



# BIM FOR FACILITIES MANAGEMENT AND OWNER OPERATIONS

Chris Tisdell

Director of Global Enterprise Services

Class ID B02372



# Class Summary

This class is designed to present the next level of Building Information Modeling (BIM) and big data for owner's lifecycle operations. The presentation will introduce a truly cloud-based, 24x7 hosted, collaboration web service born from best practices in the architecture, engineering, and construction industry and focused on the owner's lifecycle operations at an enterprise-level.

The class will foster an understanding of the next generation of globally accessible, concurrent "big BIM data" and collaboratively flexible and infinitely scalable metadata schemas. The class will showcase past and present projects where this cloud-based collaboration has been used to illustrate how communication and problem-solving on complex projects can be improved for project responsiveness, quality control, access to the most up-to-date data, and overall project cost and schedule.

# Learning Objectives

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

- Gain strategic insights on cloud-based platforms for facilities maintenance, management, and lifecycle operations;
- Explain the most important point about 3D-integration platforms for visualization and web services applications for CMMS and like systems;
- Gain insights on the “Googlization” of AECOO metadata through pervasive access and a structured, social interface;
- Identify how “heavy BIM” is made lightweight and scalable across virtually unlimited numbers of organizations and users.

# The Owner's Enterprise BIM for Lifecycle Operations



# SPEAKER BIO



**Chris Tisdel**

Gehry Technologies

Director of Global Enterprise Services

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*M. ARCH – ASSOCIATE AIA – LEED AP*

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**FORMER DIRECTOR of BUILDING INFORMATION MODELING  
(STATE OF TEXAS)**

**EXPERIENCE IN STANDARDIZING AND IMPLEMENTING BIM to  
COBie to CMMS/CAFM (OWNER FM&O)**

**DIRECTOR OF BIM AT *BROADDUS & ASSOCIATES*; INTEGRATING  
BIM AND COBie OWNER REQUIREMENTS INTO PROCESS AND  
DELIVERABLES TO MIGRATE TO PROJECT INFORMATION  
DIRECTLY INTO CMMS AND CAFM SYSTEMS**

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**20 YEARS IN THE PUBLIC/PRIVATE SECTOR**

**BIM RESEARCH AND TEACHING AT A UNIVERSITY LEVEL**

**DESIGN, PRODUCTION AND MANAGEMENT EXPERIENCE**

**MULTIPLE CAD AND BIM PLATFORMS SINCE 1987**

**SMALL, MEDIUM AND LARGE FIRMS**

**WIDE RANGE OF PROJECT SIZES AND TYPES**



# 20 YEAR HERITAGE



Under Frank's guidance, Gehry Technologies is focused on demonstrating more successful processes to achieve outcomes of higher quality, more efficiency, and cost effective projects.

## Gehry Partners (GP)



# 1992

### Barcelona Fish

First architectural project -  
Direct digital integration of  
design and fabrication



# 1997

### Guggenheim Bilbao Opens

Introduces digital  
construction  
to the world stage



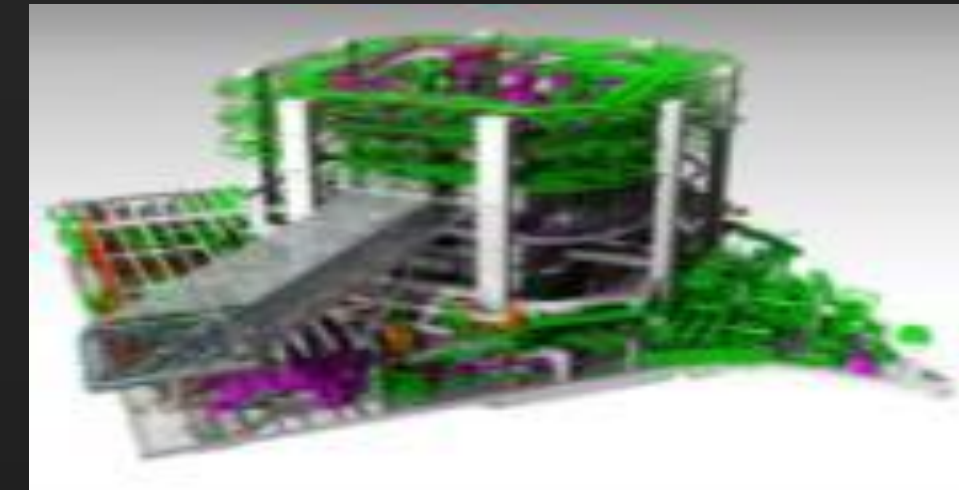
# 2002

### Walt Disney Concert Hall

First project with mechanical  
systems

# 2002

## Gehry Technologies Launched



# 2007

### One Island East

Completion of first fully  
integrated BIM Project at  
Gehry Technologies



# 2012

### Foundation Louis Vuitton

Estimated completion of the  
most ambitious digital  
construction projects to date



