

Masterplans at microlevel in India – BIM as a tool



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Contents

Motivation

Present context

Introduction to BIM

Methodology

Conclusion

Motivation

To align master plans
for 6,75,000 villages
(micro-level) and 3500
towns and cities
(wards) towards
fool-proof planning
for the next 100 years





Architectural
education
around 1986



Architectural education – present context

Present context



Haphazard planning



Poor documentation



Qualified experts are limited

Introduction to BIM

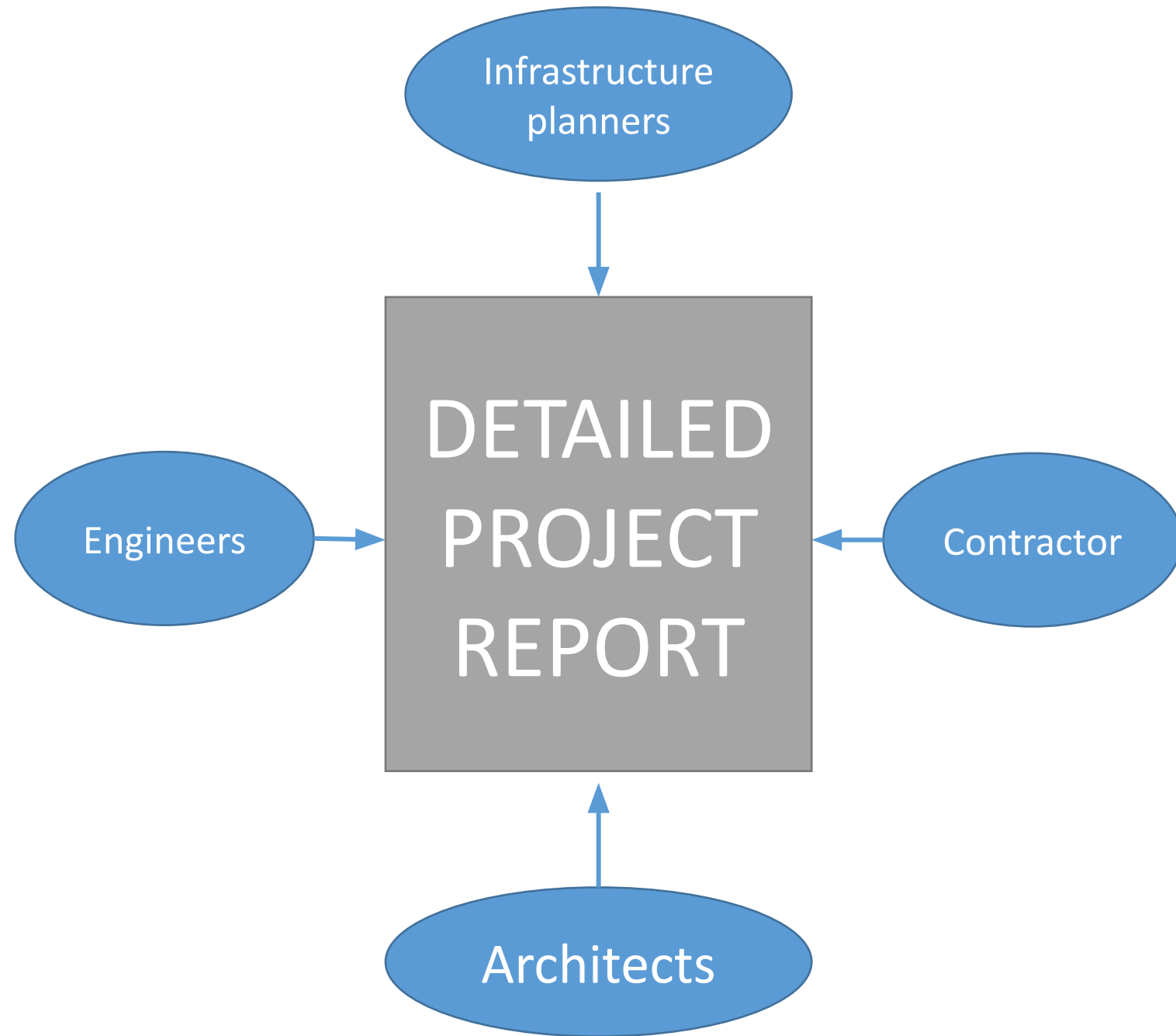
- Defining BIM
- Global BIM related initiatives
- Indian BIM Association
- BIM maturity stages
- Evolution of BIM

How BIM relates to smart villages and wards?

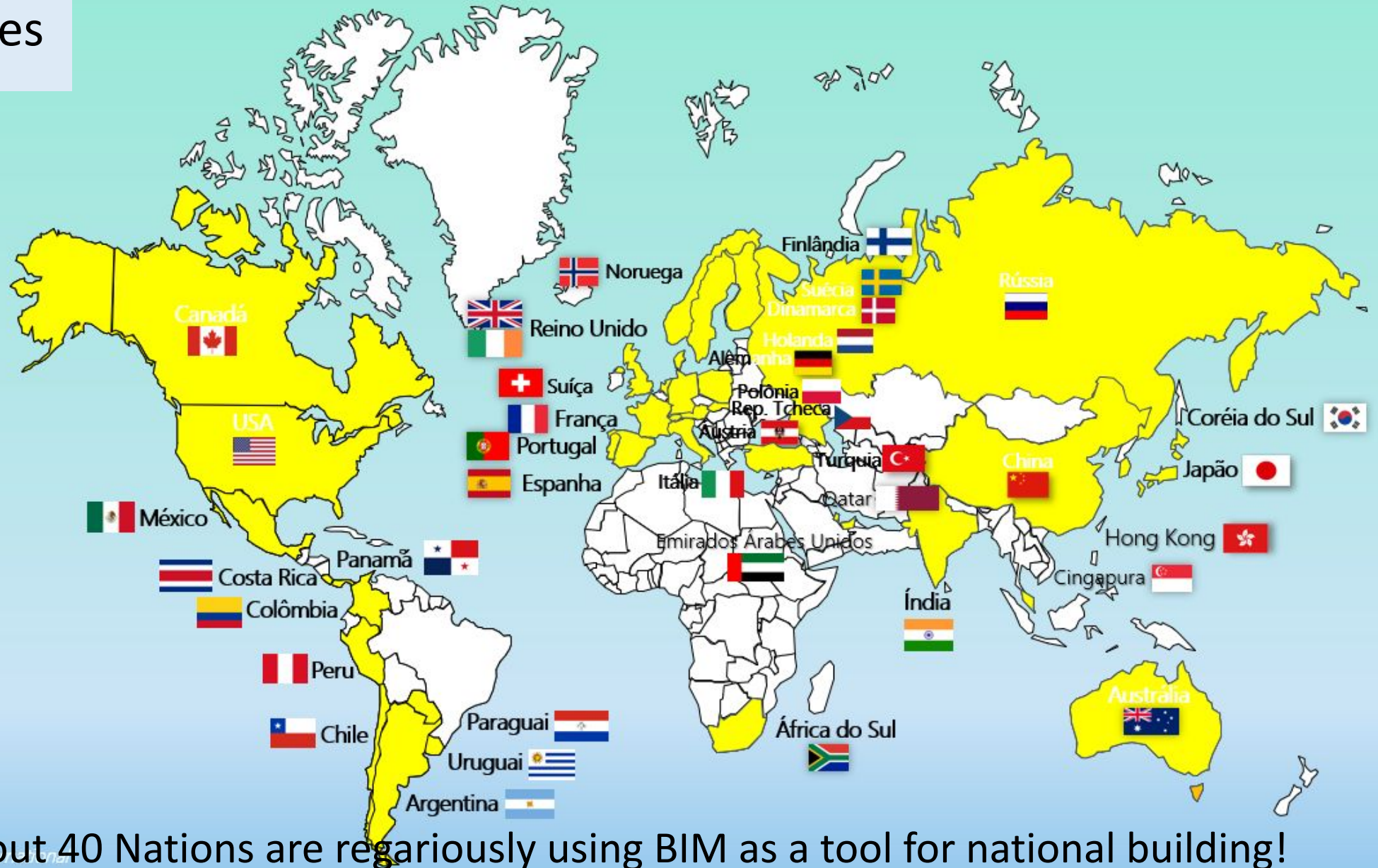
BIM is a set of technologies, processes and policies enabling multiple stakeholders to collaboratively design, construct and operate a Facility in virtual space (BIM Dictionary, 2018).

BIM is the basis for fool-proof planning and execution with full datas for facility management and maintenance.

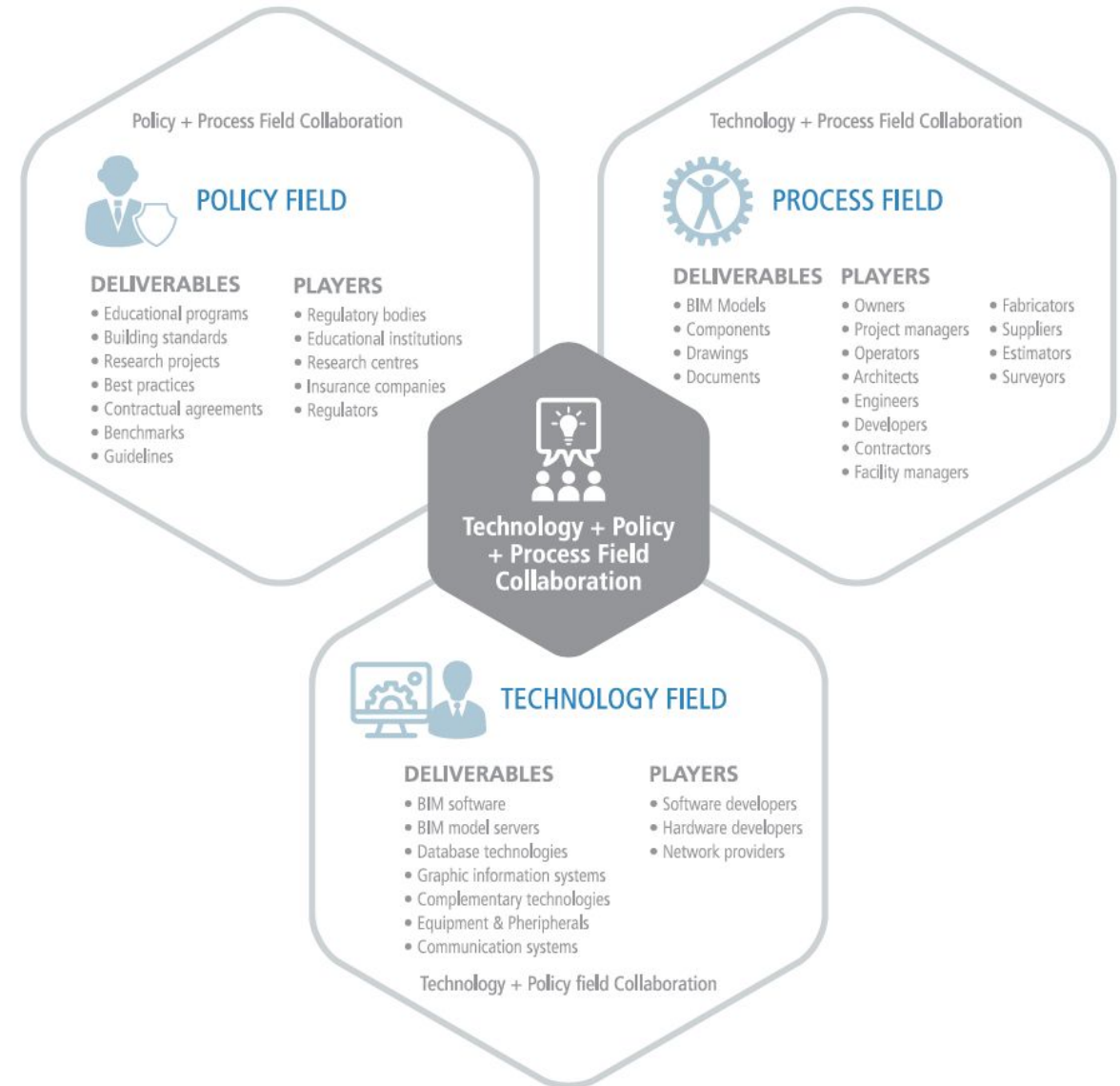
What we are lacking at micro-level, our villages and wards level in cities is an integrated master-plan with inputs from experts in the field of infrastructure planning, architecture, structures, and other allied fields.



Global BIM related initiatives



About 40 Nations are regariously using BIM as a tool for national building!



BIM Ecosystem has to be fine-tuned for
micro-level planning at village & ward-level in
cities & towns

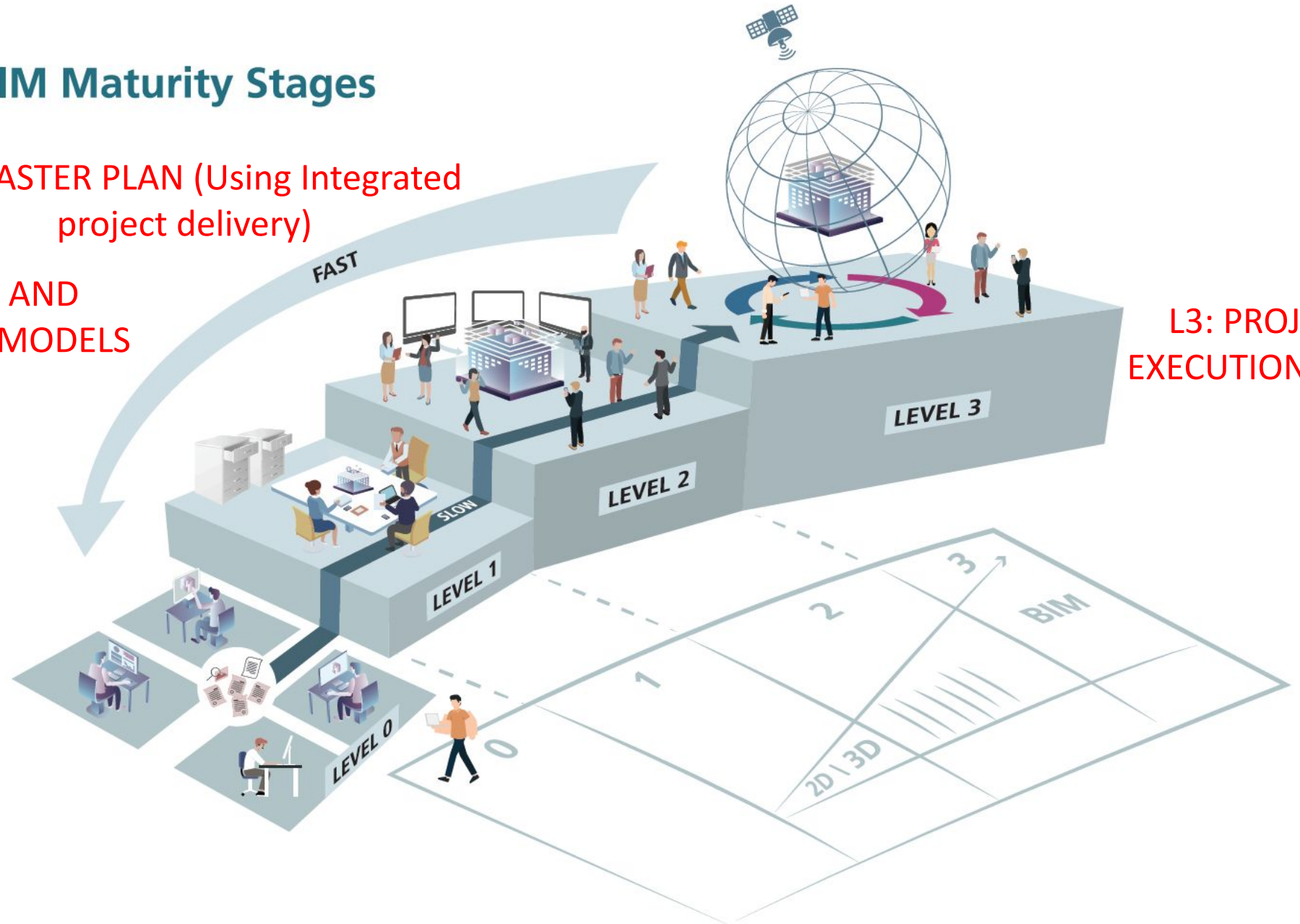
BIM Maturity Stages

L2: MASTER PLAN (Using Integrated project delivery)

L1: INFRASTRUCTURE AND SERVICES WITH ENERGY MODELS

L0: COLLECTION OF DATA AND BASIC CONCEPT

L3: PROJECT EXECUTION PLAN



BIM Education for micro-level planning with Six sigma standard

*Evolution of **BIM** education in Academia across the Globe*



Georgia Tech - 1990
Stanford Univ - 1993



Many schools
incorporated BIM in
their Curriculum
2003 - 2006



Interdisciplinary & distance
collaboration
2006 - 2009



Trans-disciplinary, Inter-level,
Multinational Collaboration
2010



Trans-disciplinary,
Inter-level, Multinational
Collaboration with various
BIM field players in process
2015



Methodology

Methodology

- Project Stakeholders
- Mode of selection of Stakeholders
- Documentation according to BIM Standards
- Collection of inputs from stakeholders on a common data platform using integrated project delivery
- Project execution plan and its documentation
- Facility management and training

Client

Project Stakeholders

Sustainability Expert

PMC

Contractor

Architect

BIM Expert

MEP Expert

Structural engineer

Surveyors

Quantity surveyor

Safety expert

Specification writer

Life cycle
analysis expert

??



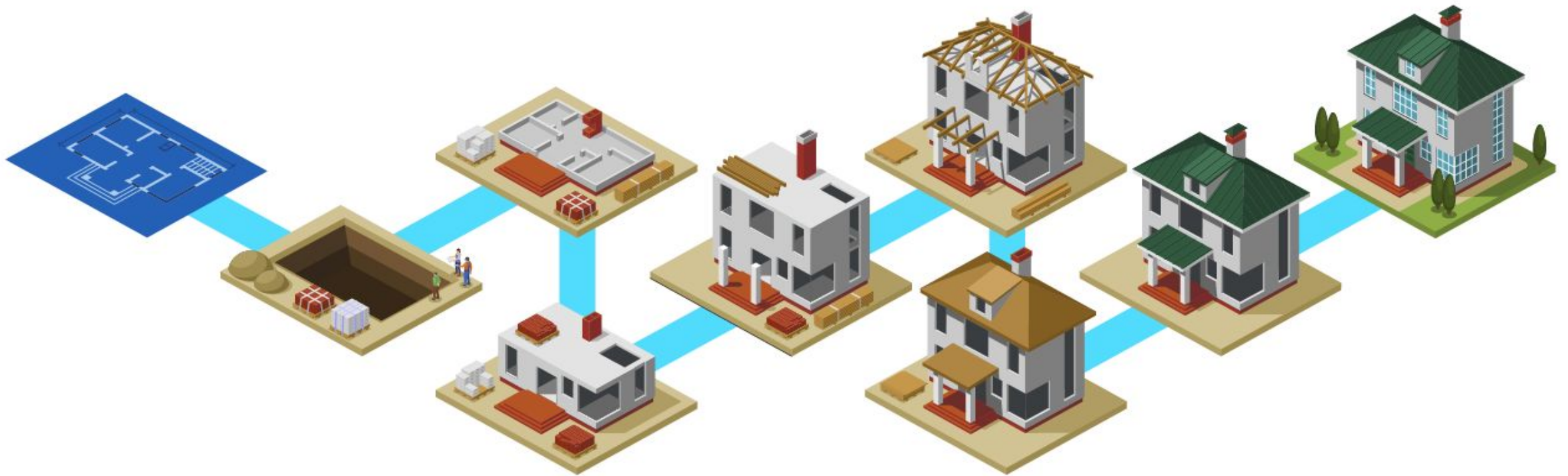
Mode of selection of Stakeholders

- Using online information, either by inviting or by receiving qualified experts, process of enlisting experts shall be done.
- Global experts should be also considered without restricting to our own nation, however there would be encouragement for local expertise.
- Grouping of stakeholders for preparing around 10 lakh reports and master plans shall be done based on strict criterias.

Documentation according to BIM Standards

- BIM has its own set of disciplines and standards.
- We need to simplify and fine-tune to basic requirements of DPR and master plan preparation for villages and towns.

