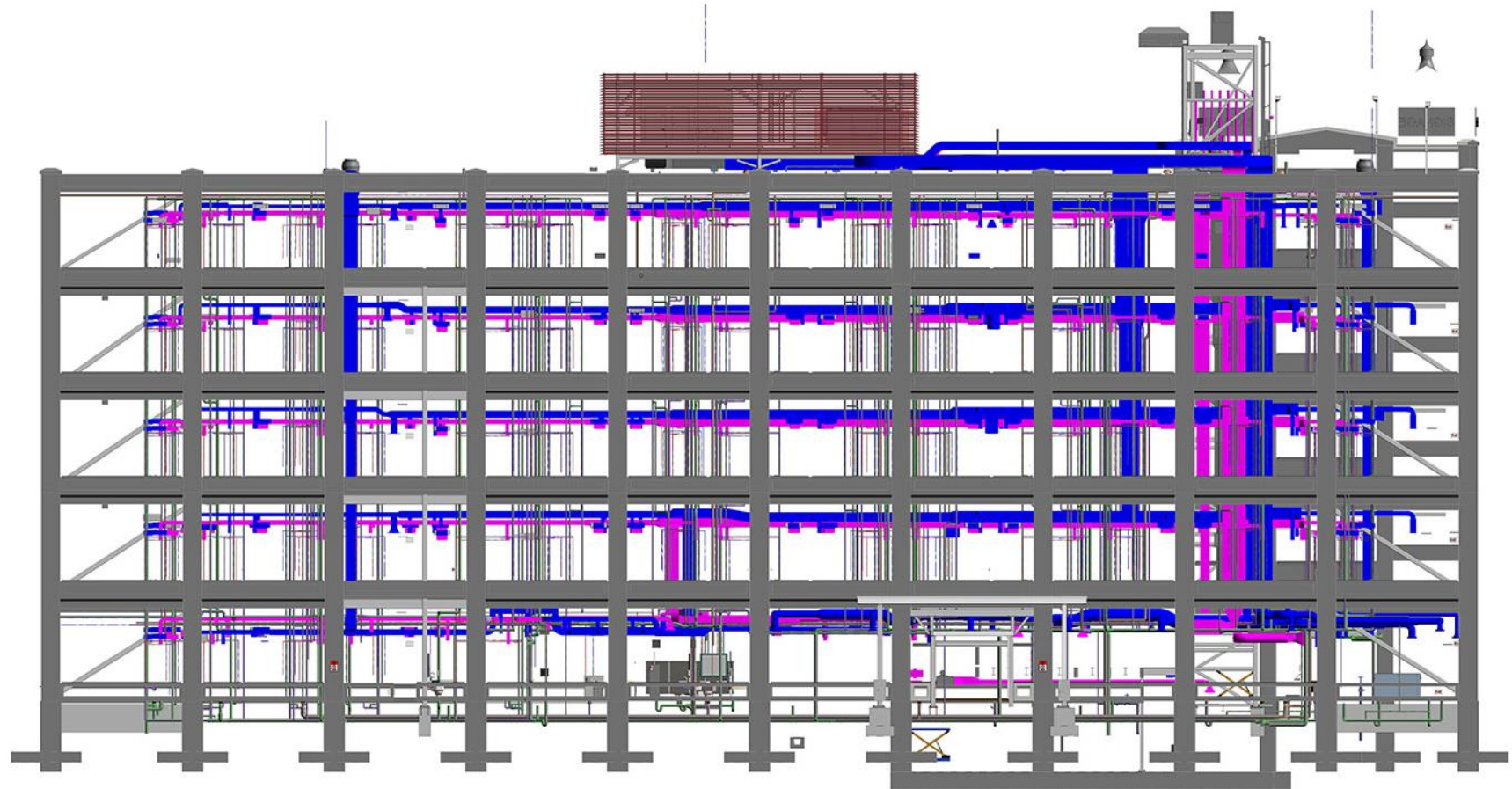
Unlike the traditional design process that would involve overlapping designs made on tracing papers, computerized BIM process evaluates a large number of federated models at the same time and makes it easier for BIM, structural and MEP coordination for integrating all the design information into a master model. Using automated integrated, architects and designers can identify and analyze all the instances of clashes in their model when all other models are combined into a single entity.


Advanced clash detection & design review packages like Navisworks makes it easier for architects and building designers to breakdown bigger models into subsets for focused clash detection. Designers can check for compatibility of structural elements against walls, for instance, and mark these clashes on-screen.