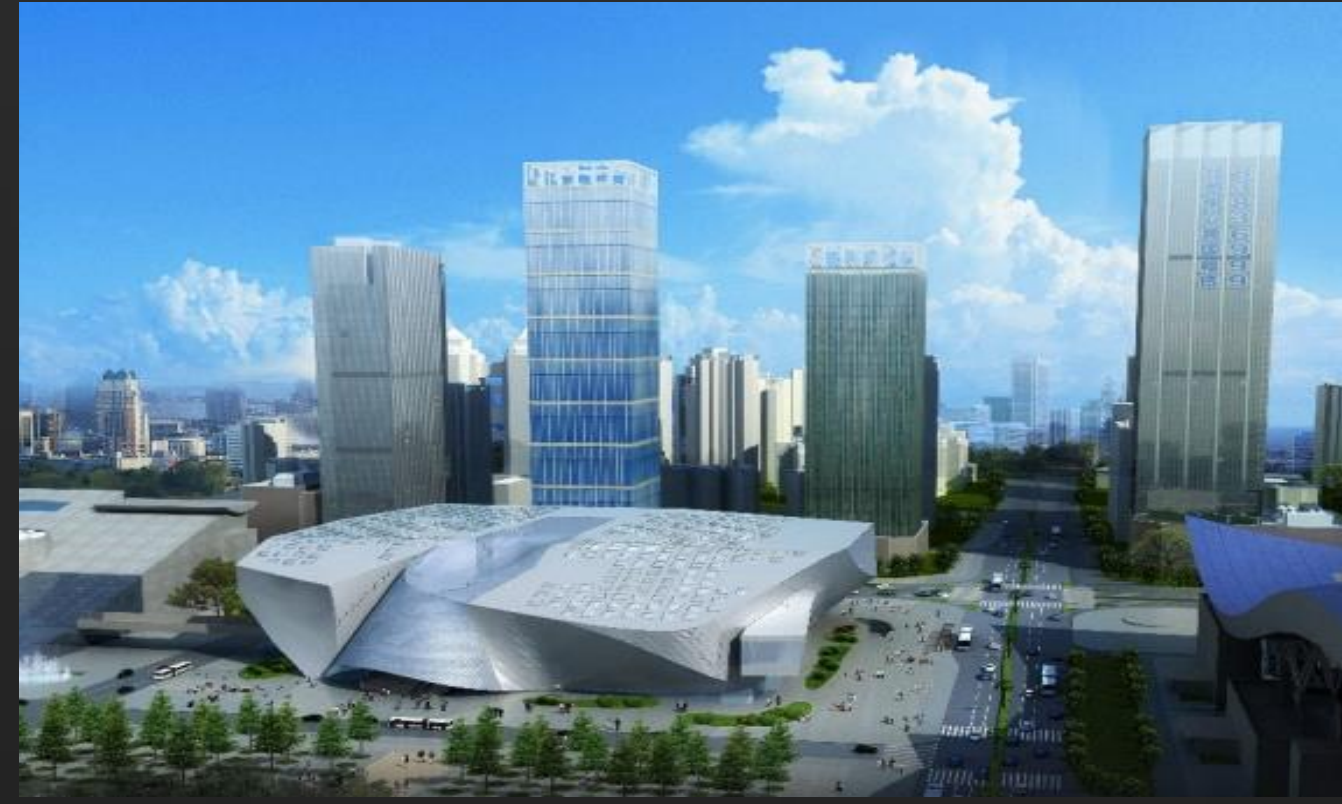
**Design / Delivery Process Innovation Using BIM**  
**BIM Award Citation**  
One Island East, Hong Kong  
Gehry Technologies - Asia