Collection of inputs from stakeholders on a common data platform using integrated project delivery

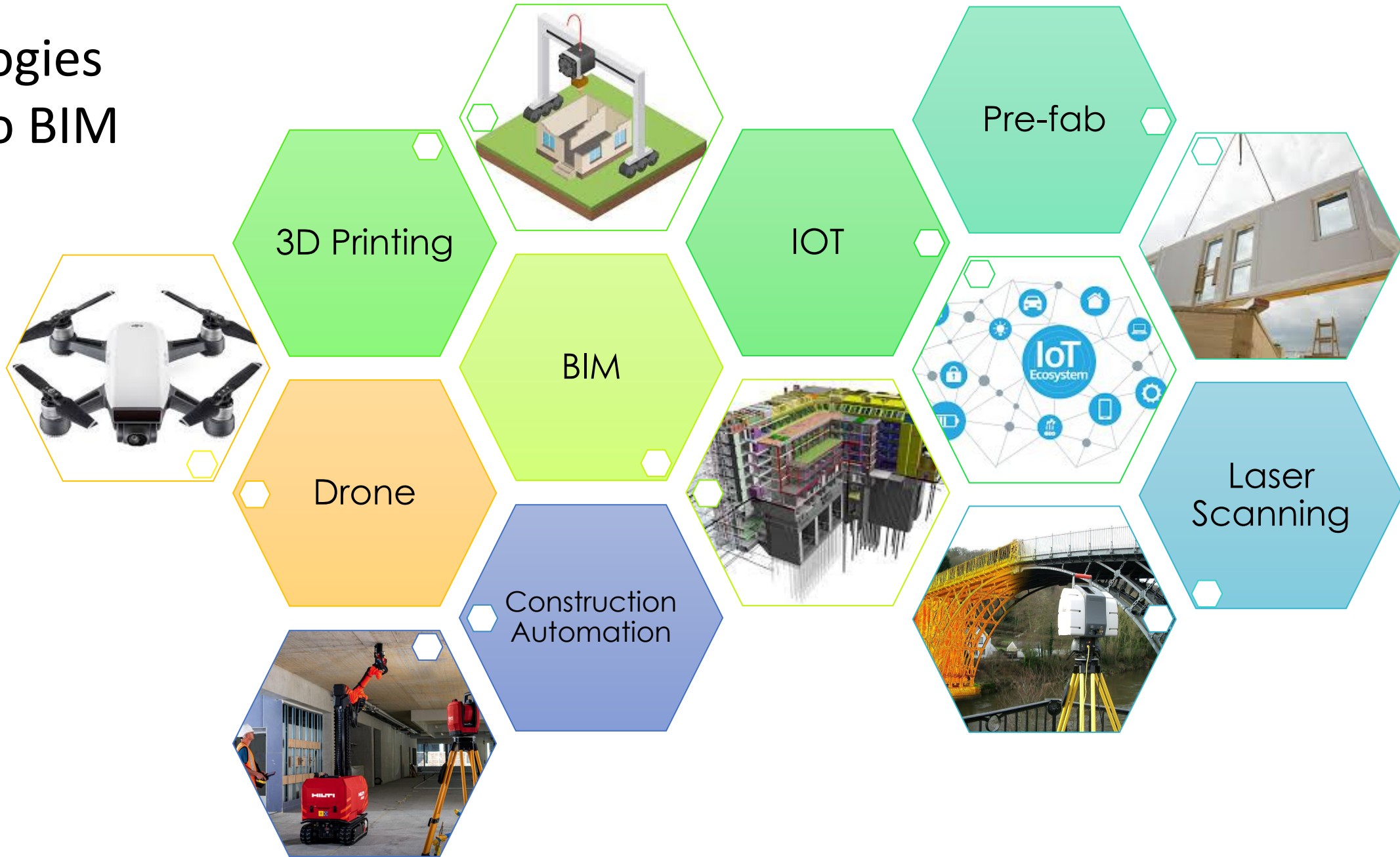


Around 10 lakh reports stored either in cloud or servers

Project execution plan and its documentation

Facility management and training

Technologies related to BIM



Integrated Project Delivery



Various levels of inputs into BIM

Data collection

Site condition with its surroundings

Clients' requirement

Architects Input

Structural engineer and MEP

Interior and landscaping expert

Sustainability factors

Life cycle analysis

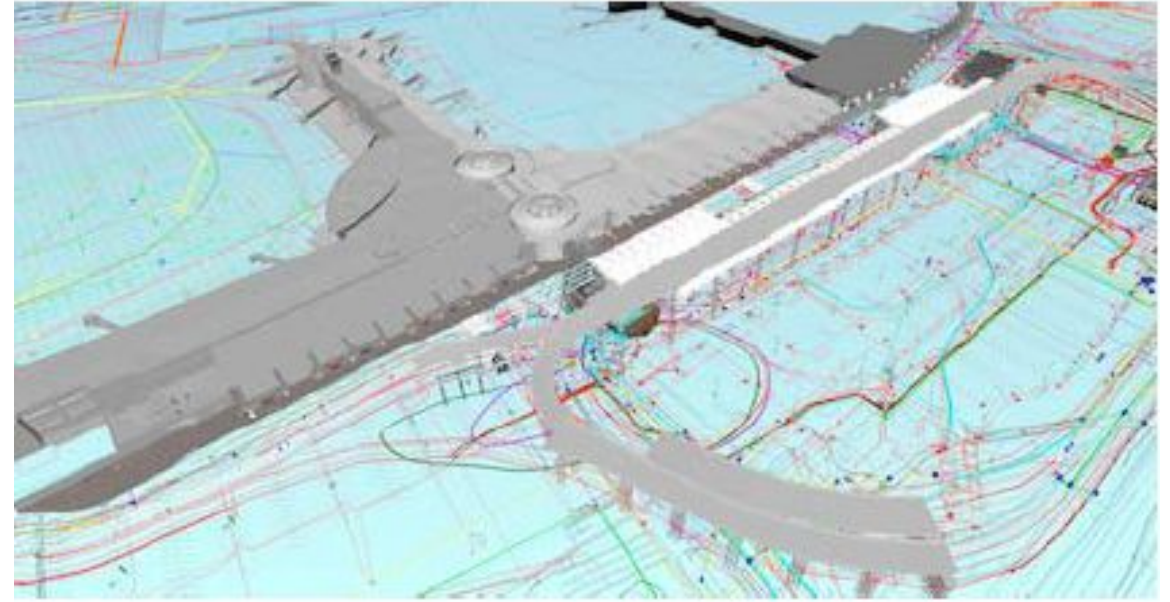
Scheduling of the project

Tendering process and appointment of contractors

Facility management CD

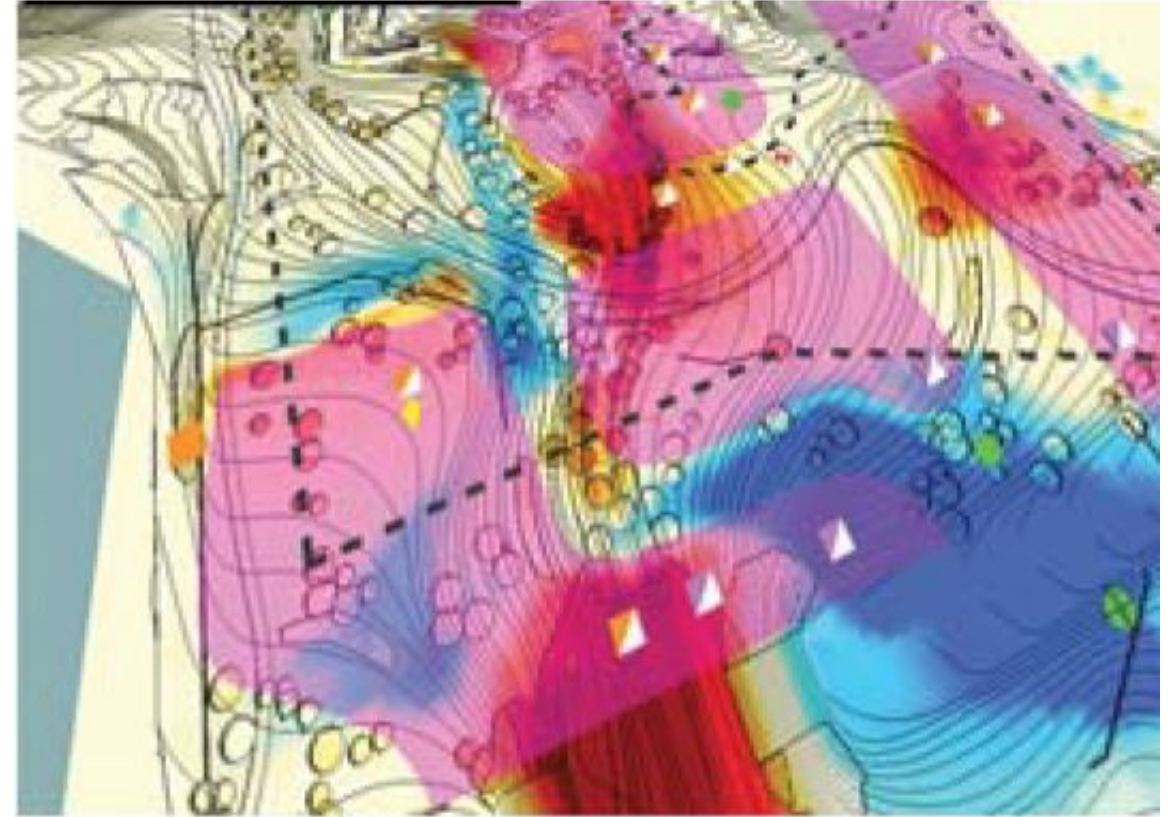
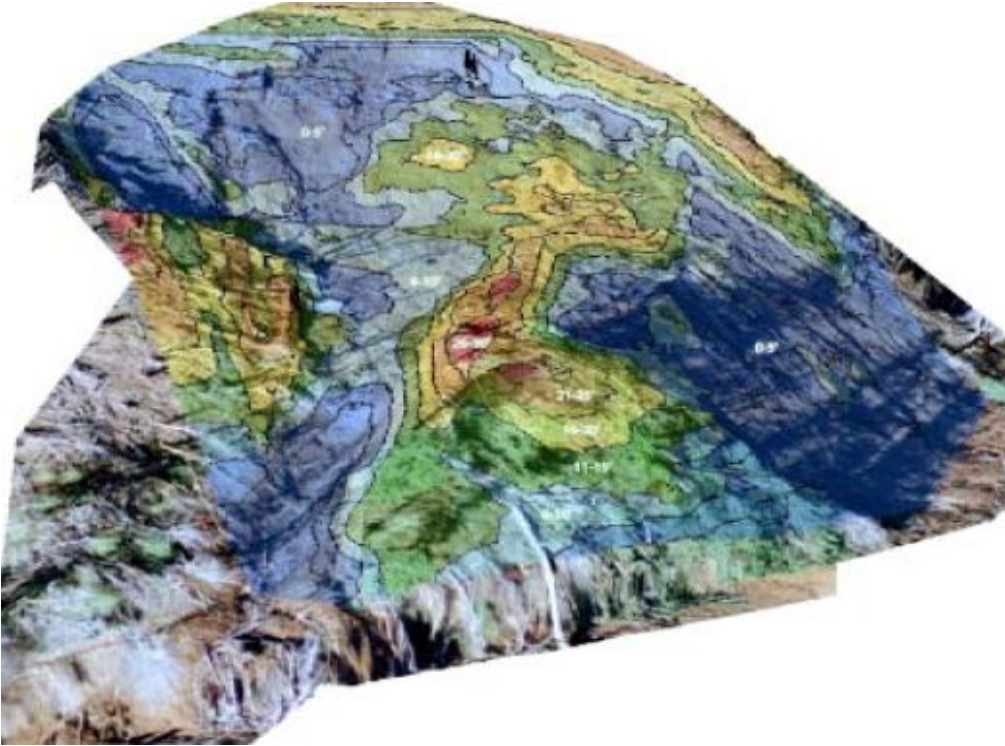
Training for maintainance

Data Collection



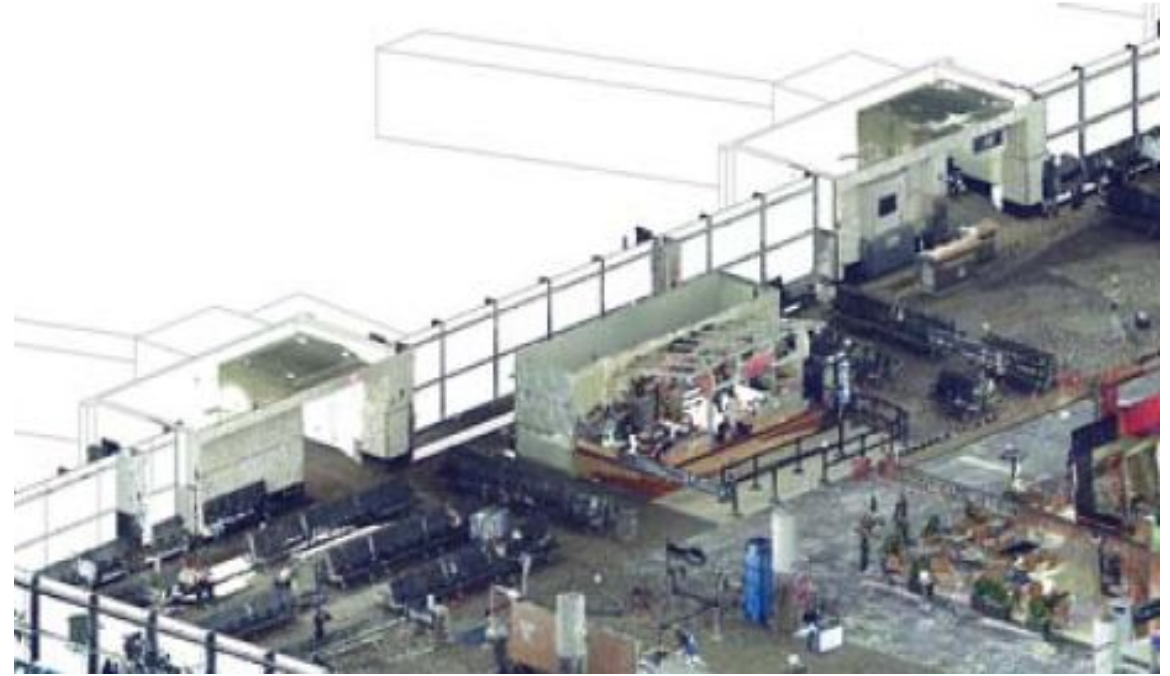
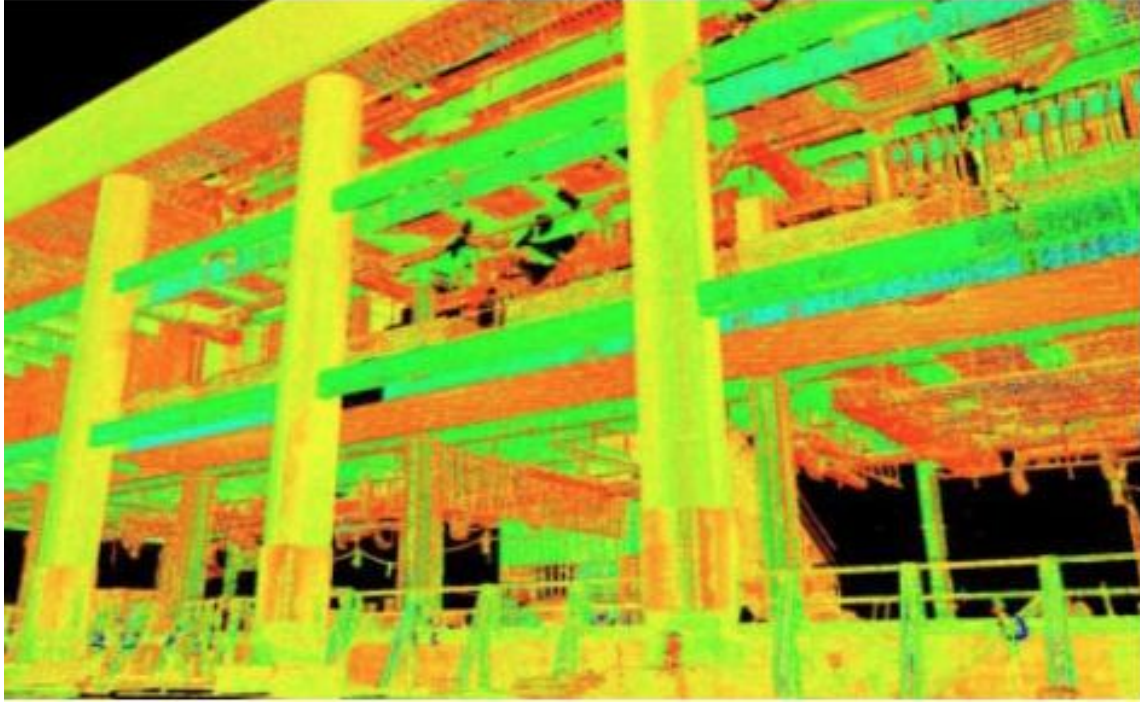
Project site modelling and infrastructure
modelling

Data Collection



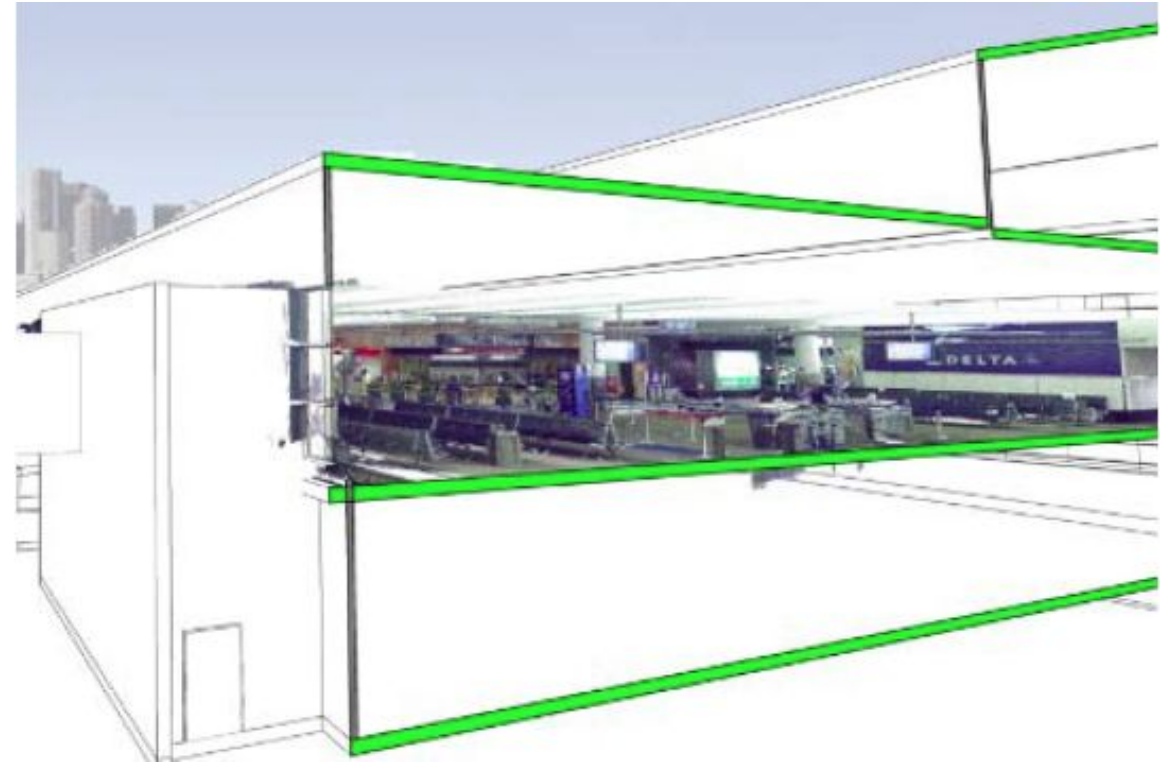
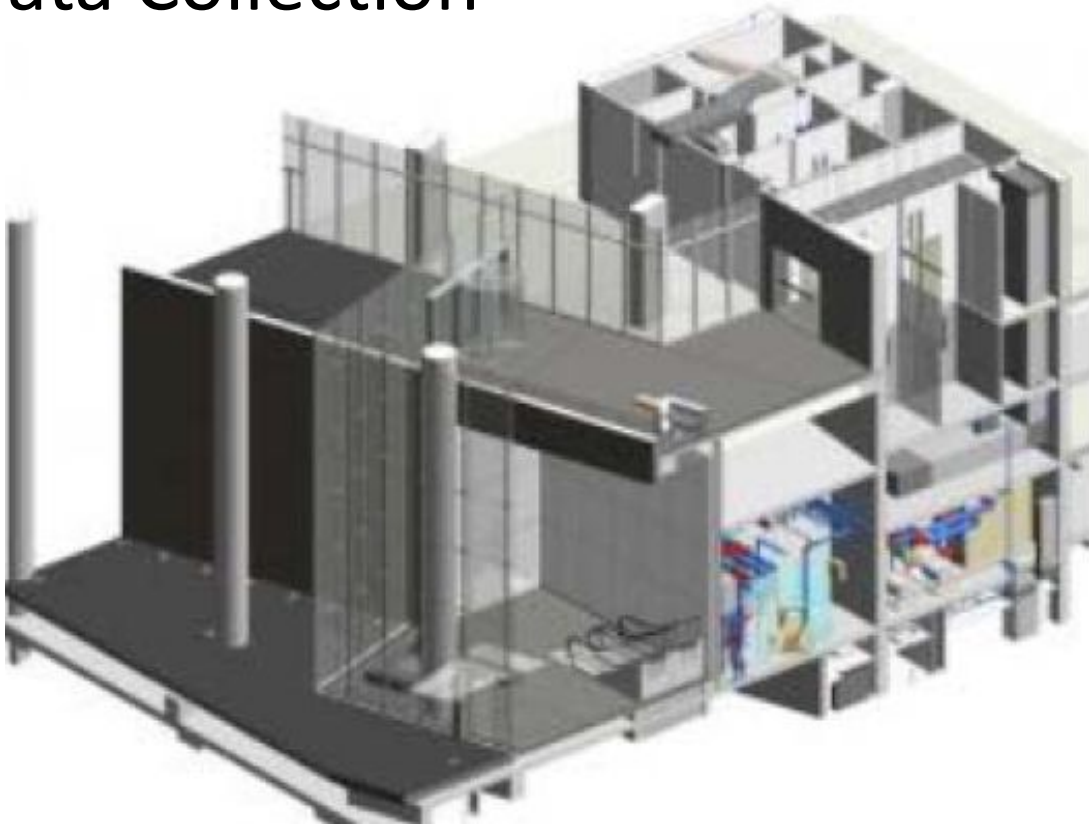
Geo-technical modelling