Achieving Efficiency in Clash Detection through BIM Technology

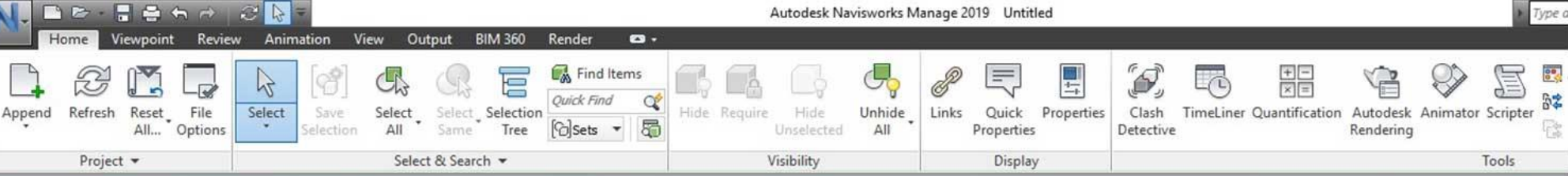
BIM and clash detection go hand in hand. Without clash detection at the design stage with the help of integrated models, completing projects in this era is next to impossible. Clashes and interference can lead to losses, delays and other problems during the construction stage and even lead to a total design failure in terms of compliance.

Even when a building design is compliant, design issues can lead to unprecedented losses. With BIM clash detection and coordination, building designs can become more efficient and functional. Clash reports give architects the power to identify duplicate instances of clashes and rectifying clashes during the final design review





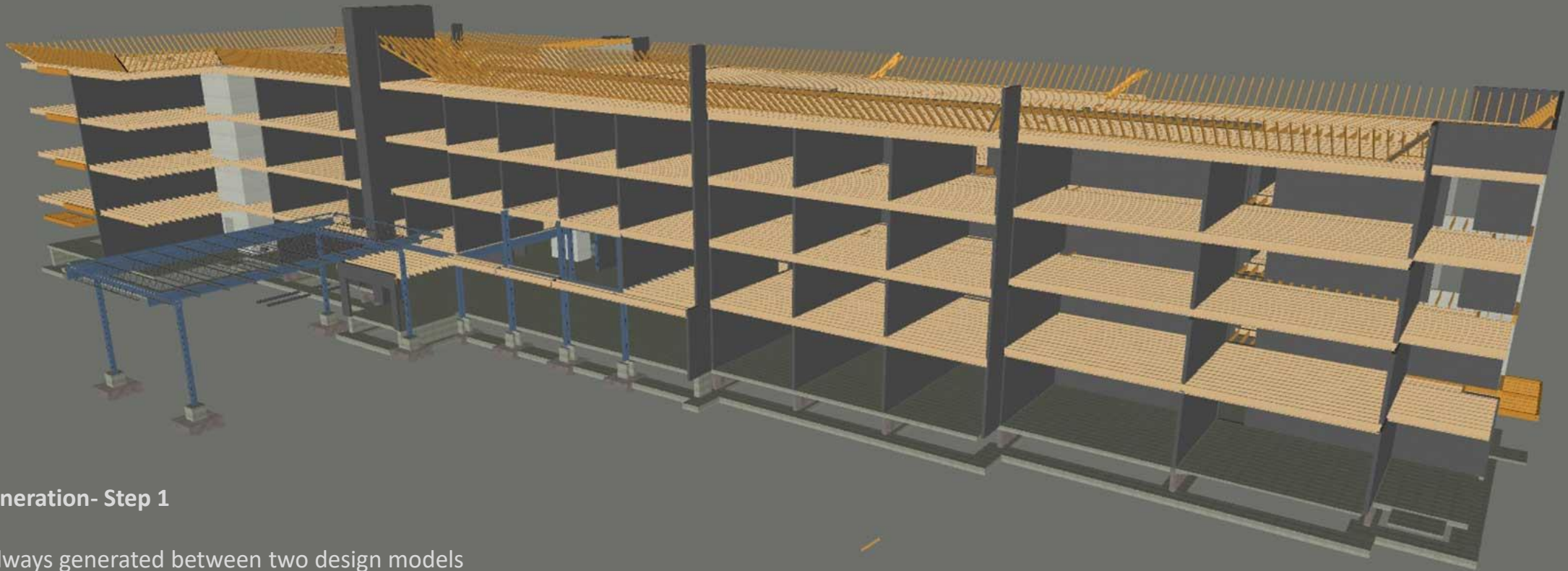
How To Generate
A Clash Report
Using Navisworks