**Consulting  
System  
Integrator  
Partner**

**Autodesk**



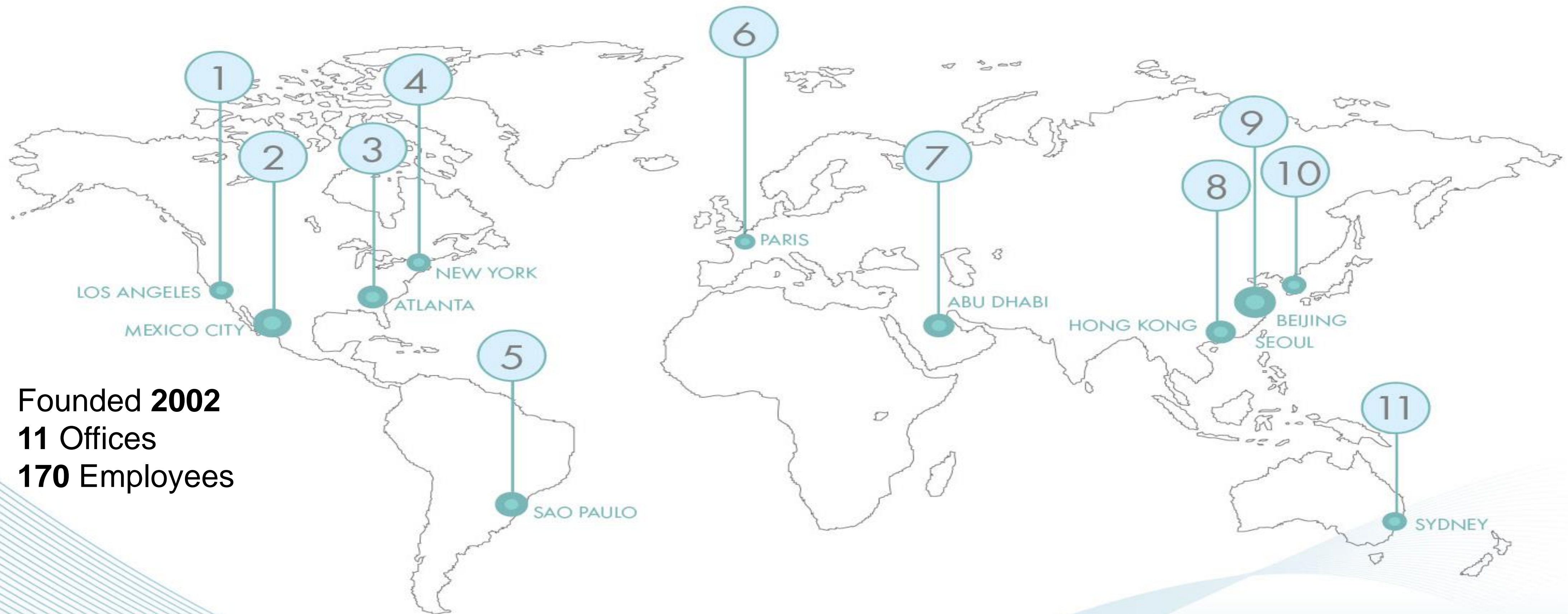
# COMPANY BACKGROUND



- **Headquarters:** Los Angeles, California
- **Office Locations:** Atlanta, New York, Paris, Hong Kong, Abu Dhabi, Shanghai, Beijing, Seoul, Sao Paulo, and Sydney
- **Services:** BIM-based Design and Construct Assist, Project Delivery and Enterprise Transformation
- **Staff:** 170 architects, engineers and software designers
- **Clients:** 550 Owners, architects, engineers, contractors, equipment manufacturers and fabricators
- **Volume:** 200 projects per year



GT IS A **GLOBAL LEADER** IN  
TECHNOLOGY-ORIENTED AEC SERVICES



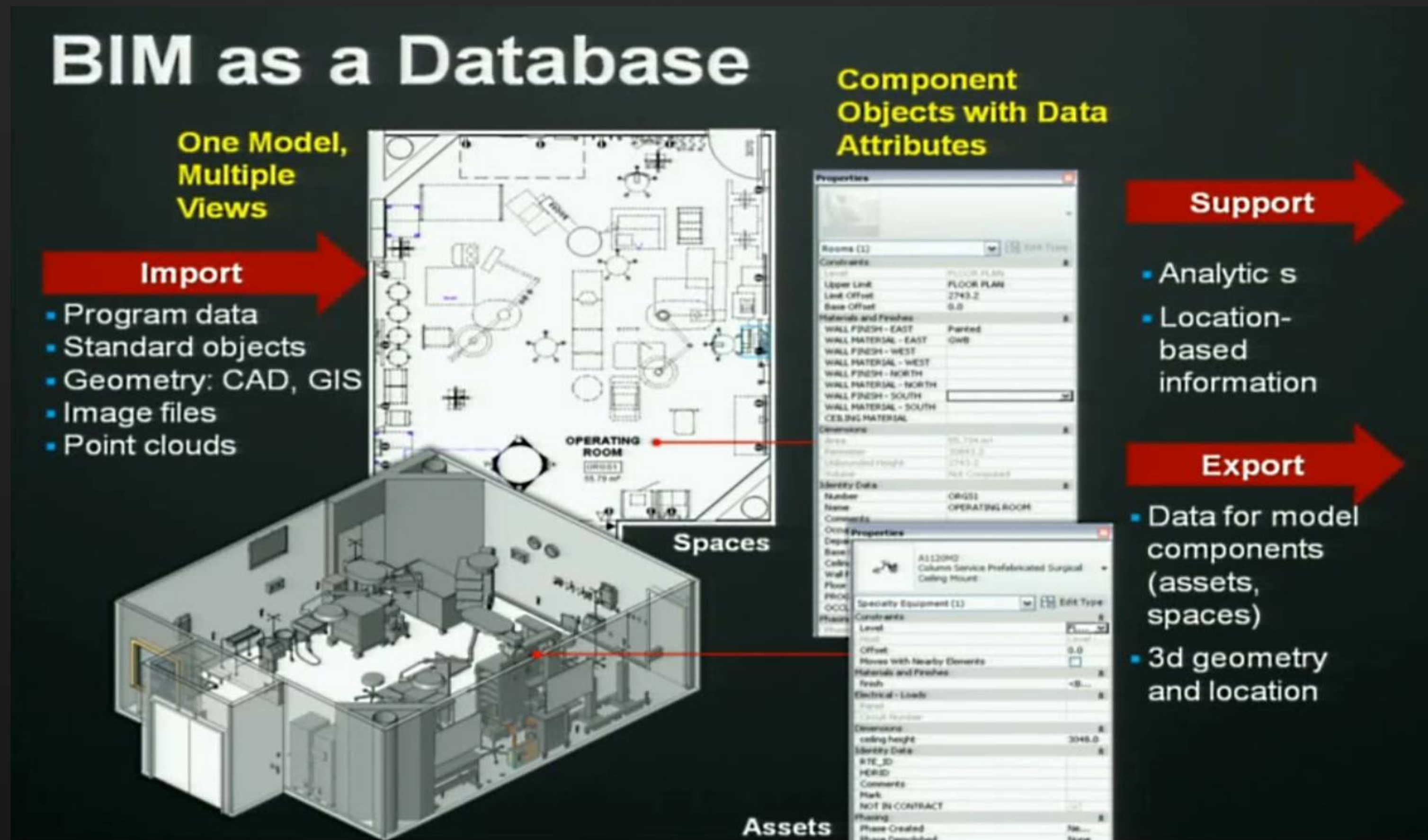
Founded **2002**  
**11** Offices  
**170** Employees