Data Collection



Existing conditions – laser scanning

Data Collection



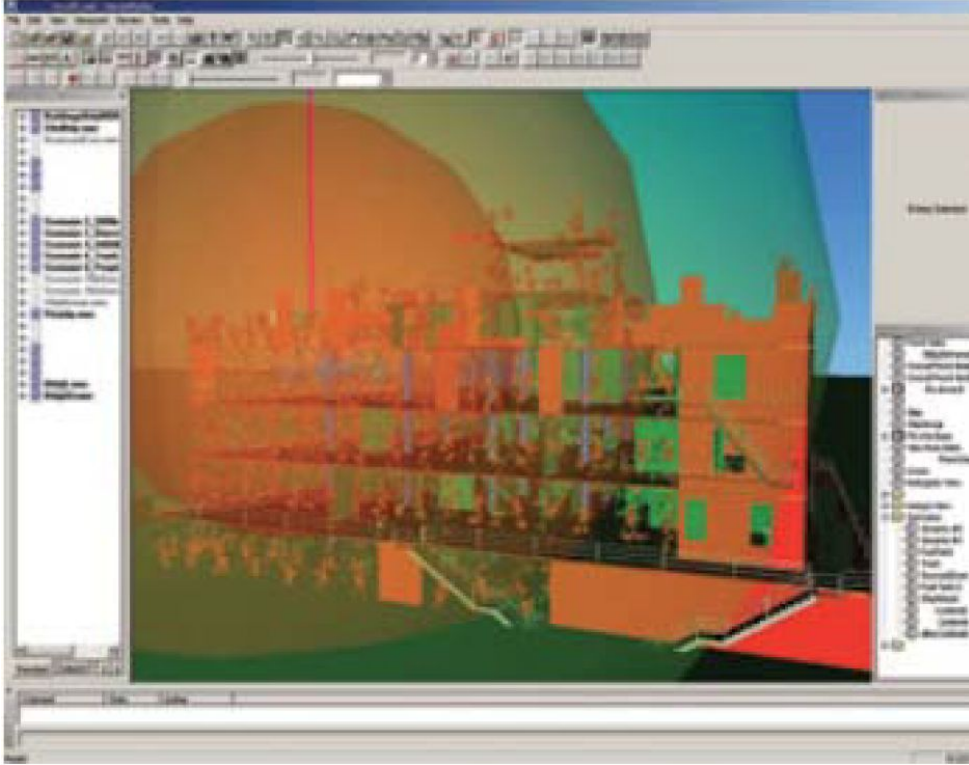
EXISTING CONDITIONS INTERIORS
modelling

Data Collection

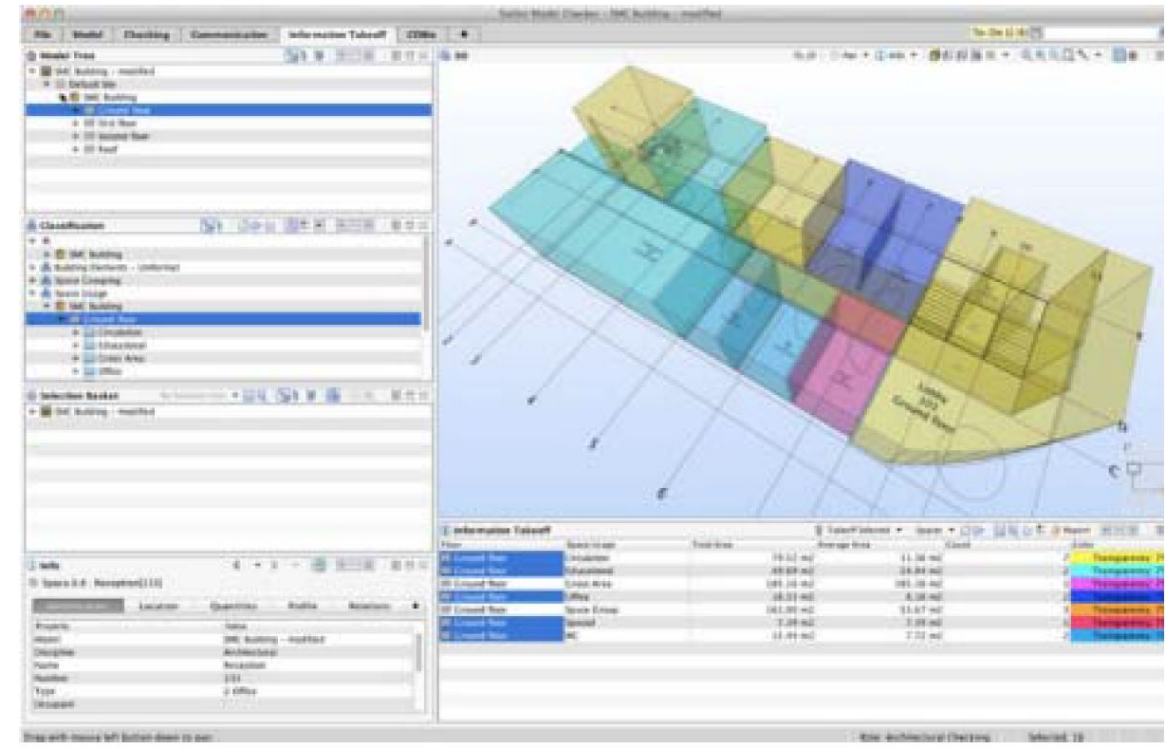
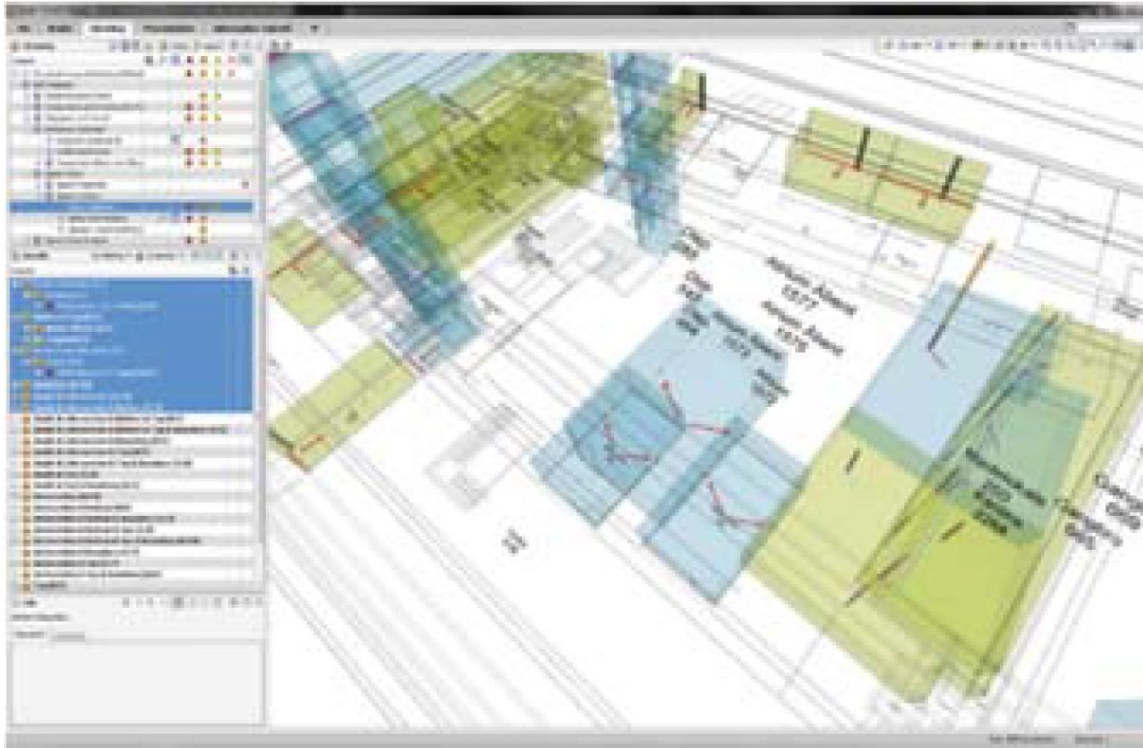


Site condition

Data Collection



Model Data Supporting Disaster Planning



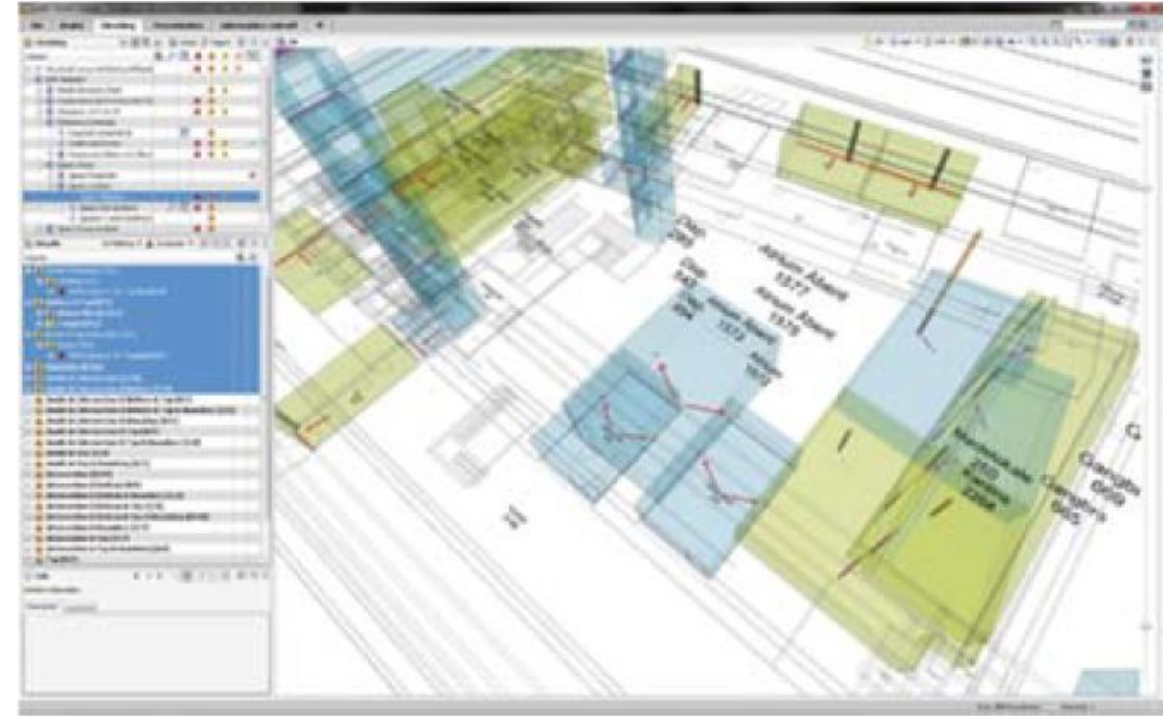
Area & Space Program Validation



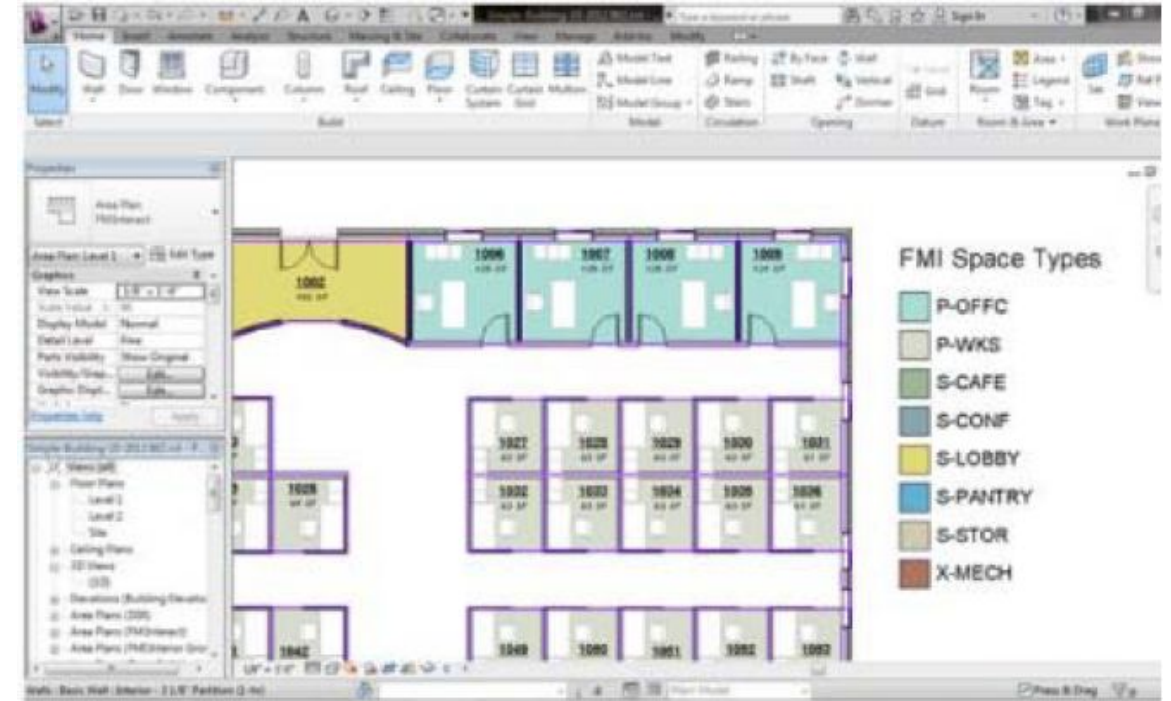
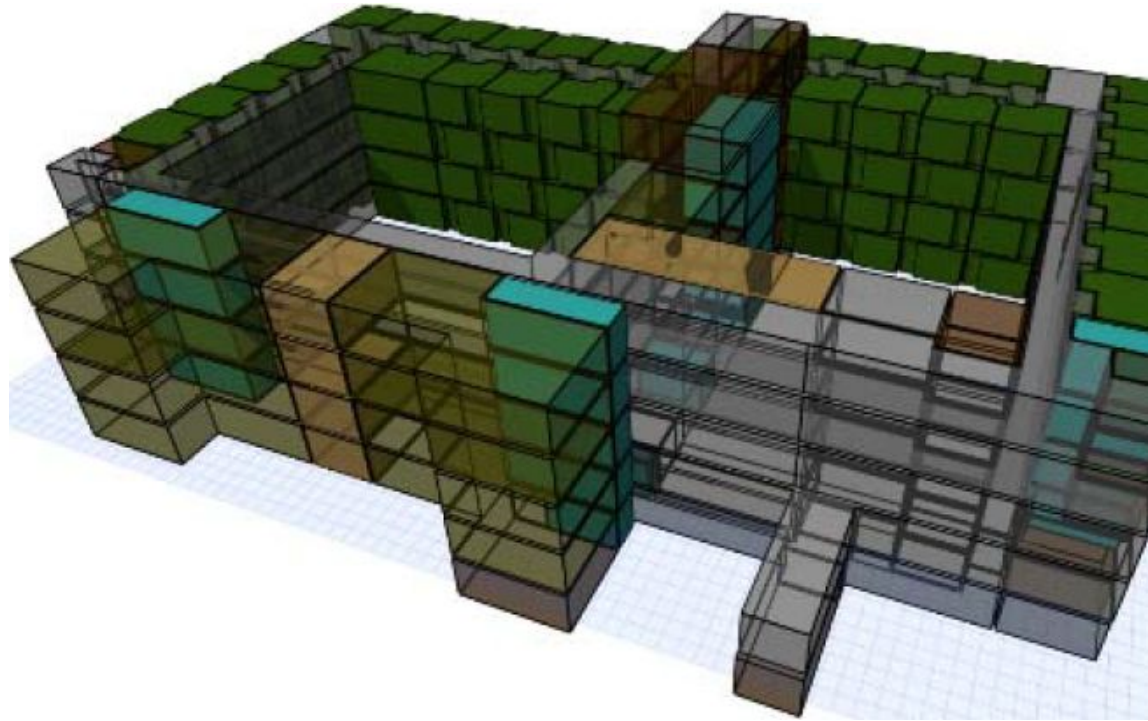
Clients'
requirement