Clash Detection Process

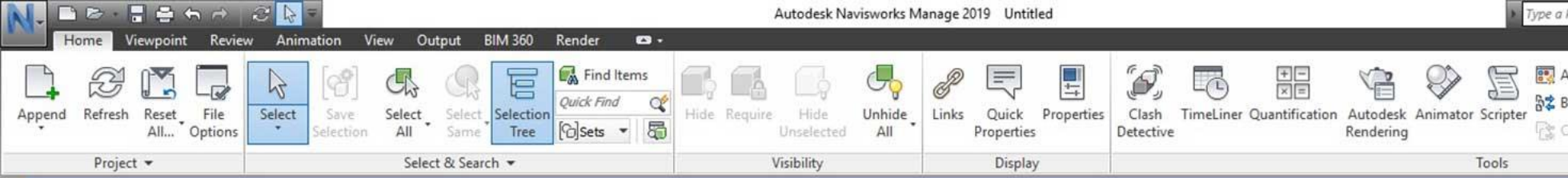
Step-1

Load First Model

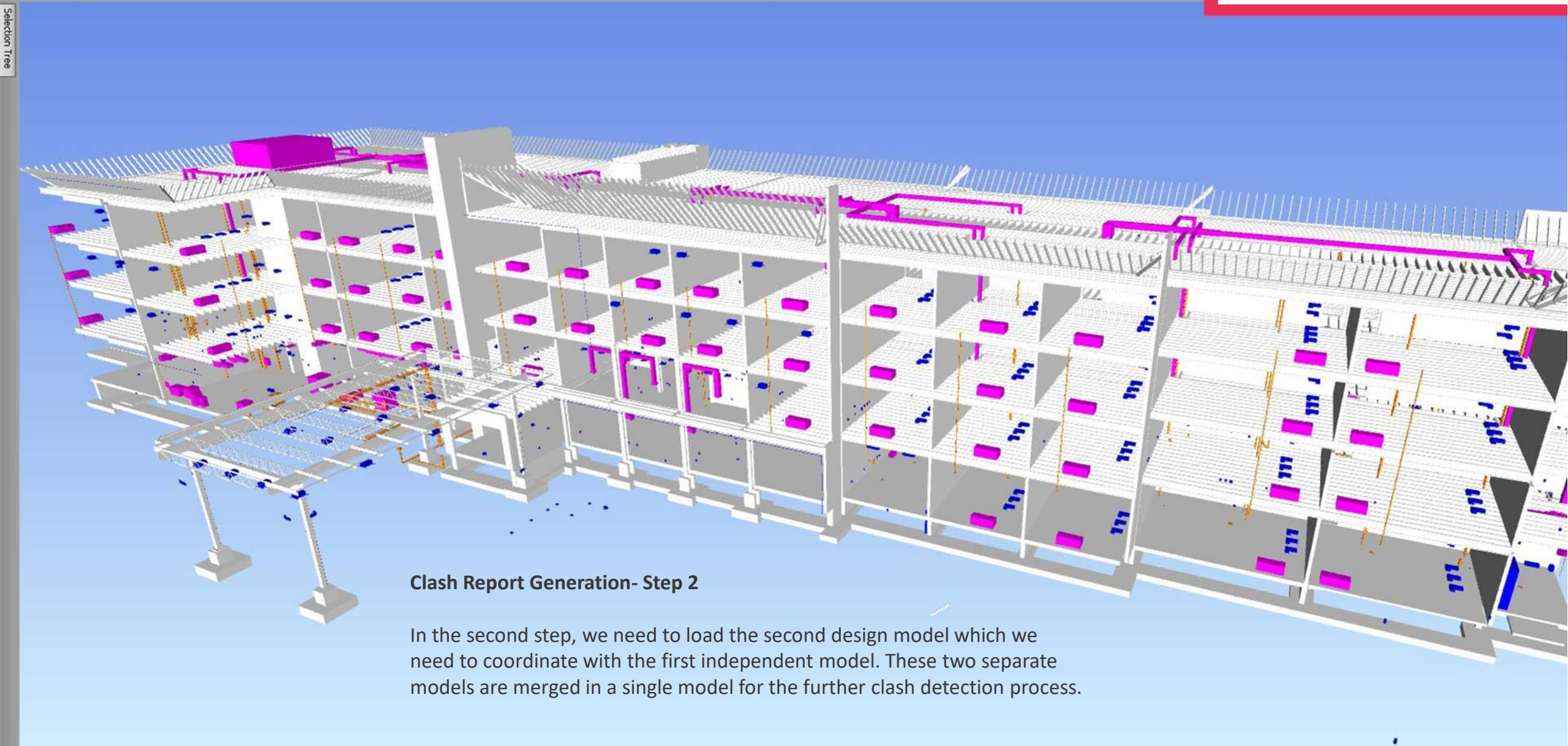


Clash Report Generation- Step 1

Clash report is always generated between two design models AutoDesk's Navisworks. The first step involved uploading the existing design model of one discipline into the Navisworks software.



Clash Detection Process
Step-2
Uploading the second model in Navisworks



Clash Report Generation- Step 2

In the second step, we need to load the second design model which we need to coordinate with the first independent model. These two separate models are merged in a single model for the further clash detection process.