# Service Clients



# WHAT IS BIM FOR FM?



- MAINTENANCE WORK ORDER
- EMERGENCY SERVICE REQUEST
- CONTINUOUS COMMISSIONING
  - ENERGY OPTIMIZATION

- WORK ORDER VISUALIZATION
- FACILITY CONDITION ASSESSMENT
  - LIFE SAFETY INSPECTIONS
- LIFECYCLE/SUSTAINABILITY ANALYSIS



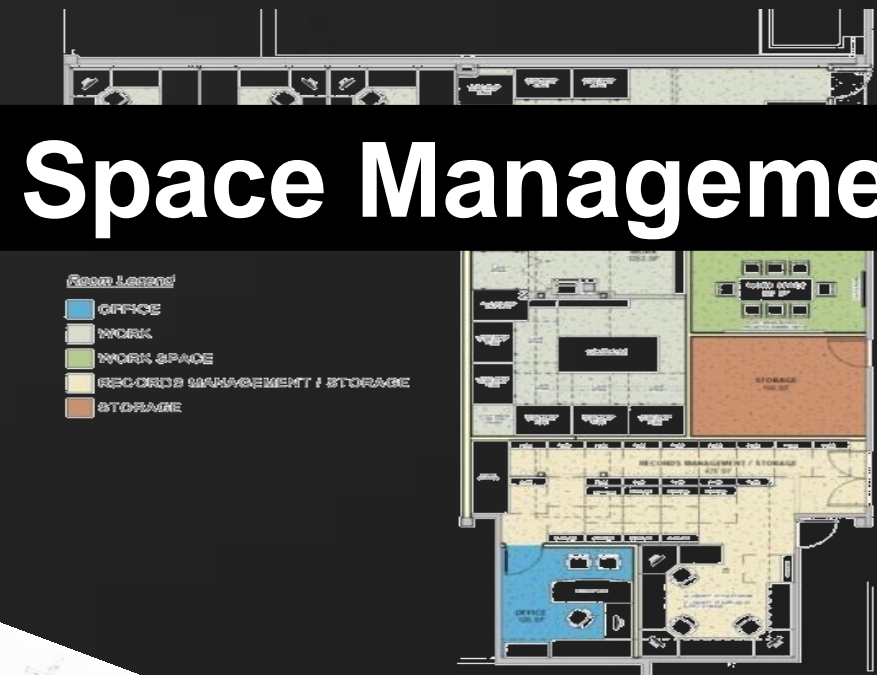
# THE BIG IDEA...