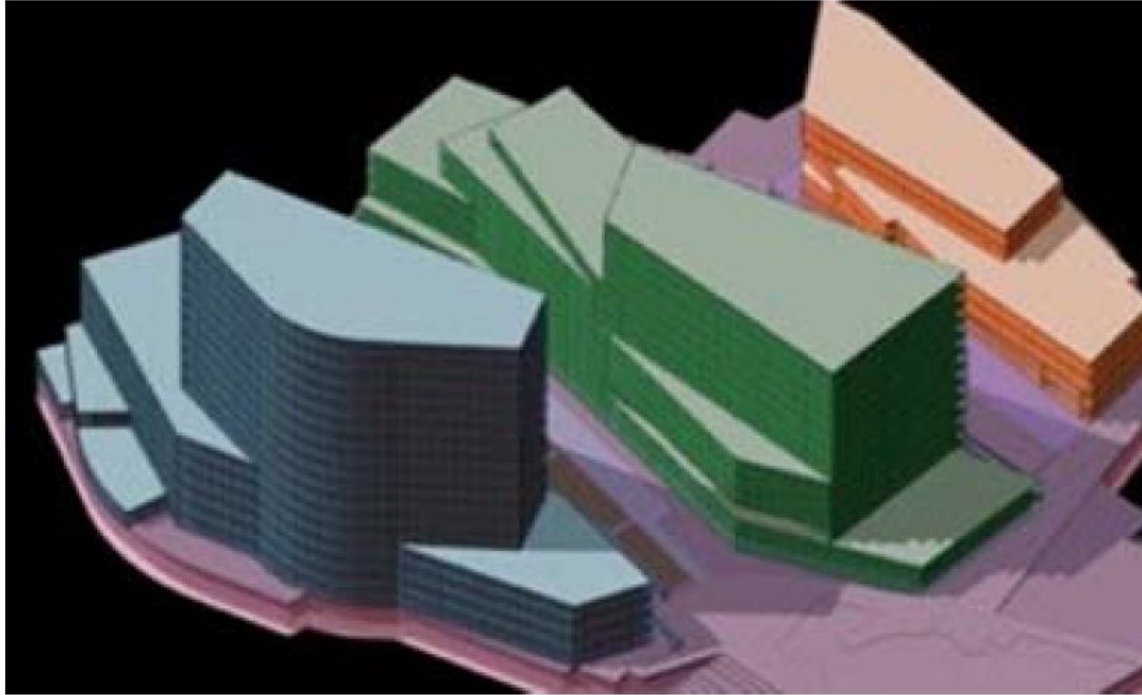
Architect's input



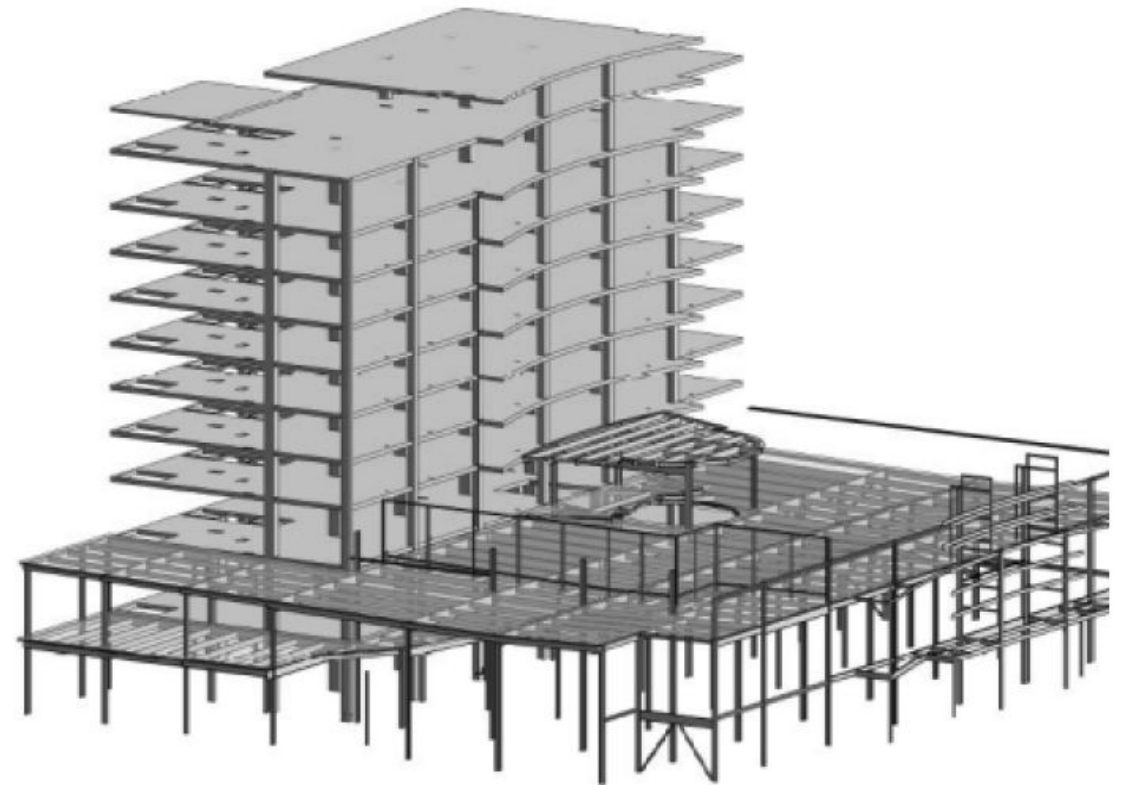
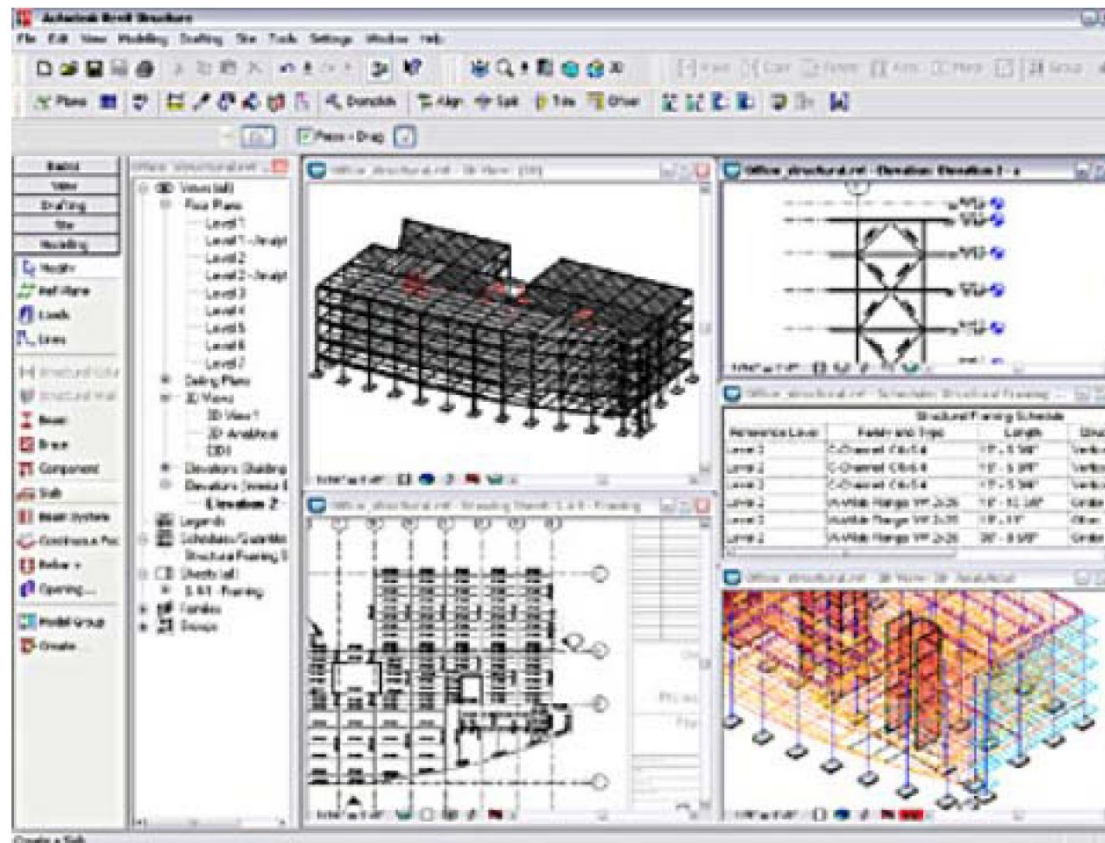
Architectural modelling



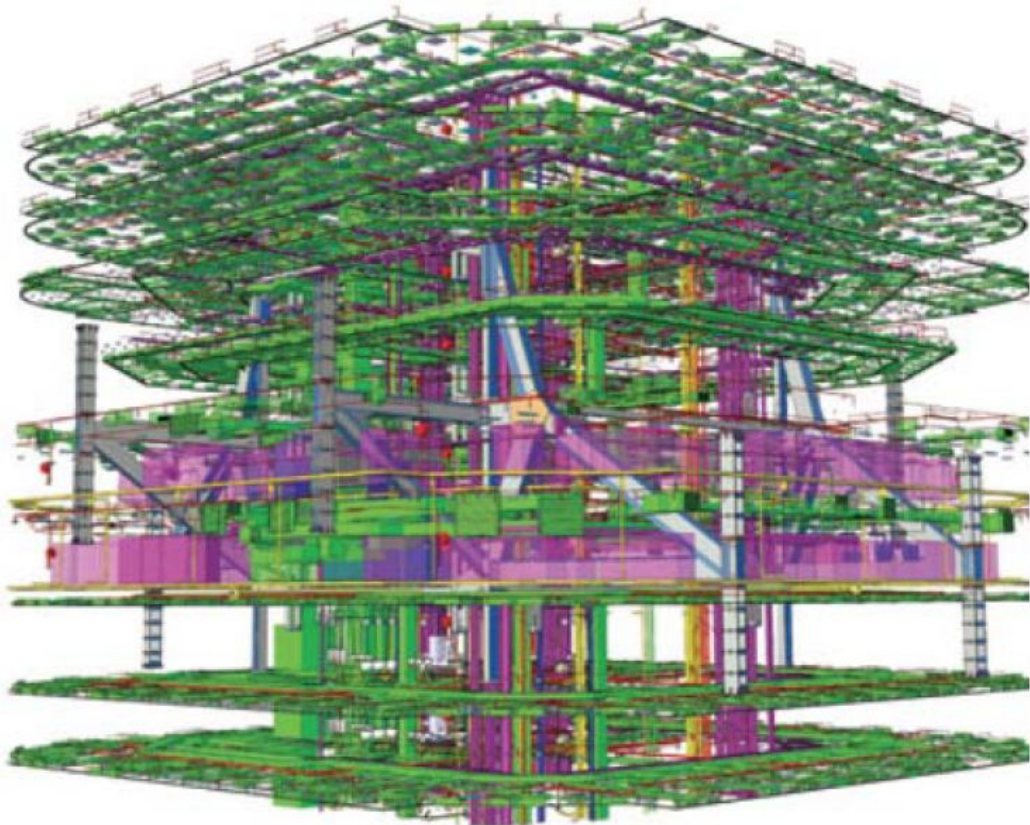
Space, Accessibility, and Circulation Requirements Modeling



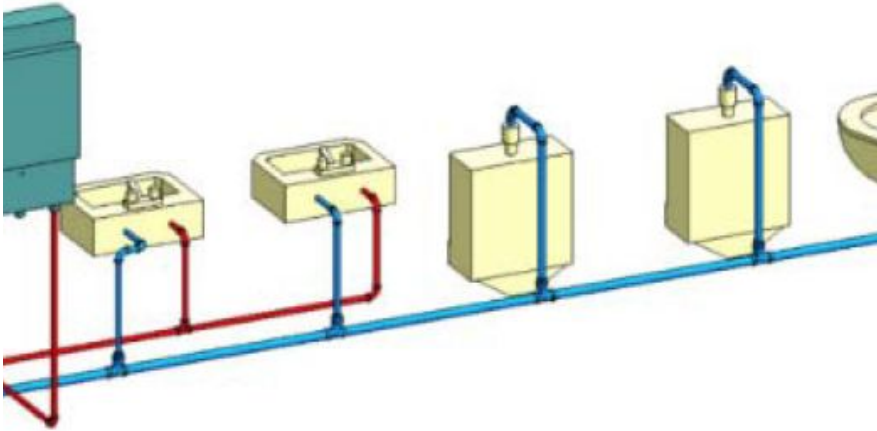
Design Options



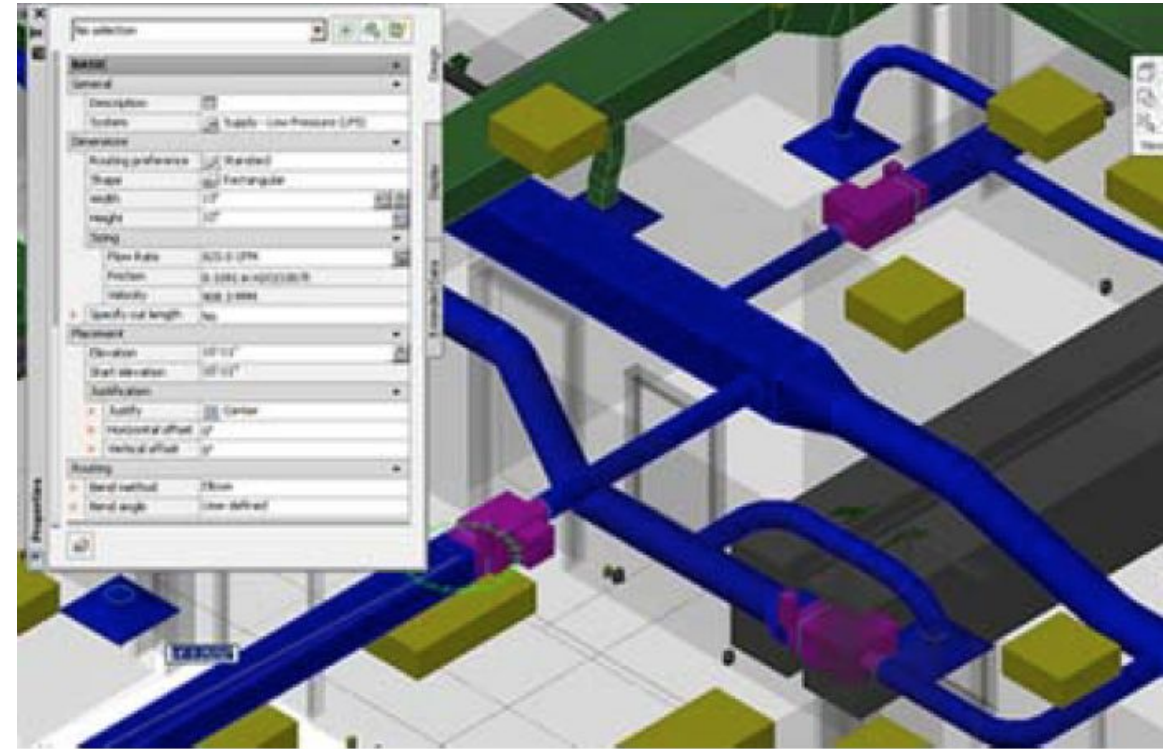
Structural Modeling



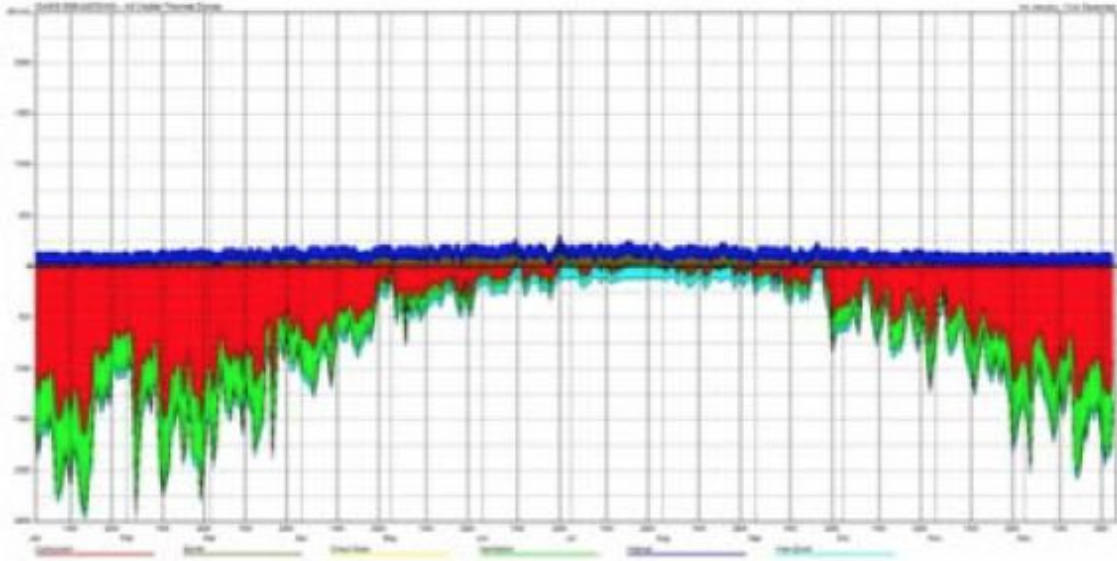
MEPs



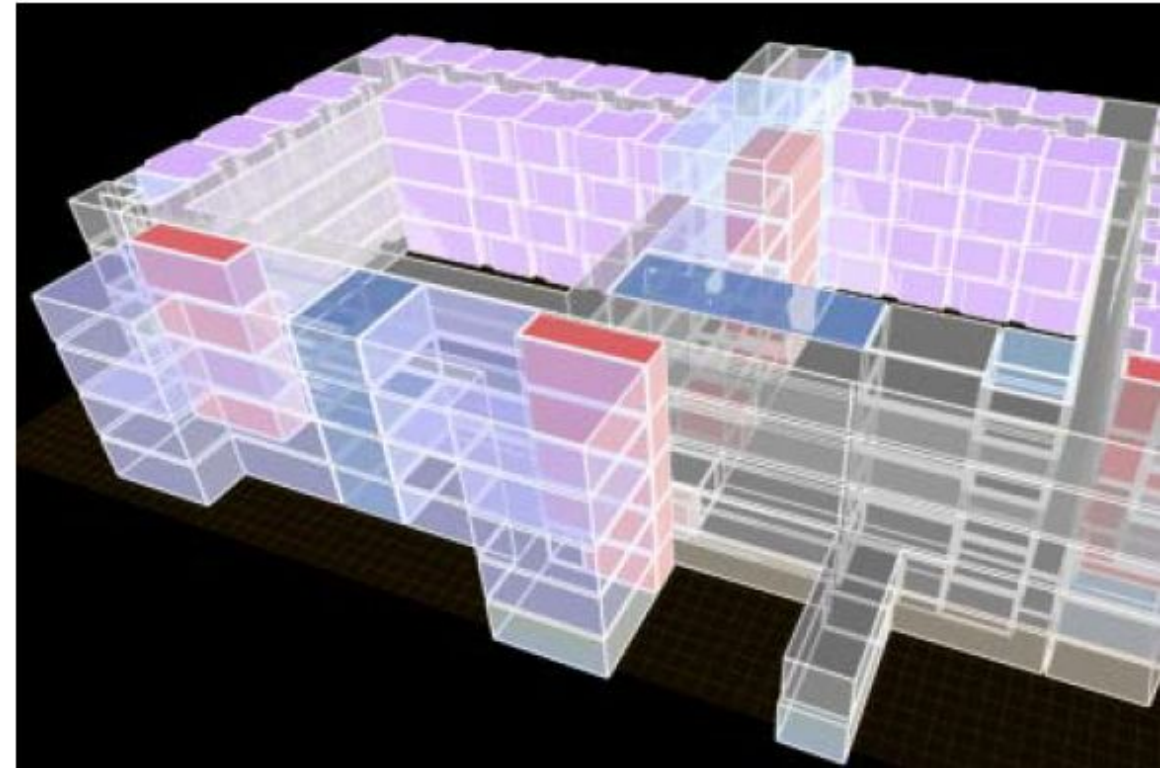
Plumbing & Fire Protection



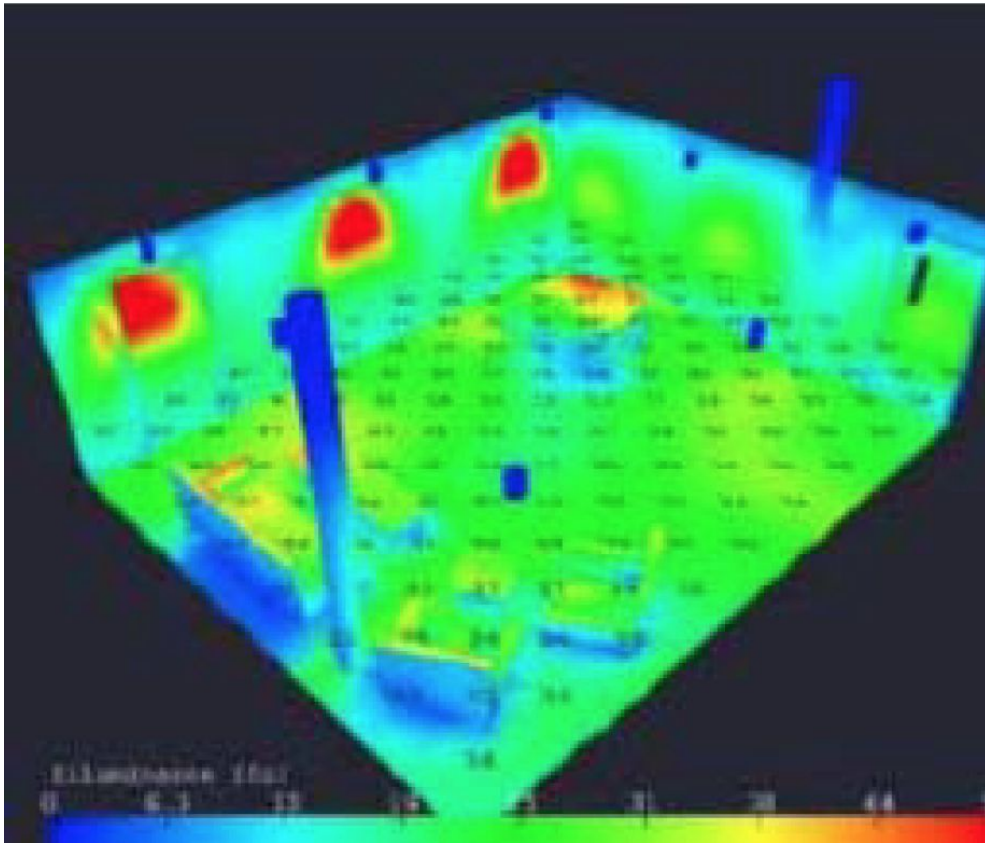
Electrical Alarm Systems



Passive Gains breakdown in Ecotect for a building in Nashville, TN.