Clash Detection Process
Step-3
Select design models which you need to coordinate and run test

Clash Detectives

Test 1 Last Run: <None>

Clashes - Total: 0 (Open: 0 Closed: 0)

Name	Status	Clashes	New	Active	Reviewed	Approved	Resolved
PLUMBING TO STR	New	0	0	0	0	0	0

Rules | Select | Results | Report

Selection A

- Standard
- 18-039_ARCH.fbx
- 18-039_STRU.fbx
- 18-039_MECH.fbx
- 18-039_PLUM.fbx
- 18-039_ELEC.fbx

Selection B

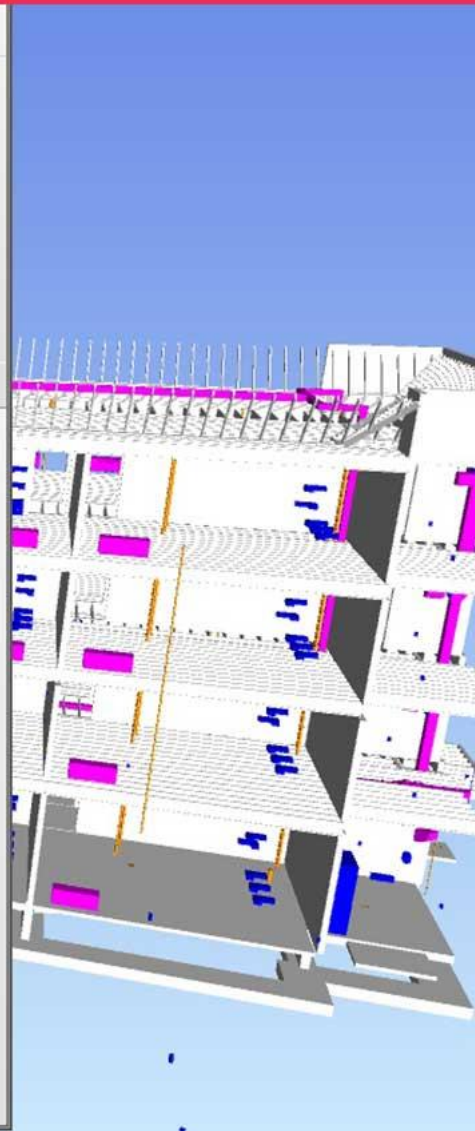
- Standard
- 18-039_ARCH.fbx
- 18-039_STRU.fbx
- 18-039_MECH.fbx
- 18-039_PLUM.fbx
- 18-039_ELEC.fbx

Settings

Tolerance: 0.001 m

Step (sec): 0.1

Run Test



Clash Report Generation- Step 3

Next steps involve starting the clash detection process through choosing these two models from the loaded models. Naming this report and running the clash test.



Clash Detection Process
Step-4
Report will show all the possible design clashes.

Clash Report Generation - Step 4

After running the scan, the system gives us all the potential clash between those models with status details, description and condition according to their level. It provides its status as new, active, approved and resolved which is essential when re-running the test after design alteration.

Clash Detective

PLUMBING TO STR Last Run: 25 April 2019 05:47:57 PM
Clashes - Total: 1252 (Open: 1252 Closed: 0)

Name	Status	Clashes	New	Active	Reviewed	Approved	Resolved
PLUMBING TO STR	Done	1252	1252	0	0	0	0

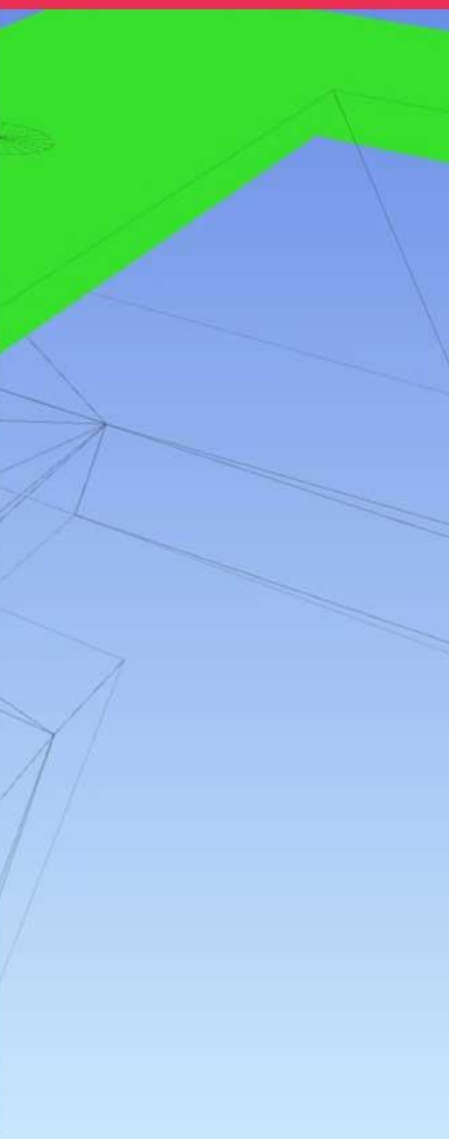
Buttons: Add Test, Reset All, Compact All, Delete All, Update All

Buttons: Rules, Select, Results, Report (circled in red)