Dashboard Portal



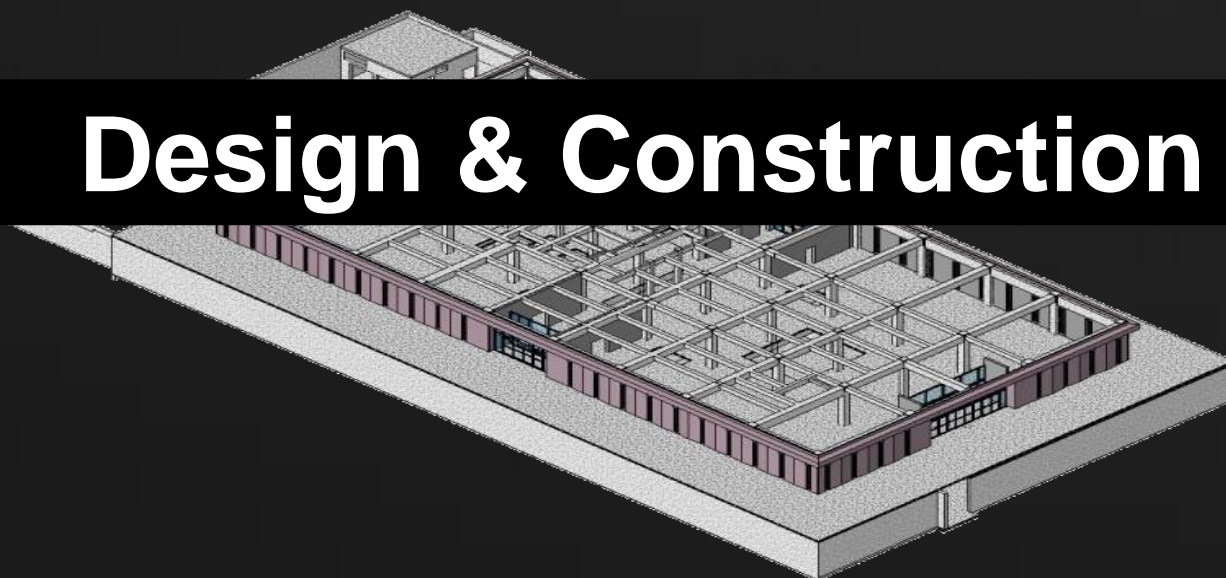
Administrative



Space Management

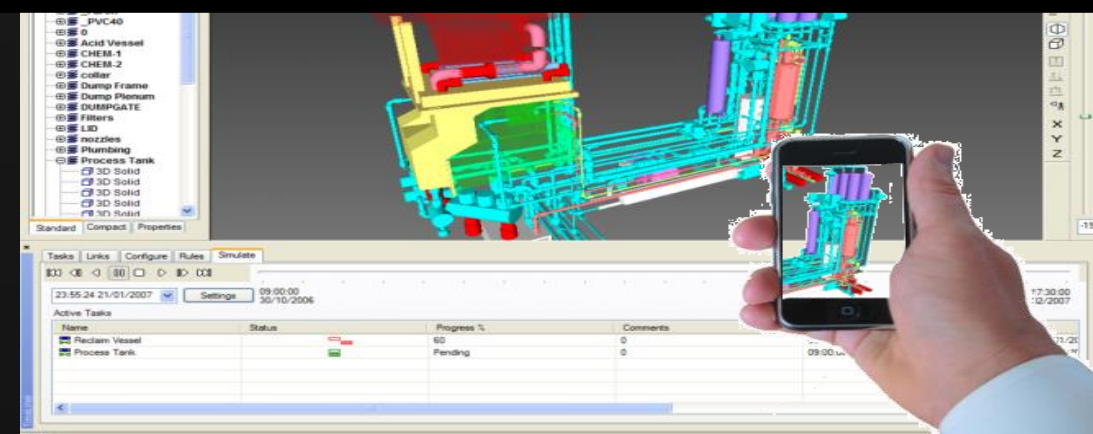