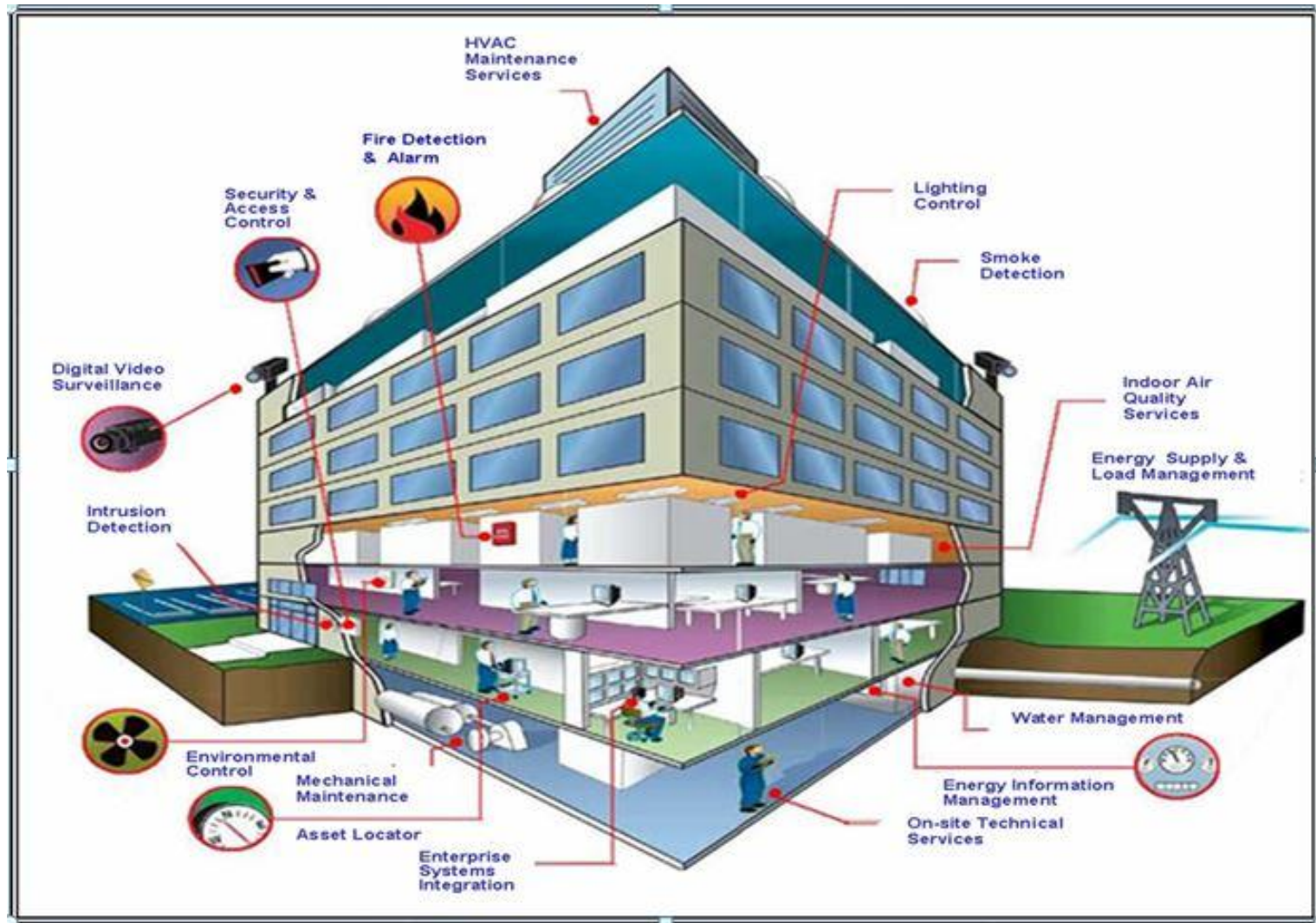


Mechanical Analysis



Lighting Analysis

Building Automation Systems BAS Integration



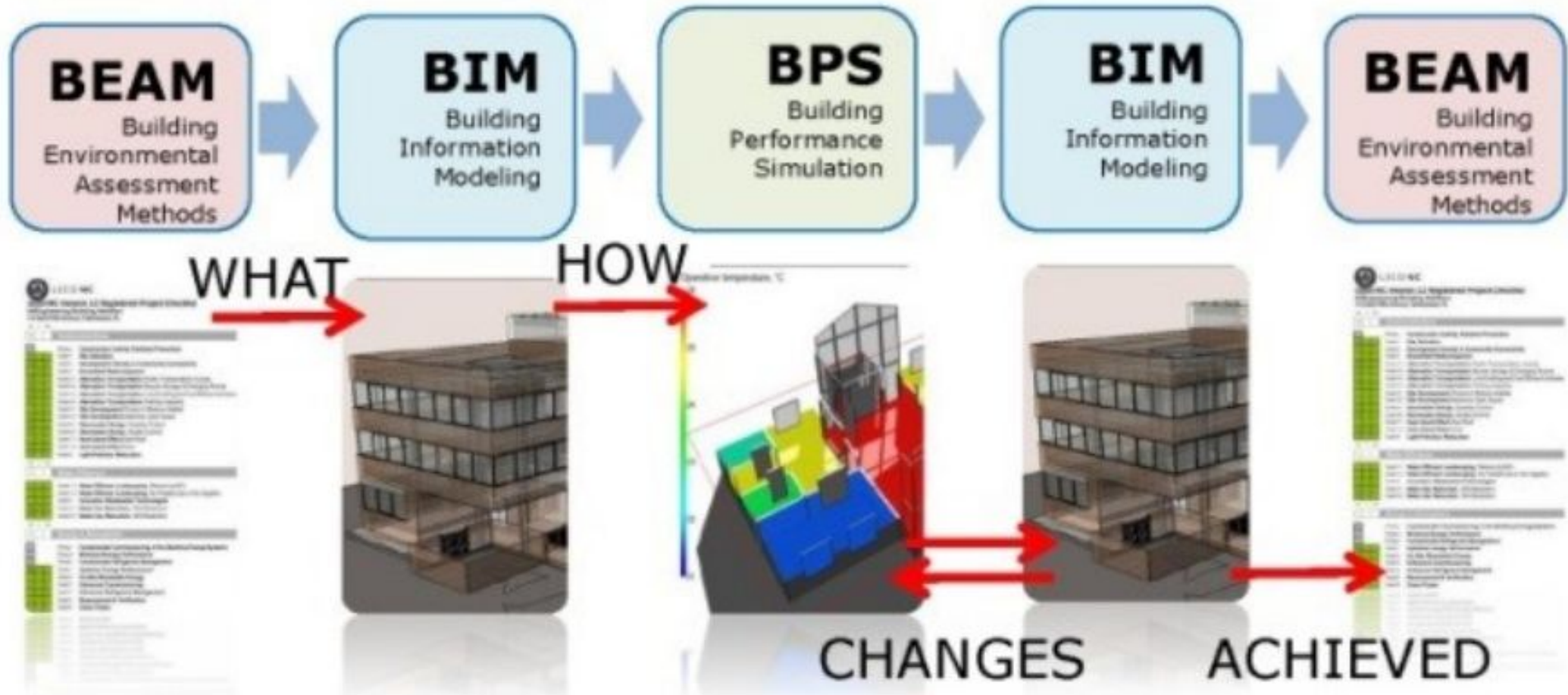


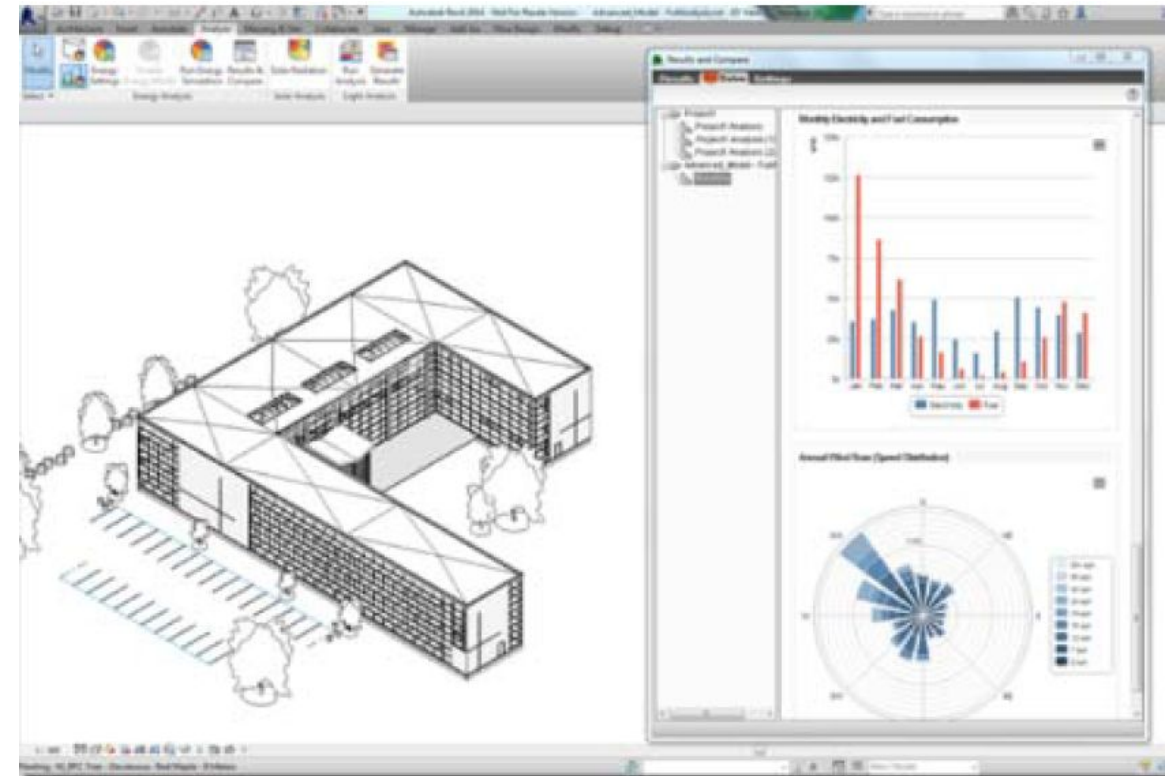
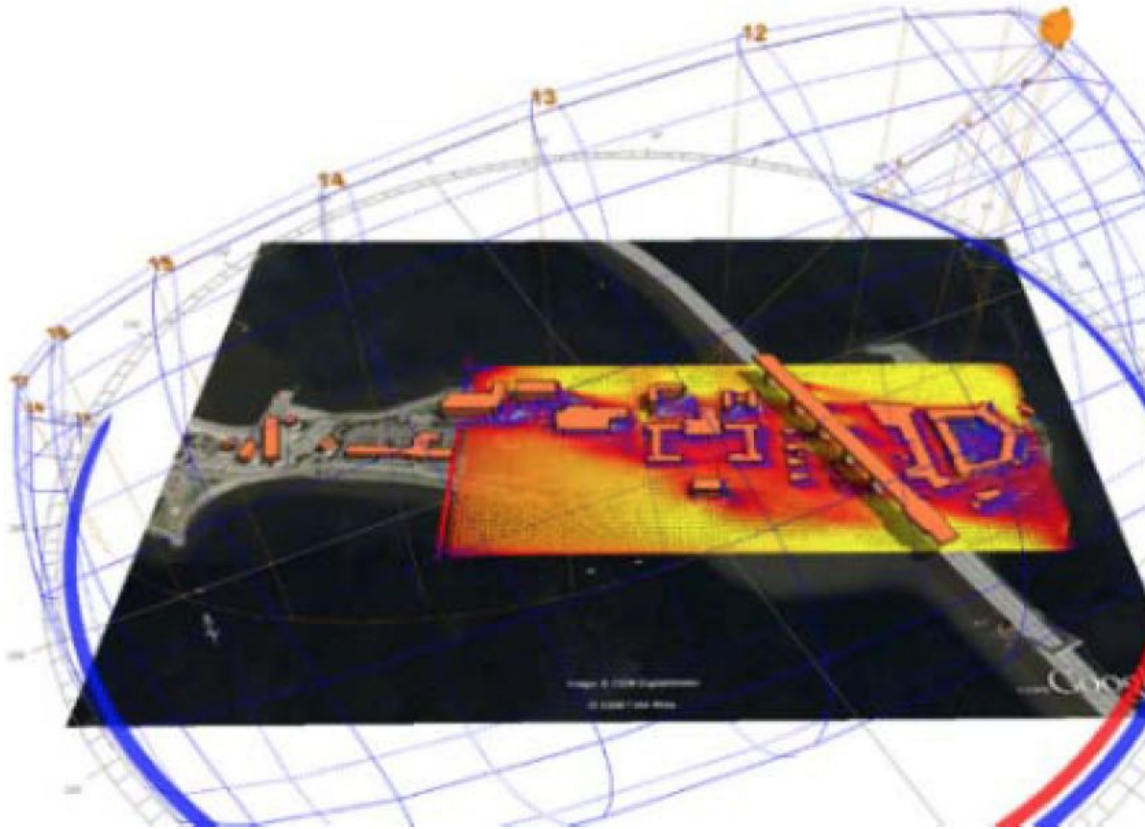
Interiors



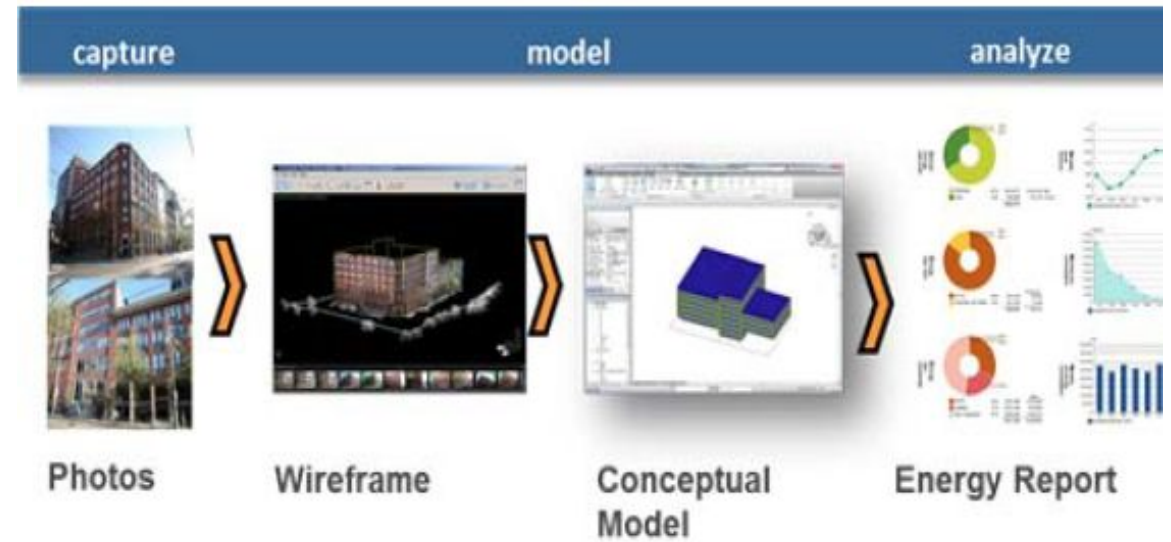
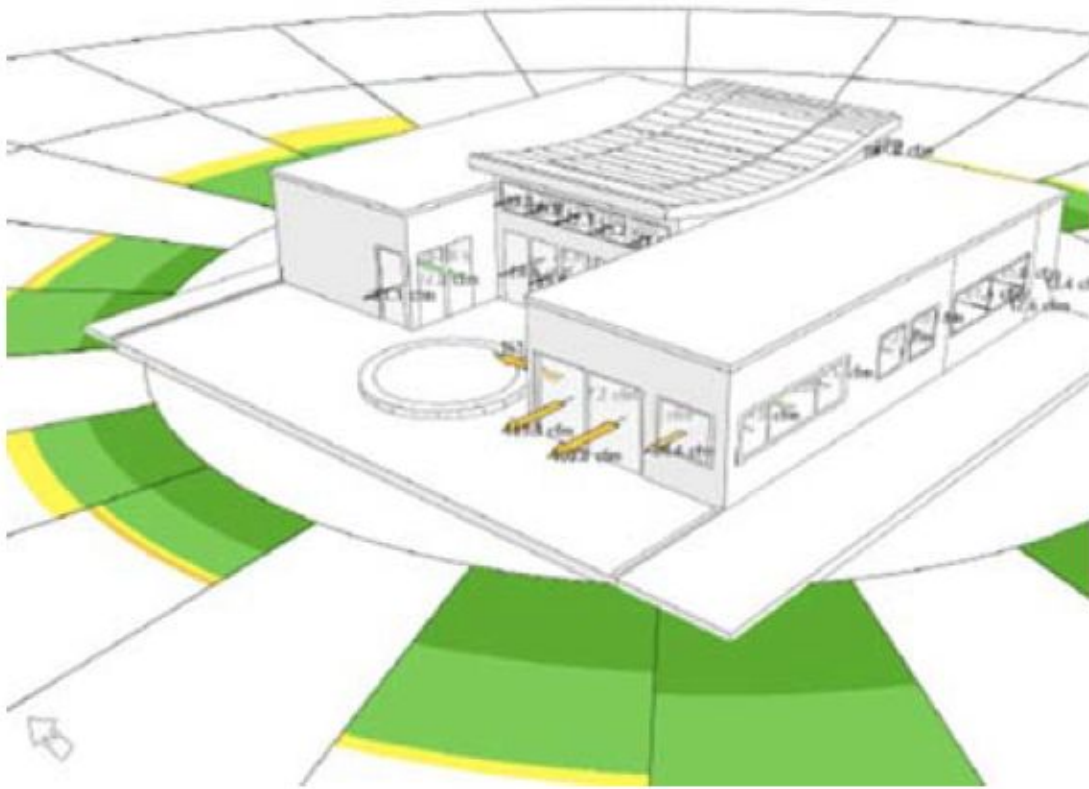
Landscape expert