Buttons: New Group, Assign, Re-run Test

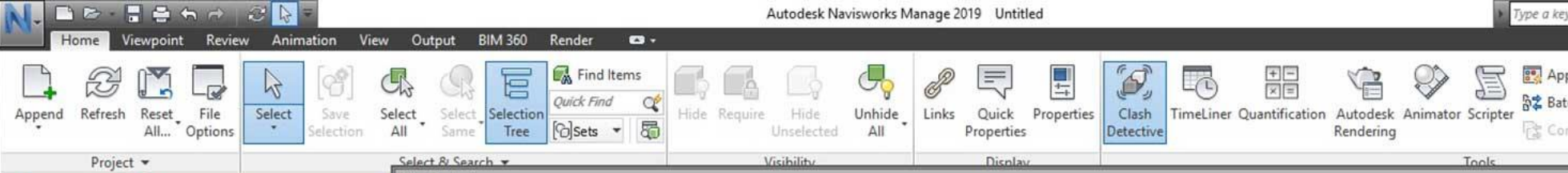
Name	Status	Found	Approved...	Approved	Description	Assigned To	Distance
Clash1	New	17:47:57 25-04-2019			Hard		-0.203 m
Clash2	New	17:47:57 25-04-2019			Hard		-0.137 m
Clash3	New	17:47:57 25-04-2019			Hard		-0.134 m
Clash4	New	17:47:57 25-04-2019			Hard		-0.127 m
Clash5	New	17:47:57 25-04-2019			Hard		-0.127 m
Clash6	New	17:47:57 25-04-2019			Hard		-0.127 m
Clash7	New	17:47:57 25-04-2019			Hard		-0.124 m
Clash8	New	17:47:57 25-04-2019			Hard		-0.123 m
Clash9	New	17:47:57 25-04-2019			Hard		-0.122 m
Clash10	New	17:47:57 25-04-2019			Hard		-0.122 m
Clash11	New	17:47:57 25-04-2019			Hard		-0.122 m
Clash12	New	17:47:57 25-04-2019			Hard		-0.122 m
Clash13	New	17:47:57 25-04-2019			Hard		-0.122 m
Clash14	New	17:47:57 25-04-2019			Hard		-0.122 m
Clash15	New	17:47:57 25-04-2019			Hard		-0.122 m
Clash16	New	17:47:57 25-04-2019			Hard		-0.122 m
Clash17	New	17:47:57 25-04-2019			Hard		-0.122 m

Items



Clash Detection Process Step-5

Select preferred details and generate Clash Report



Clash Detective

PLUMBING TO STR Last Run: 25 April 2019 05:47:57 PM
Clashes - Total: 1252 (Open: 1252 Closed: 0)

Name	Status	Clashes	New	Active	Reviewed	Approved	Resolved
PLUMBING TO STR	Done	1252	1252	0	0	0	0

Buttons: Add Test, Reset All, Compact All, Delete All, Update All

Rules | Select | Results | Report

Contents

- Summary
- Clash Point
- Date Found
- Assigned To
- Date Approved
- Approved By
- Layer Name
- Item Path
- Item ID
- Status
- Distance
- Description
- Comments
- Quick Properties
- Image
- Simulation Dates
- Simulation Event

Include Clashes

For Clash Groups, include:
Group Headers Only
 Include only filtered results

Include these statuses:

- New
- Active
- Reviewed
- Approved
- Resolved

Output Settings

Report type: Current test

Report Format: HTML

Preserve result highlighting

Write Report

Clash Report Generation - Step 5

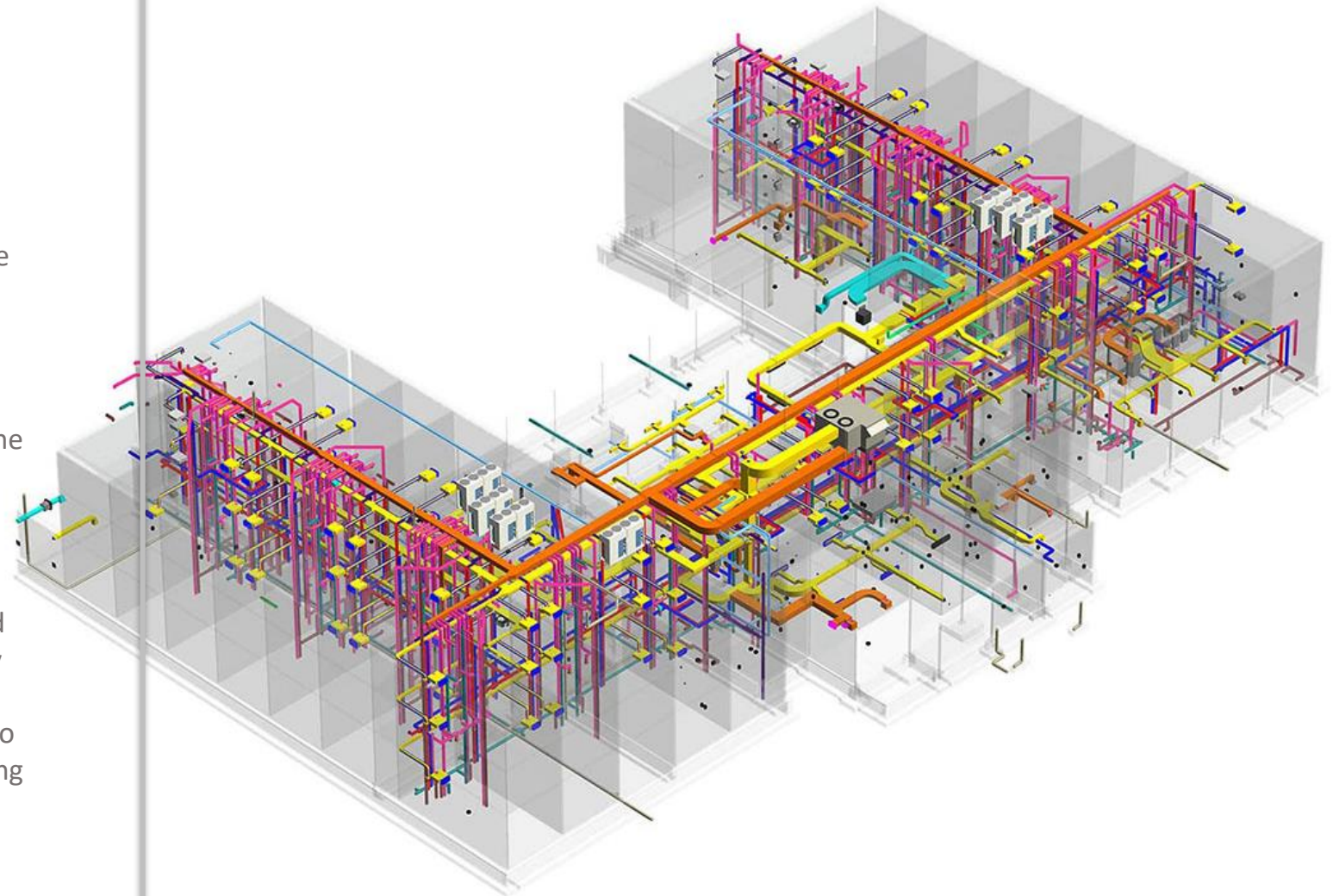
At the last stage of this process, it allows us to select all the details we want to include in the Clash Report. We can choose from the available options for the format of the report, i.e. HTML, PDF etc. Once we generate the clash report by clicking on the "Write Report", it generates a detailed report and individual images showing those clashes in two designs.

Significance & Scope

Clash Detection in Modern Era

Clash detection software suites will become more powerful with each passing day. Level 3 BIM- the future of BIM technology will make it possible to work on a single collaborative and coordinated building model, unlike the present where different models are brought together to form an integrated model. This would ensure real-time review and rectification, minimizing the chances of project clashes.

In the future, high-levels of interoperability between various BIM design software and integration tools will become a reality. Models will not only be imported and overlapped, but they will enhance BIM coordination by giving teams and computer models the power to interact between themselves in real-time. So, when two teams- architectural and structural teams might be using different packages for the same project, they will interact with each other for real-time clash detection.



02

Fewer Iterations during the Construction Phase

When everything is planned, visualized and managed with BIM during the design stage itself, it leads to fewer changes during the construction phase. As everything is collated in the form of a 3D model, identifying conflicts becomes easier at initial stages, enabling teams to coordinate for resolving issues without conflict.

03

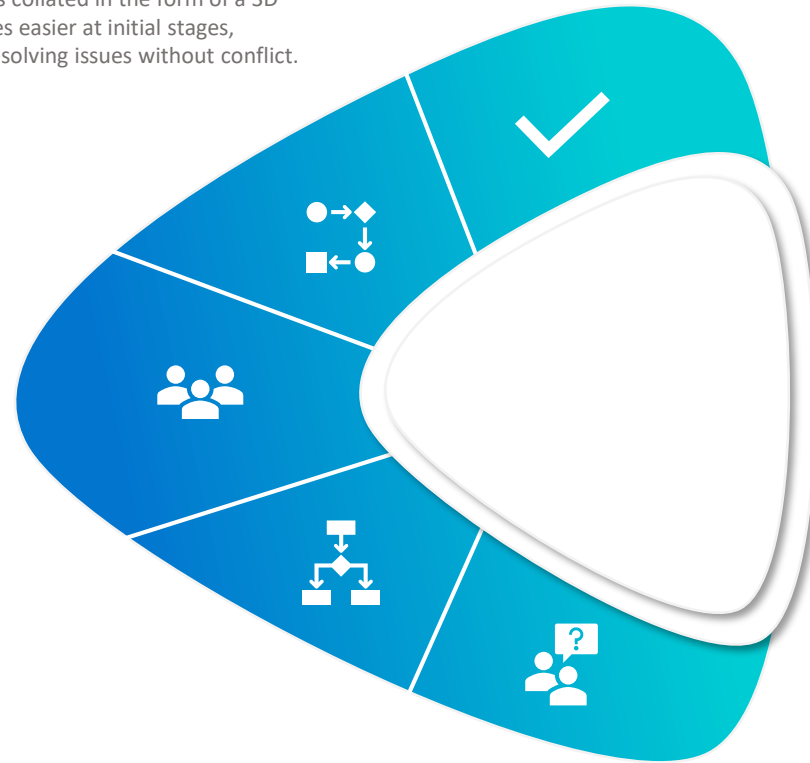
Better Coordination and Collaboration Between Teams