Design & Construction

Security

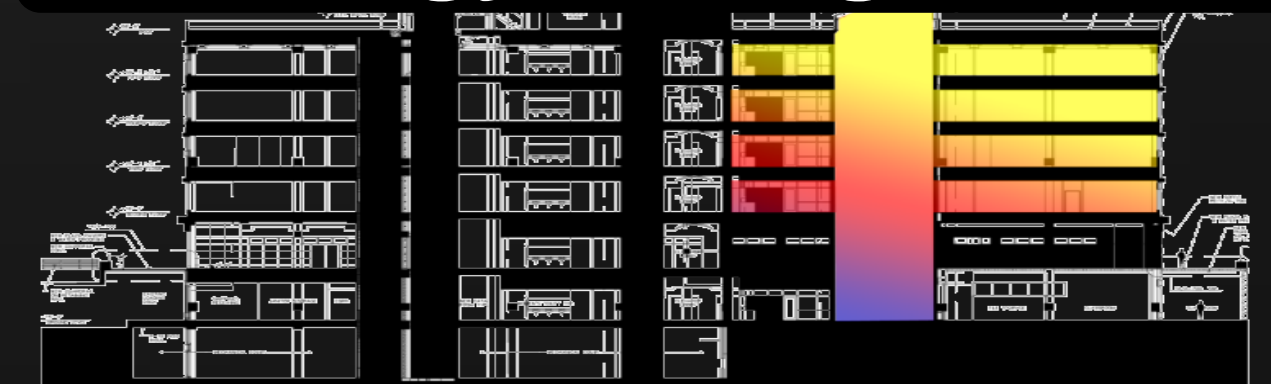
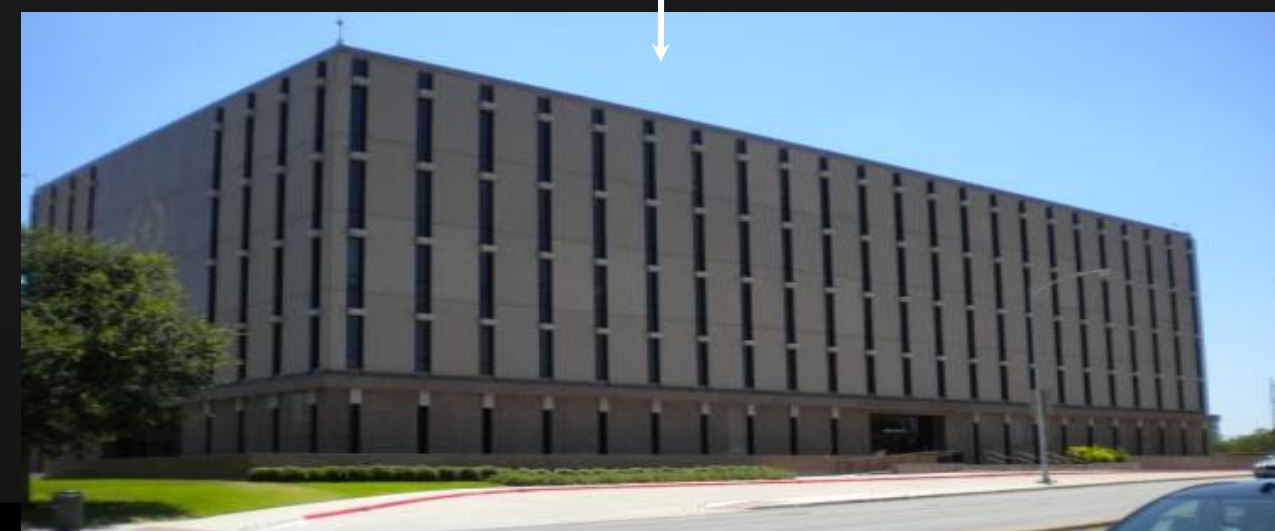