Energy & Sustainability



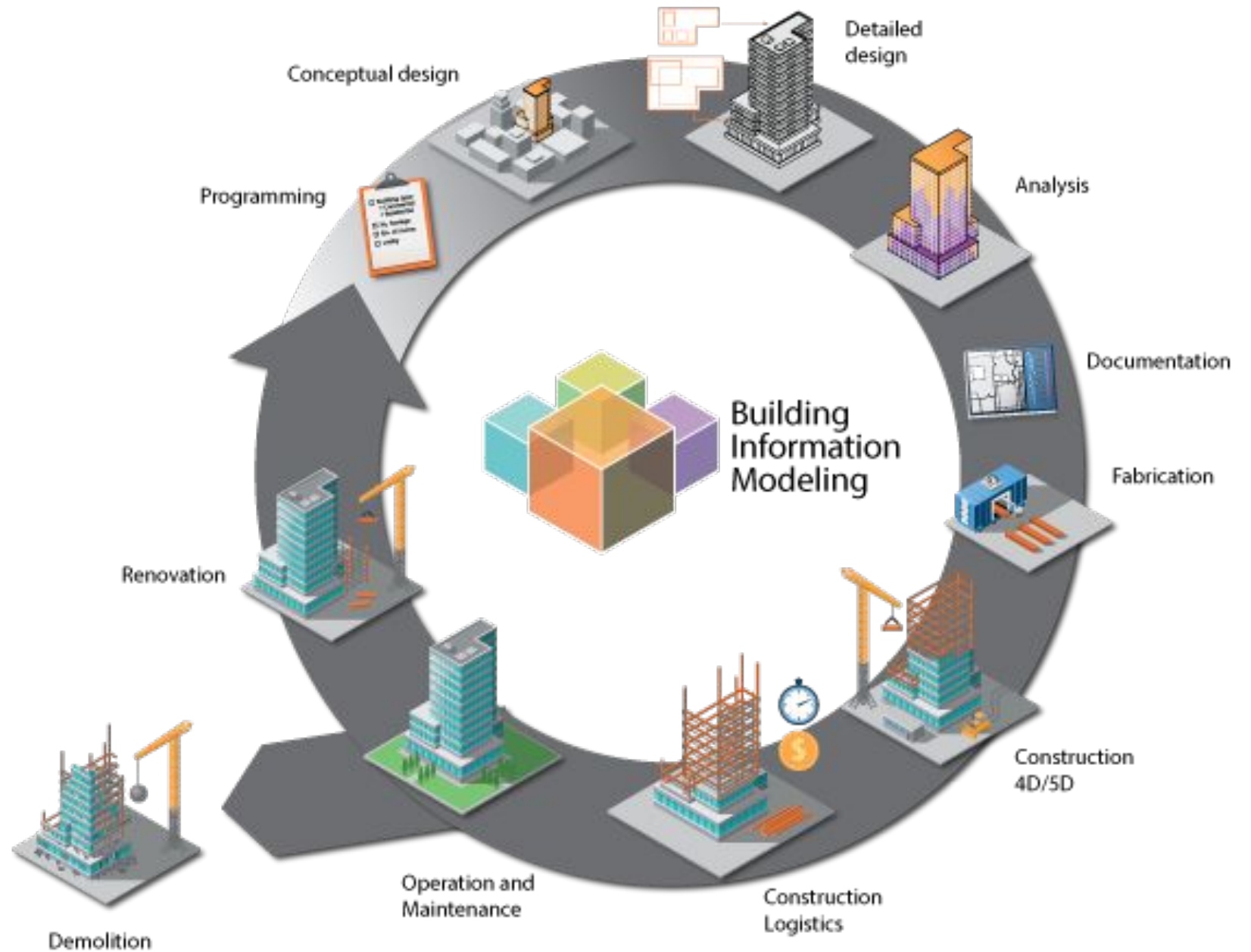


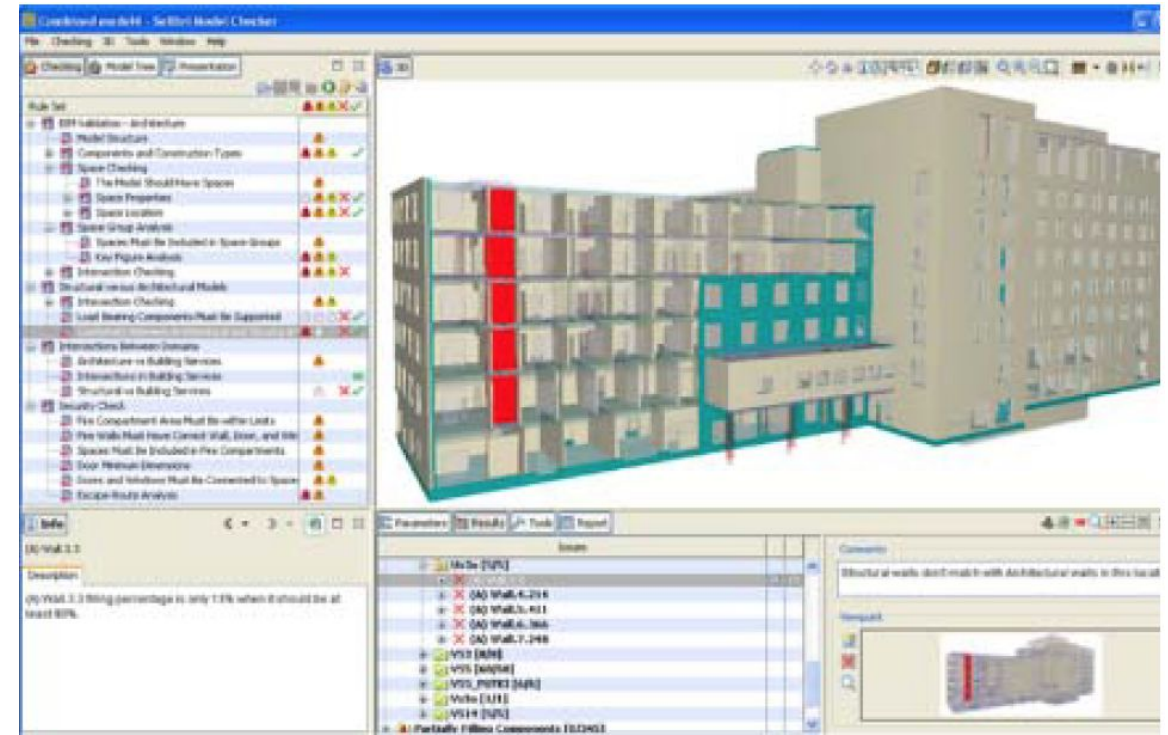
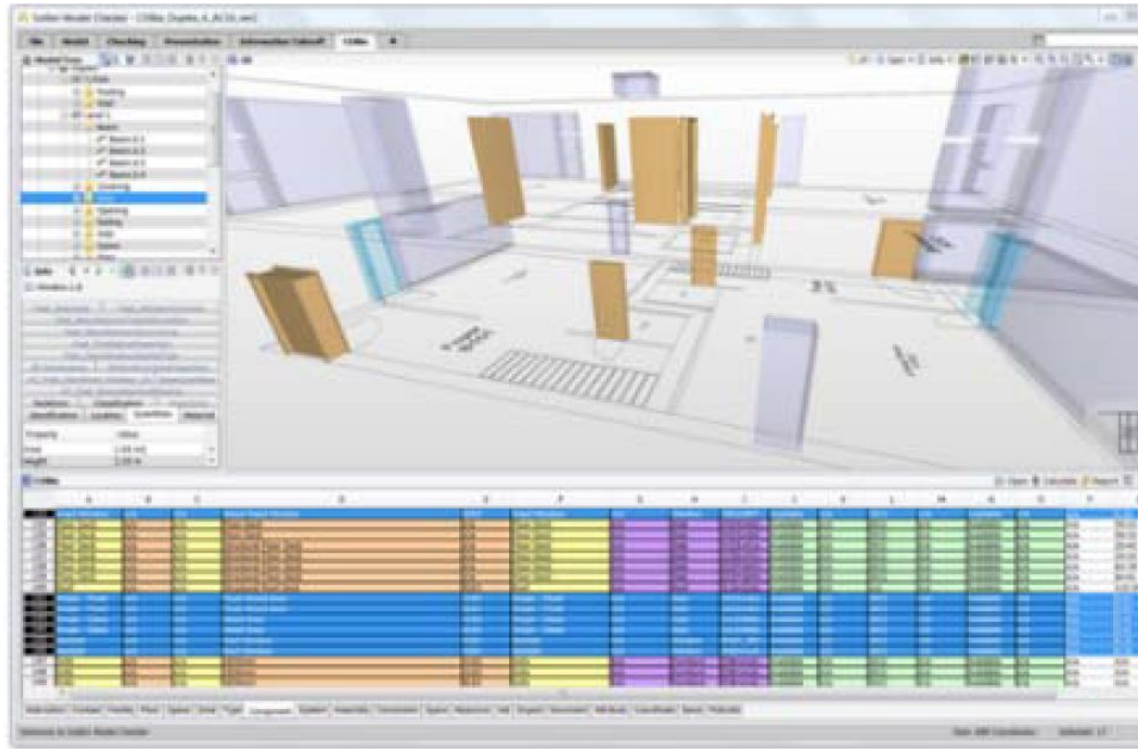
Energy Modeling, Sun Studies, Day Lighting



Existing Building – Rapid Energy Modeling

Life cycle analysis in BIM





Model Checking - Program Compliance

of "Filtered" clashes in NW

This column is tally the total of clashes. Automatically

Total n clashes Autom

This row represents number of clashes Automatically fil

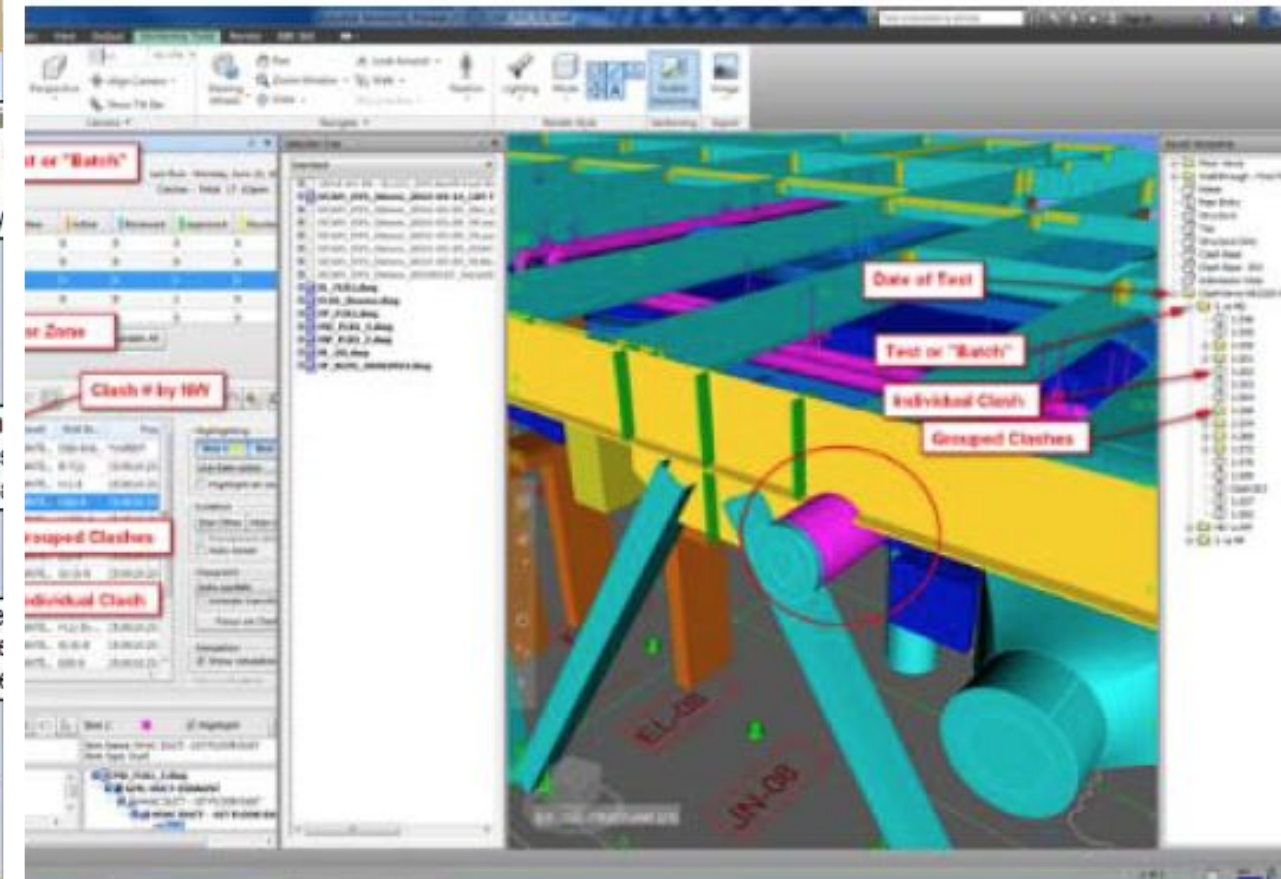
KEY: NC = Not Checked

Filling cells above grey cells automatically fill in the corresponding cells below the

Previous file HOLD

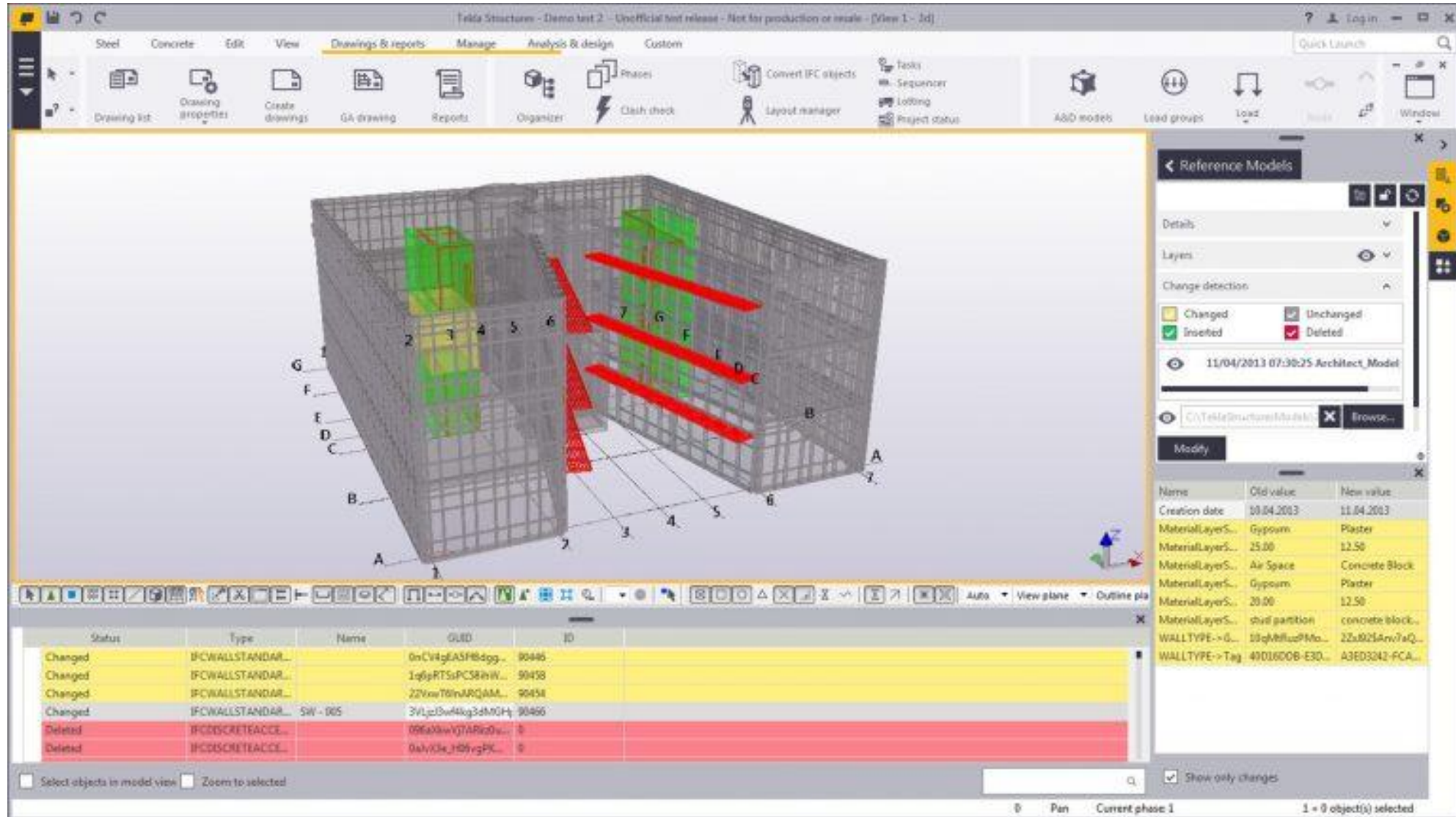
Active Project Browse HTML VP

CUP - Clash Detection Matrix (LVLG)											
Trade	Arch	Struct	EL	ME	ME	FP	TD	Arch Core	Arch Shell		
Arch	NC	NC	NC	NC	NC	NC	NC	NC	NC	0	
Struct	NC	NC	1	0	6	3	0	NC	NC	10	
EL	NC	1	NC	2	0	4	0	NC	NC	6	
ME	NC	0	2	NC	0	10	12	NC	NC	22	
FP	NC	6	0	0	NC	3	0	NC	NC	3	
TD	NC	3	4	10	3	NC	2	NC	NC	2	
Arch Core	NC	0	0	12	0	2	NC	NC	NC	0	
Arch Shell	NC	0	0	12	0	2	NC	NC	NC	0	
	0	10	7	24	9	22	14	0	0	43	



Clash Avoidance & Detection

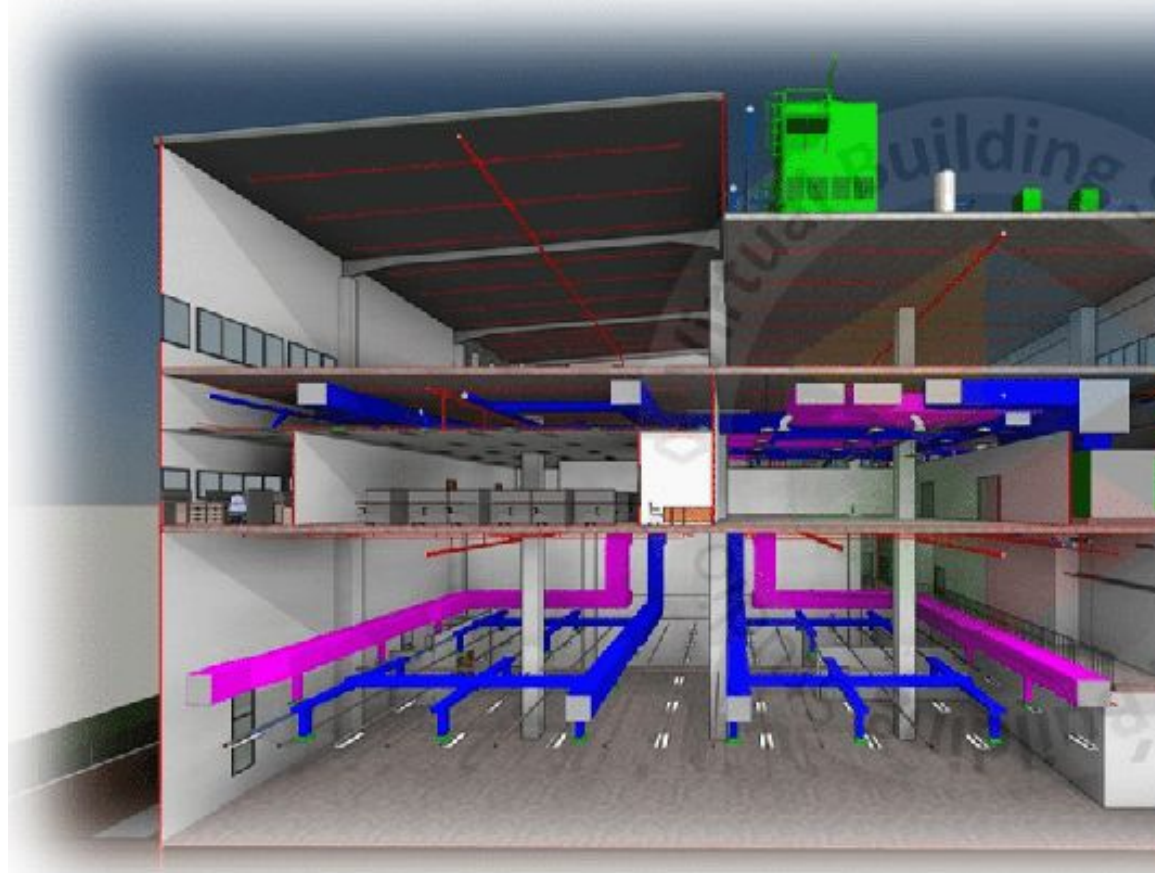
Design Authoring



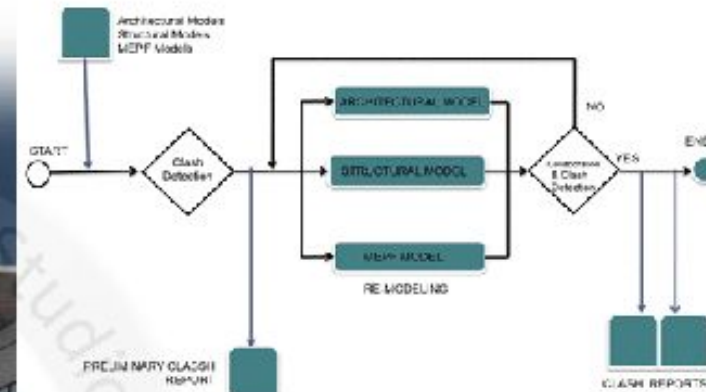
Source: Trimble introduces Tekla 2018 BIM Software Solutions (geospatialworld.net)