Digitized clash detection workflow makes it easier for teams to share and collaborate on the same project. BIM & clash detection software like Navisworks ensures prompt knowledge transfer for streamlined coordination between members of different design, construction, electrical and engineering disciplines. The review and markup capabilities with a real-time reflection into all the visuals makes the construction process faster, better and more efficient, without room for error due to negligence.

04

Automatic Clash and Conflict Resolution

Modern BIM toolkit automates multi-element clash detection. As BIM enables architects and engineers to model everything in advance, on-site conflicts are minimized as all the elements perfectly fit into each other despite being manufactured off-site.



01

Accurate Engineering Design Documentation

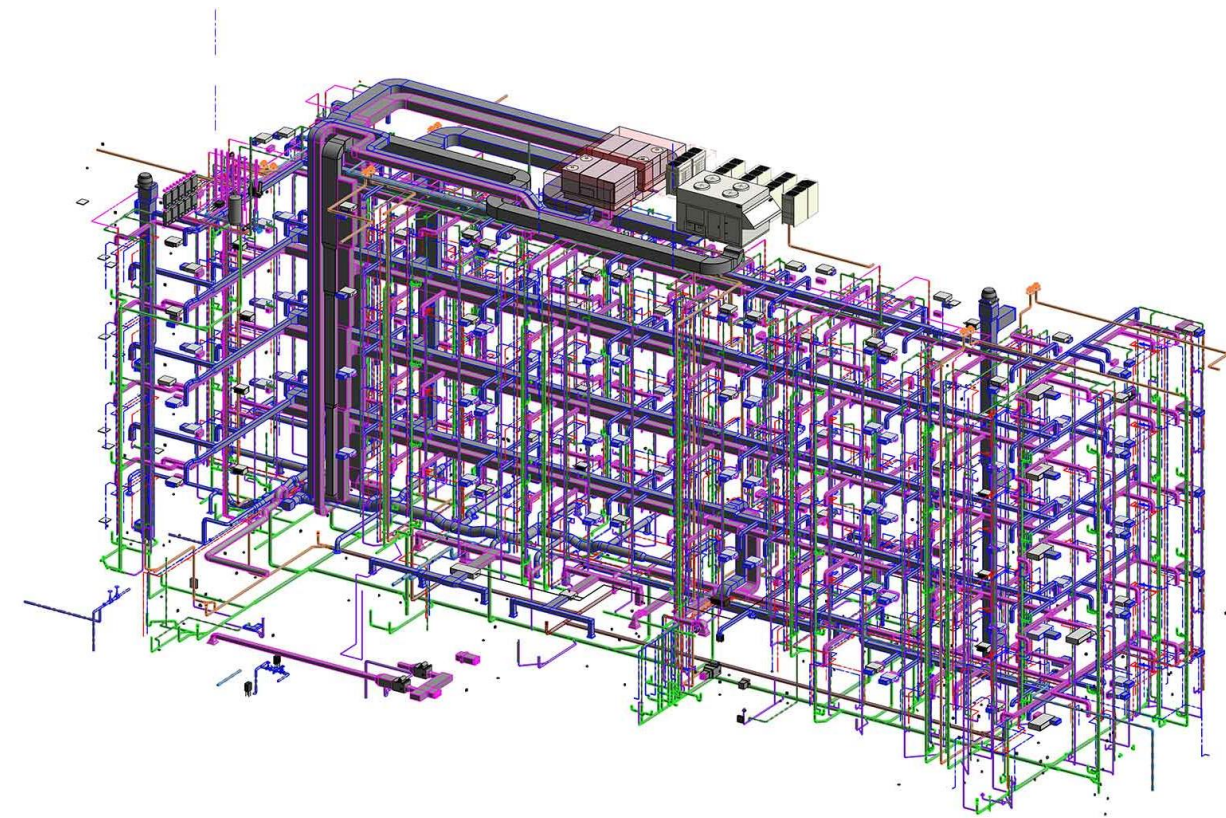
BIM technology and clash detection have collectively made it easier for designers and architects to create sophisticated building designs without worrying about the quality of construction documents. Owing to the advanced nature of clash detection & BIM software suites, a change made to a single element is reflected in all the views, automatically. Also, as everything is coordinated, knowledge transfer is seamless, reducing manual efforts and enhancing efficiencies.