Facilities Maintenance

Energy Management



Control Systems



CLOUD BIM



# TYP DATA PROCESS TO OWNER

OWNER  
SPEC

- INDUSTRY BEST PRACTICE - GENERIC

DESIGN  
DATA

CONST  
DATA

FFE/  
OWNER  
DATA

- MOST ROI TO VENDOR – PROPRIETARY
- DIFFERENT “LANGUAGES

CONFIG  
TOOL

- TYP 3<sup>RD</sup> PARTY
- LATER IN PROJECT
- MUST TRACK DOWN MISSING DATA

DATA  
STRUCTURE

- COBie (AT BEST)
- MIN. PER VENDORS FEE/CAPABILITIES

CMMS

- BEST VALUE TO OWNER
- SHOULD INFORM STRUCTURED DATA
- OPERATIONAL DATA INPUT AFTER PROJECT COMPLETION



# ENTERPRISE DATA PROCESS TO OWNER

OWNER  
PROTOCOL

- INDUSTRY BEST PRACTICE
- OWNER SPECIFIC DIRECTIVES

STRUCTURED DATA

DESIGN  
DATA

CONST  
DATA

FFE/  
OWNER  
DATA

CONFIGURATION TOOL

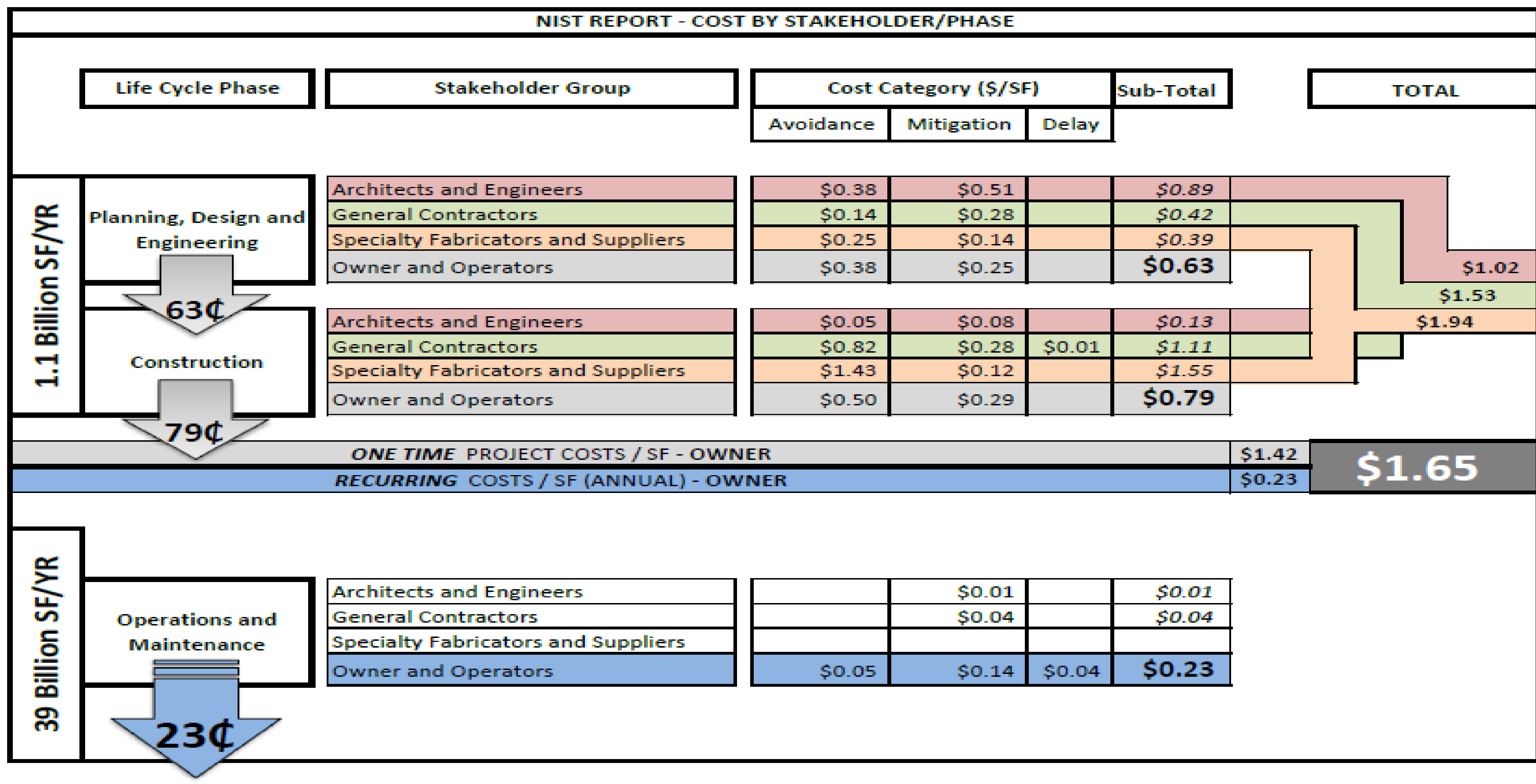
- DATA STRUCTURED AT BEGINNING
- DATA ENTERED BY RESPONSIBLE VENDOR AT THE TIME IT IS KNOWN
- ADDITIVE PROCESS

CMMS

- BEST VALUE TO OWNER
- INFORMS OWNER PROTOCOL
- OPERATIONAL DATA ON DAY 1



# WHY UTILIZE BIM FOR FM?...ROI?...



# Owner Guidelines...Standards...Templates

## TFC PROVIDED DOCUMENTATION

**GUIDELINES / STANDARDS**  
TEXAS FACILITIES COMMISSION - PROFESSIONAL SERVICE PROVIDER GUIDELINES AND STANDARDS  
Last Date: 11/15/2012

This document replaces the previously published Architectural/Engineering Guidelines (Revision Date: February 1, 2008).

Revised portions have been included in a new tabular format for greater clarity.

Unrevised portions remain in the previous outline format.

Additional revisions to the Guidelines/Standards will be issued from time to time to reflect the latest TFC practices.

As revisions are issued they will be published in the new tabular format.

The electronic version of this document contains hyperlinks to relevant internal web-sites as well as pertinent locations within the document itself.