Analysis & Reporting

Clash Detection is so important in BIM



Progress Diagram – Auto Clash Detection Services



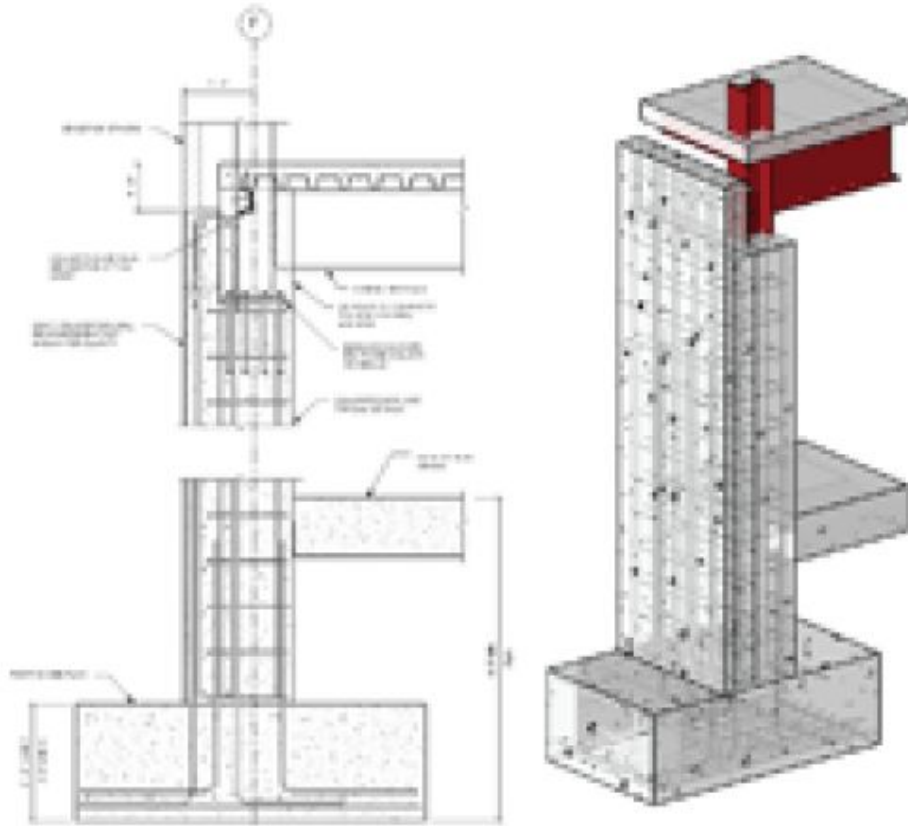
Clash Detection Report

Clash detection among all disciplines helps to save cost and time during construction

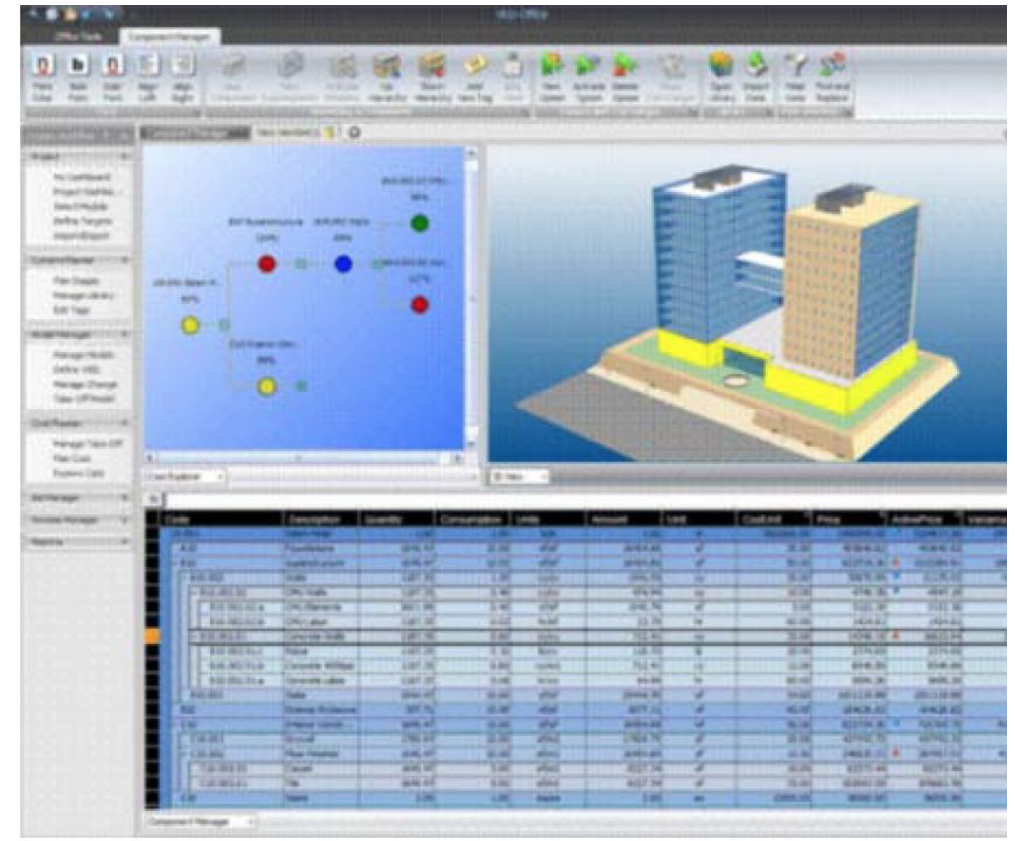
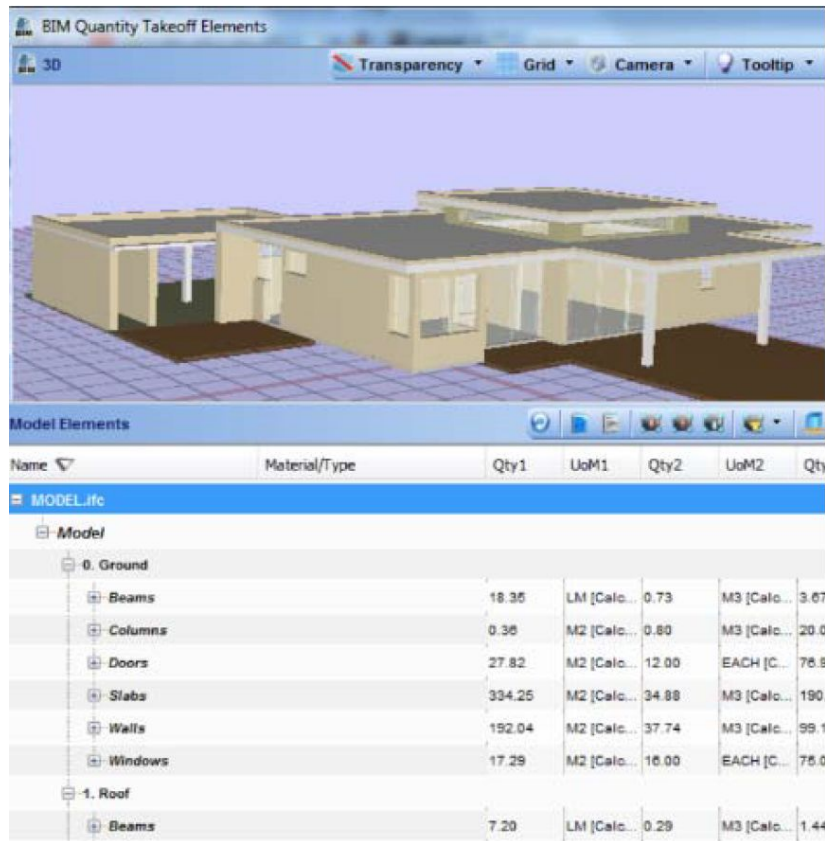
CLASHES	CLASHES	CLASHES
Report Data	Report Data	Report Data
<p>My Project is a building design.</p> <p>Clash Detection Report</p> <p>Clash Detection Report</p> <p>Clash Detection Report</p>	<p>Clash Detection Report</p> <p>Clash Detection Report</p> <p>Clash Detection Report</p> <p>Clash Detection Report</p>	<p>Clash Detection Report</p> <p>Clash Detection Report</p> <p>Clash Detection Report</p> <p>Clash Detection Report</p>

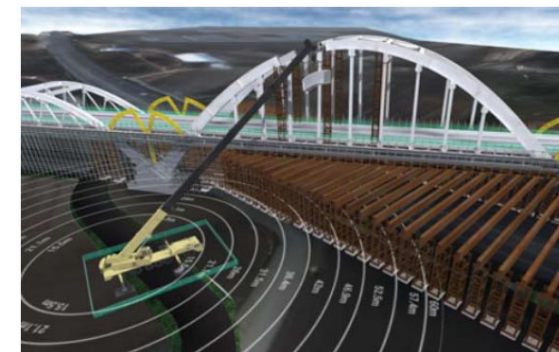
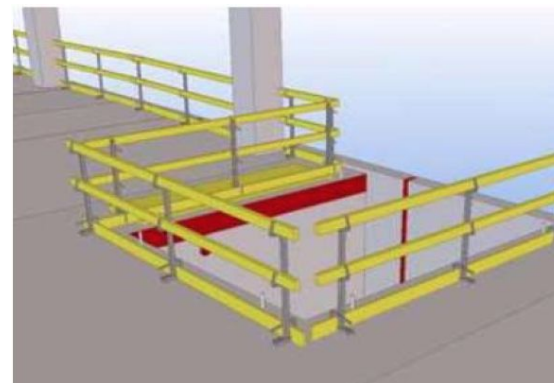
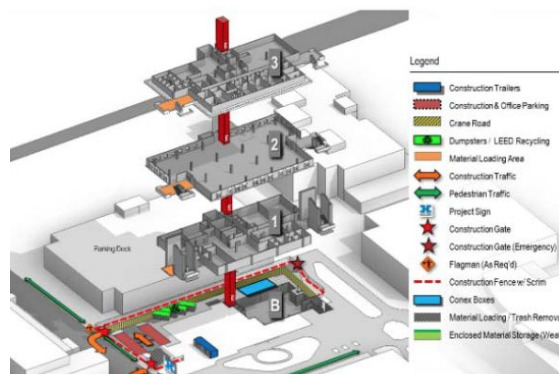
LEED Credit and Certification Reporting



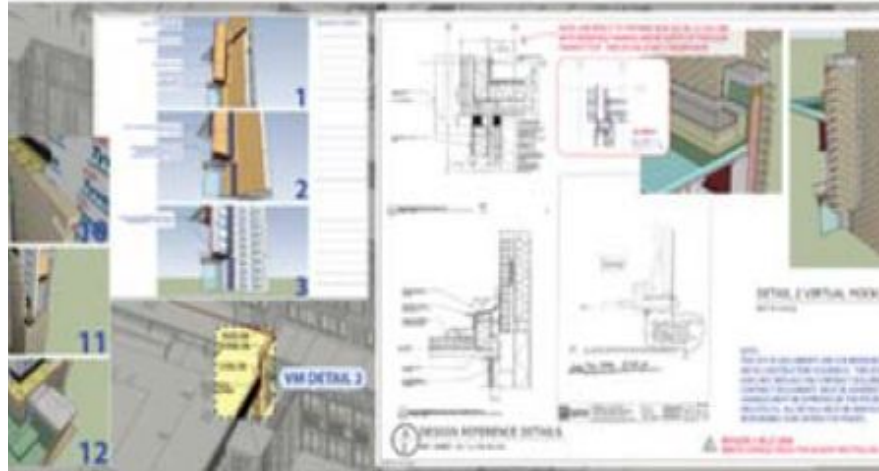
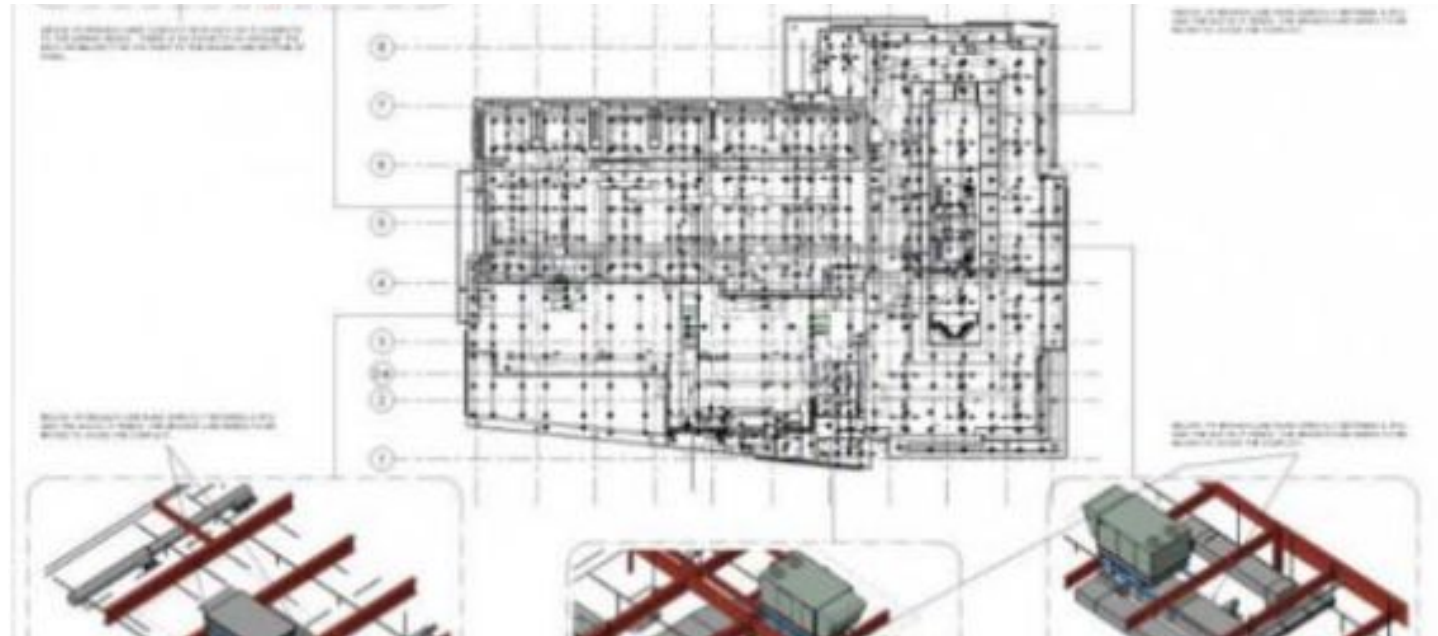
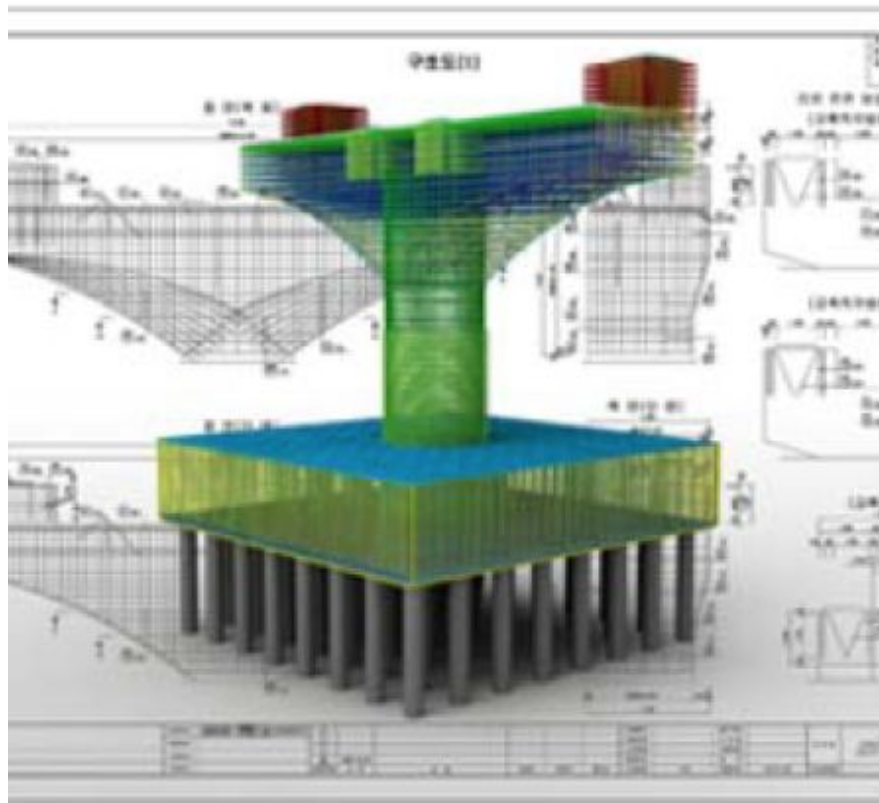


Construction Drawing Production





Site Safety criterias



Shop Drawing Coordination

Scheduling – 4D Modeling and Logistics



Tender document processing

1. Preparation of tender documents
2. Calling of tender
3. Shortlisting the contractors
4. Selection of contractor
5. Contract document

Constructability reviews & coordination



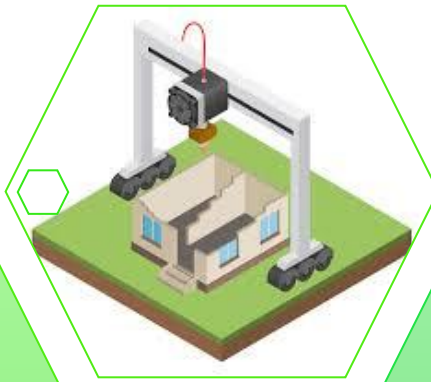
Source: Kelar Pacific - bim-coordination-and-bim-services Image | ProView (thebluebook.com)



BIM Based Progress Meetings, Reviews – “Big Room”