BIM Clash Detection Advantages

05

Streamlined and Integrated Approach

Without a central BIM modeling strategy in place, it is quite hard for a building designer/architect to get a universal view of a project. With hundreds of totally unconnected documents, it becomes hard for the design team to visualize and pepper the right amount of creativity for success of the project. BIM clash detection provides a greater level of transparency and effective means to collaborate with other project stakeholders.



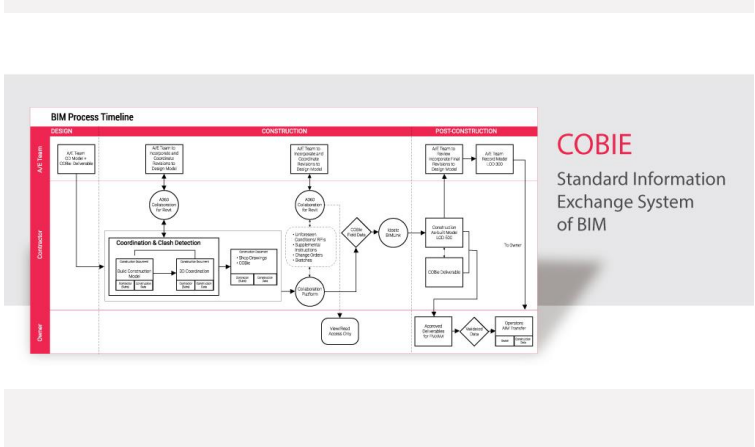
Conclusion

BIM Clash detection has revolutionized the engineering design domain, holistically. By giving everyone the power to visualize, analyze and eliminate clashes in advance, the technology is serving as much needed a lifeline for an industry stressed with thousands of issues.

At the same time, BIM and clash detection has made the lives of architects simpler by empowering them to control and supervise various elements without having to compromise on ingenuity at the last minute for project completion.

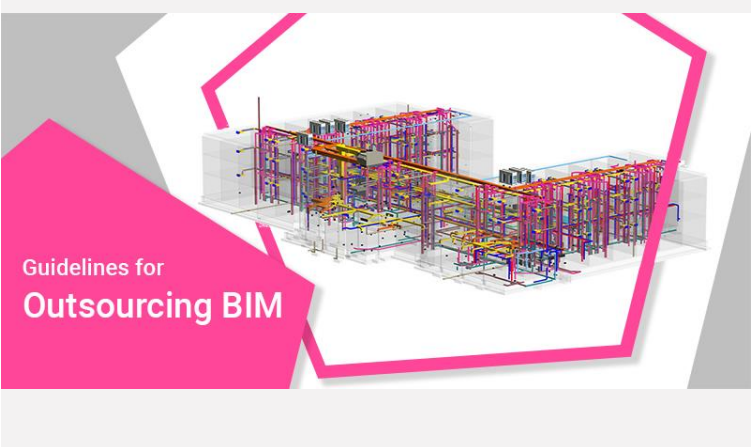
If you are thinking why [MEP Coordination- Everything You Need to Know | Importance & Benefits](#) If you are planning to implement BIM in your latest project, feel free to [Contact Us](#). We would be happy to assist you in your BIM journey.

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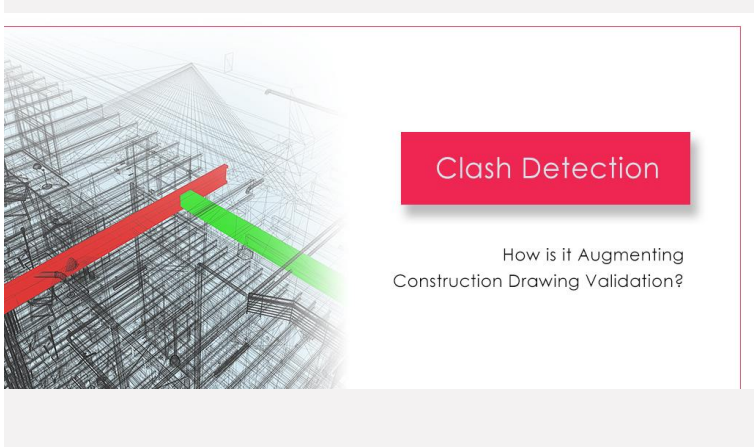
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How it is streamlining data collaboration between AEC professionals



Guidelines for Outsourcing BIM

Key Takeaways for AEC Professionals



What is Clash Detection in BIM?

Process, Benefits and Future Scope in Modern Day AEC industry

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