3D Printing



IOT

Pre-fab



BIM



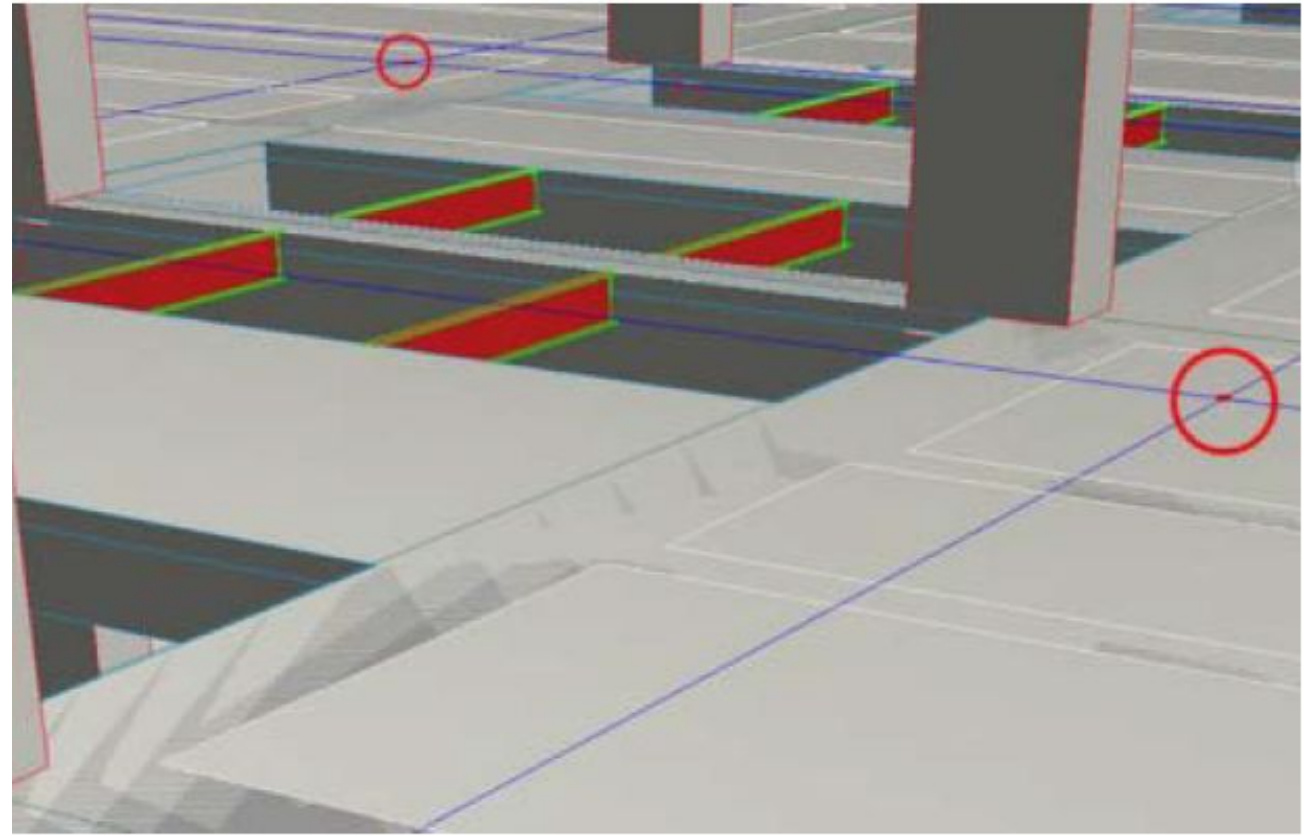
Drone



Construction Automation



Laser Scanning



In Field – Construction Layout

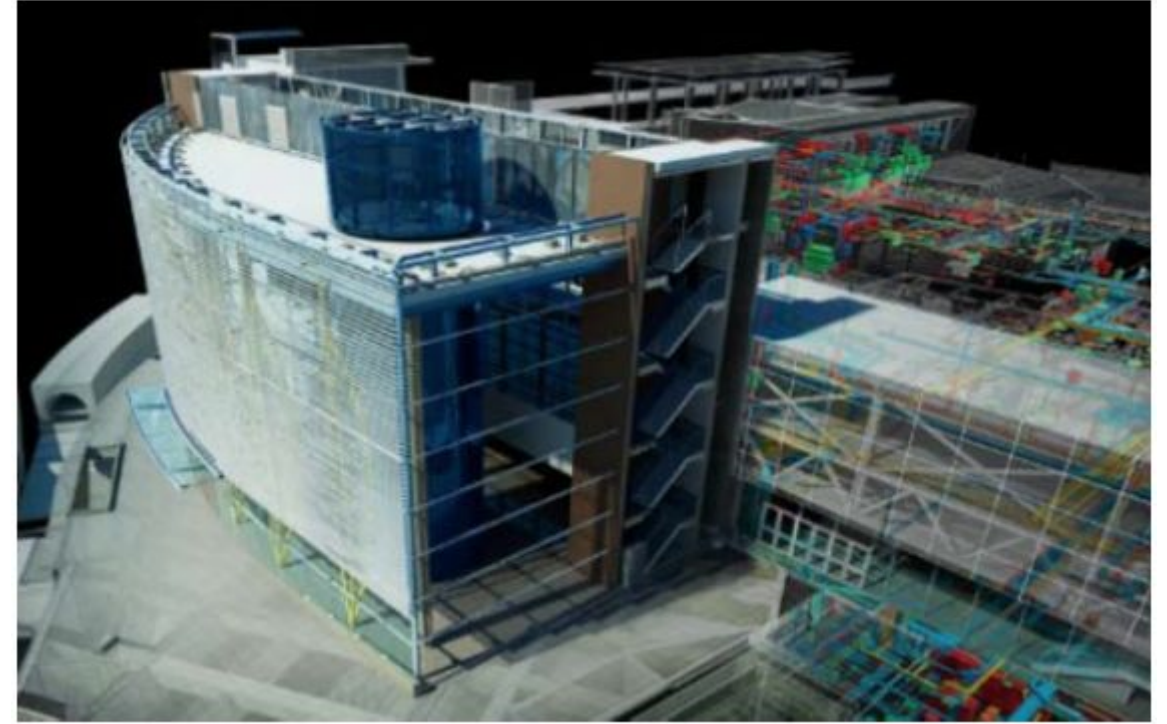
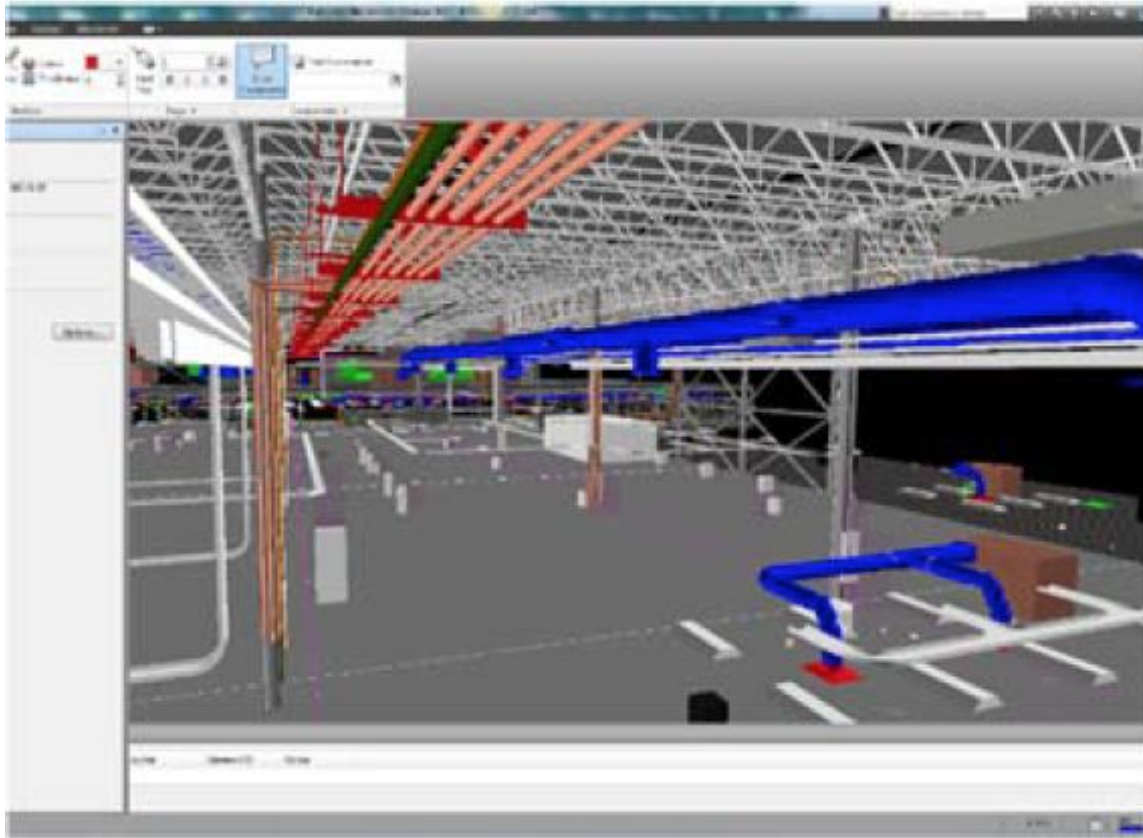


Laser Scanning – Construction Phase

Documentation



Source: www.lcgclabs.com



AS-BUILT Models

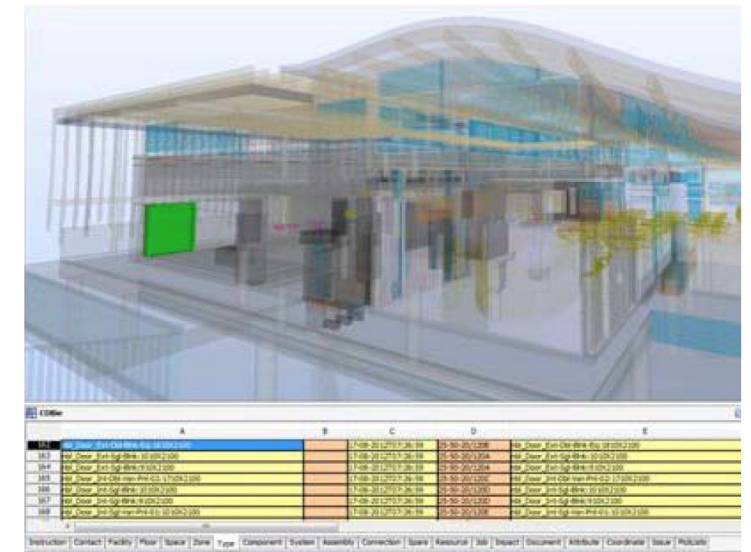
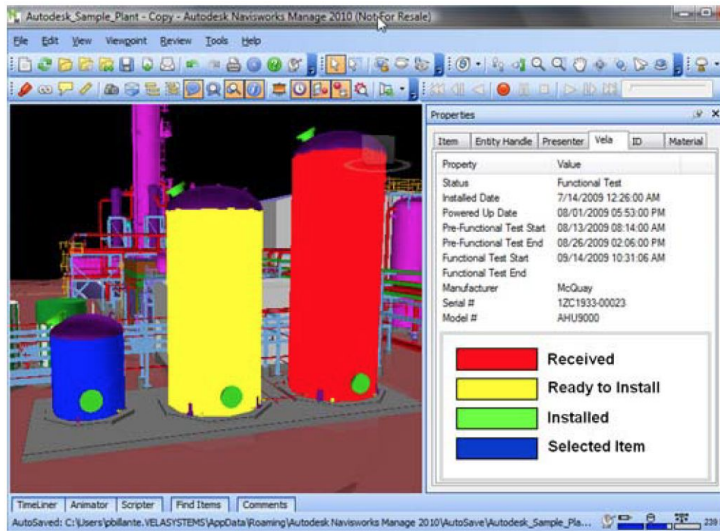
Commission & Handover



Source: The Complete Guide to Project Commissioning - Digital Builder (autodesk.com)

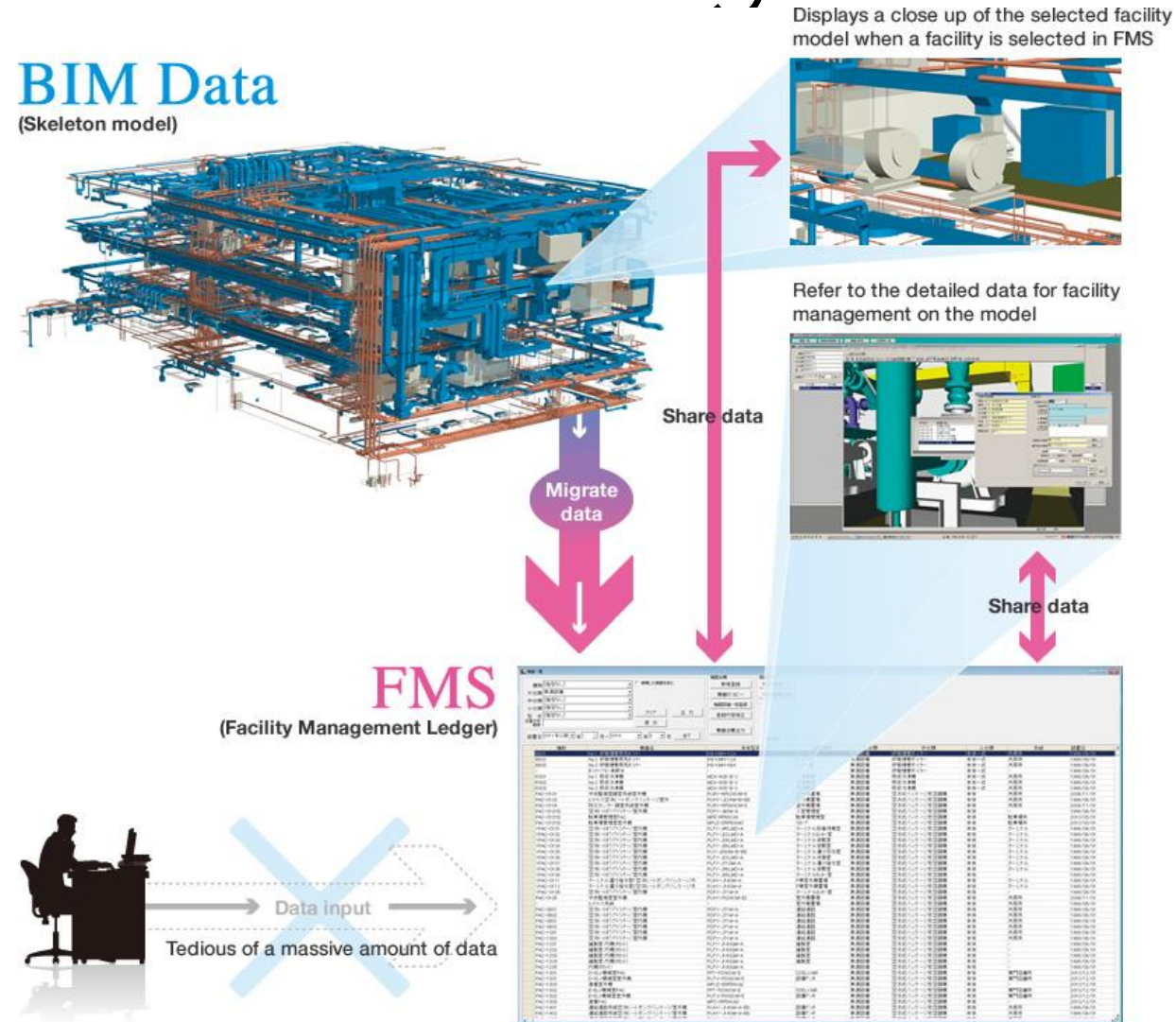


Virtual Handover (Record Model)



Commissioning

Facilities Data Integration, management and training



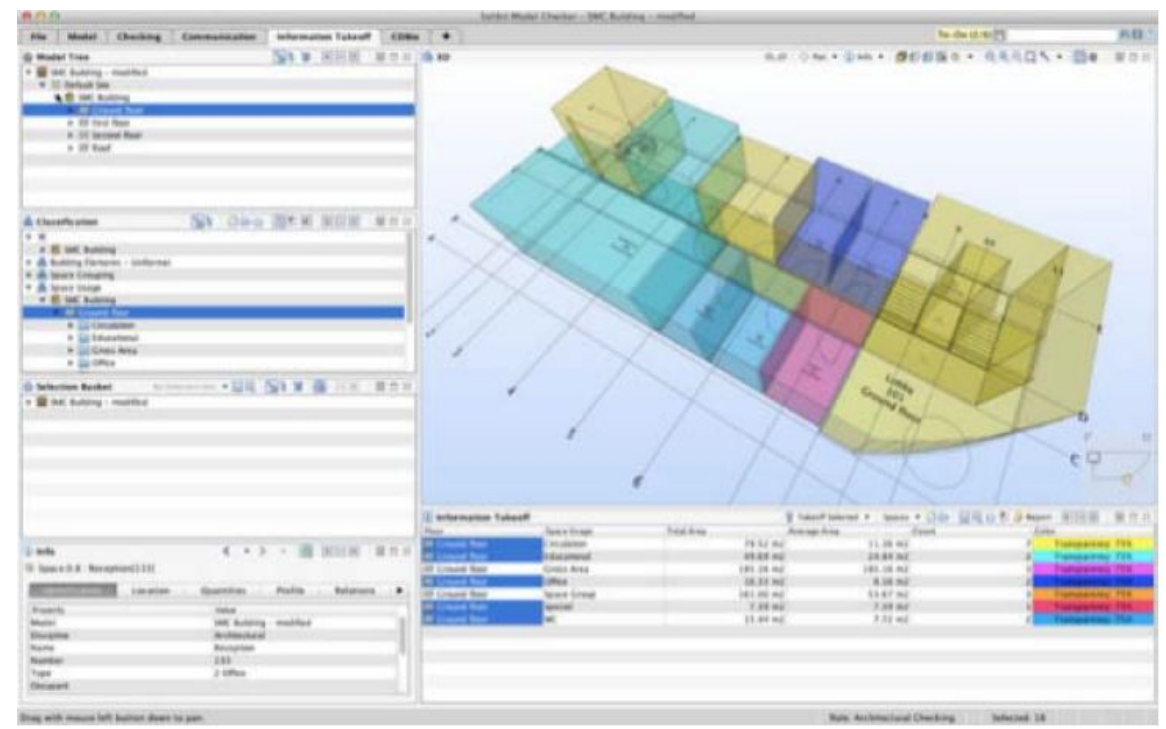
This Door is Equipped with an ElectroLynx Wiring Harness

Std Routing

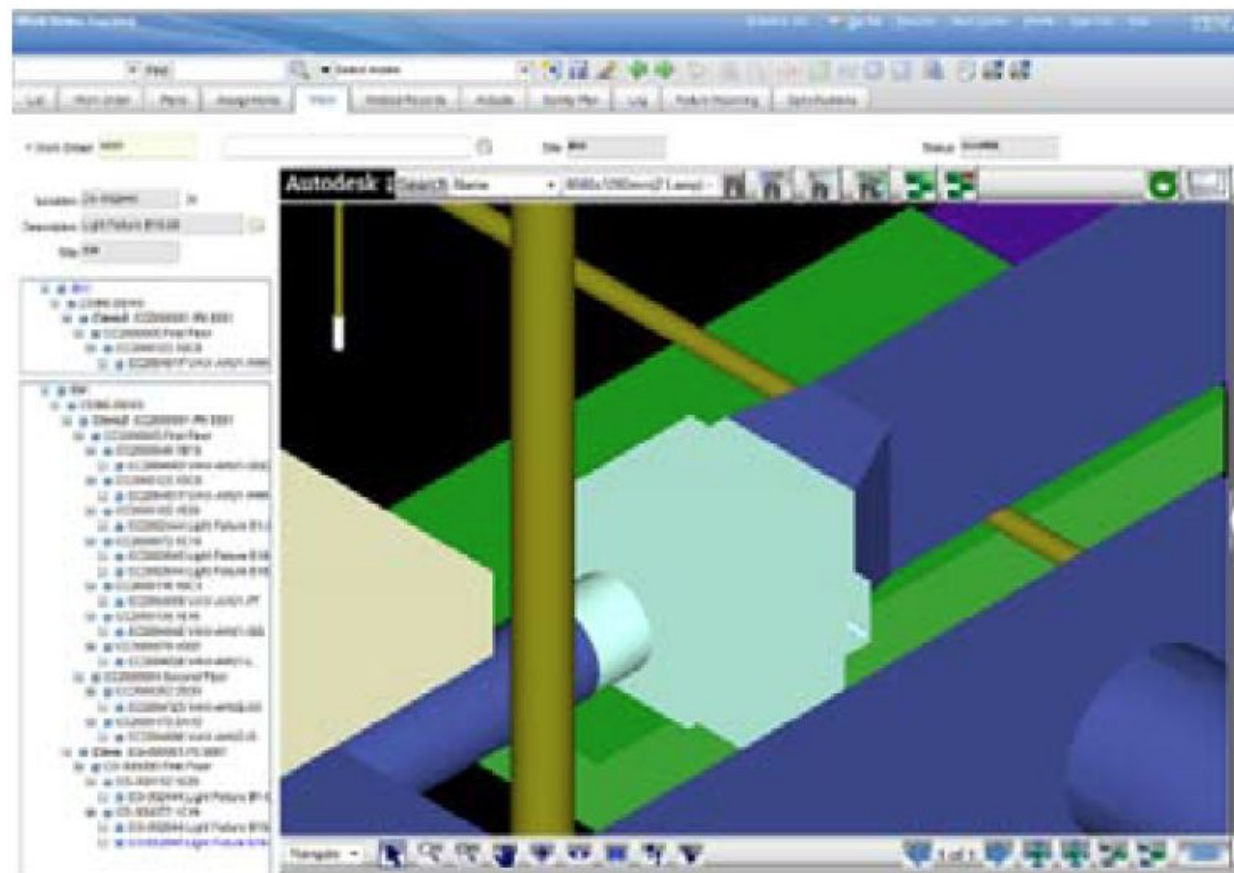
Alt Routing

The Cable Runs Between the Lock Outout and Electric Hinge

USE CAUTION WHEN FACE DRILLING



Security



Data Model Integration

Conclusion

- Architects leadership involves from data collection to facility management training
- BIM is the only platform which gives full scope to deliver an
 - efficient
 - green
 - intelligent
 - sustainable building
- New generation architects has to master BIM

How to get into BIM?

BIM Software Packages



What is the present context of BIM training in India?

- India BIM Association (40,000 members)
- BIM Crew (70 members)
- Various private institutions for different platforms are available

Impact of BIM on construction Industry

- Airport authority of India
- Metro projects
- Railway projects
- Defense projects
- Irrigation projects

MANDATORY!

Special
thanks to Dr.
Amarnath

Dr. AMARNATH CB

Head-BIM Strategy, Larsen & Toubro Ltd.

Volunteering

President, India BIM Association.

Chairman-BIM, Forum of Critical Utility Services

National Secretary, Forum for Human Rights & Anti-Corruption

Member-Board of Studies, Vellore Institute of Technology

Board Member-Programme Review Committee, Symbiosis
International University

Member of Advisory Board - Conferences, SRM University

Member-Board of Studies, Kolhapur Institute of Technology

Guest Faculty, CEPT | IITD | IITM | IIT Mandi | NITK | NIT Trichy | SPA
| RICS | UVCE | ESCI | SSN | RVCE | BMSCE | SONA College | AIT |
CHRIST Univ | DSI | Politechnico Di Milano | Chulalongkorn Univ |
PMI

Strategic Advisor, CII | EIG | Geospatial Media | BAI | BIG5 | COA |
TraiCon | EU BIM Observatory | BIMCrew | HILTI | ACCA | Invicara |
Bexel | VB Studio | Infiblocks |

Strategic Partner, CanBIM | BIM Forum Brazil | BIM Africa |
BIM4Turkey

BIM Technical Committee Member, ISCCBE

Country Editor - BIM Dictionary, BIME Initiative

Guest Speaker, GRIHA | IGBC | CREDAI | BCT | WIC | Sinaenco

BIM Job oppurnities



Technical



Managerial



Strategic



Discussion Session

Thank you