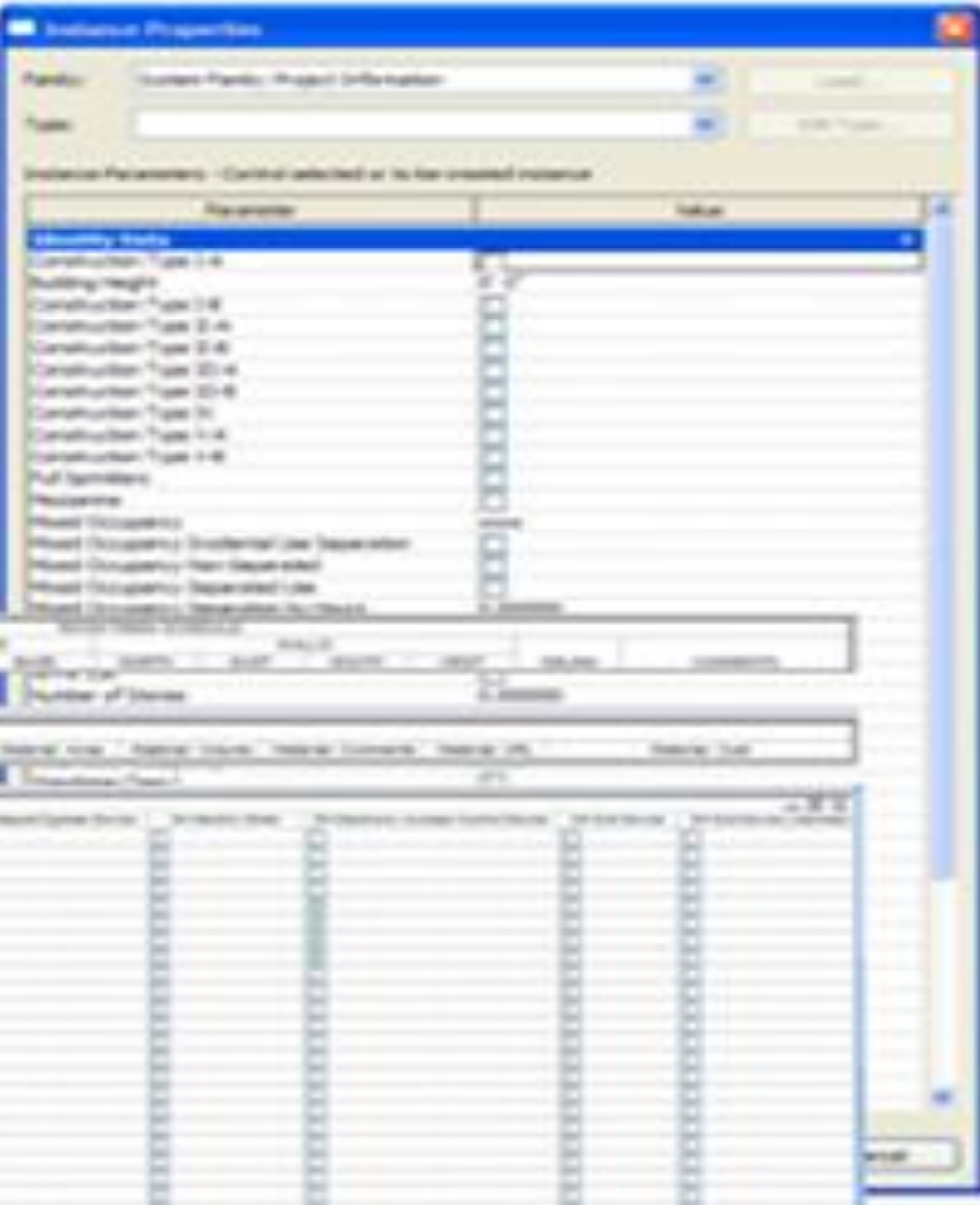

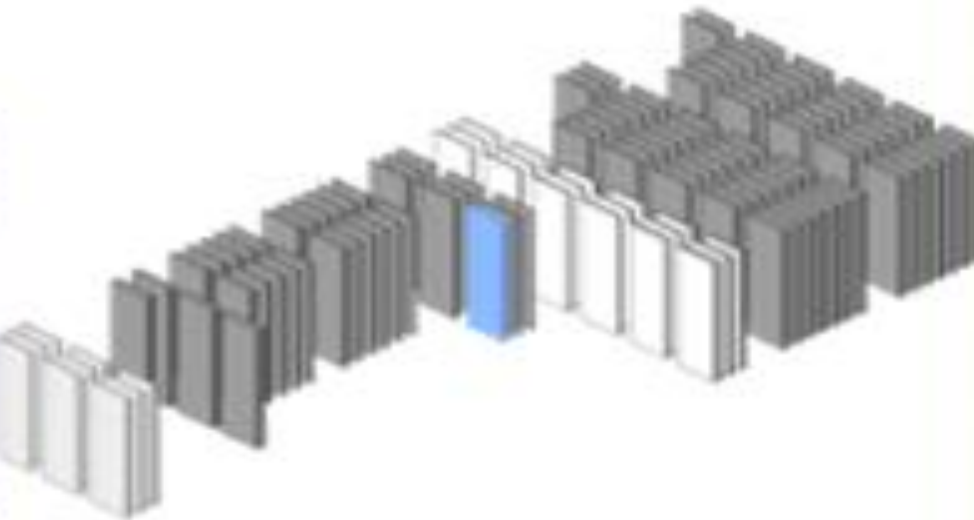

## BIM TEMPLATES

- STANDARDIZED DOCUMENT SET
- STANDARDIZED SCHEDULES
- STANDARDIZED GRAPHICS
- "SMART" PARAMETERS
- TYPICAL DETAILS
- PHASING

•UPDATED QUARTERLY

•DIRECTLY REFLECTS A/E GUIDELINES & STANDARDS

•EMBEDDED HYPERLINKING TO TESTING AND VENDOR DATA





# HOW DO YOU IMPLEMENT BIM FOR FM?



ENTERPRISE LEVEL COLLABORATION:

**INFORMATION IS NORMALIZED... NOT LOST... NEVER DUPLICATED  
PROCESS IS CONTINUOUSLY "DATA COMMISSIONED" FOR ACCURACY**



# PROJECTS...

Projects - Messages & Events

Files – Upload, Sync, History

3D - BIM Object Server & Viewers

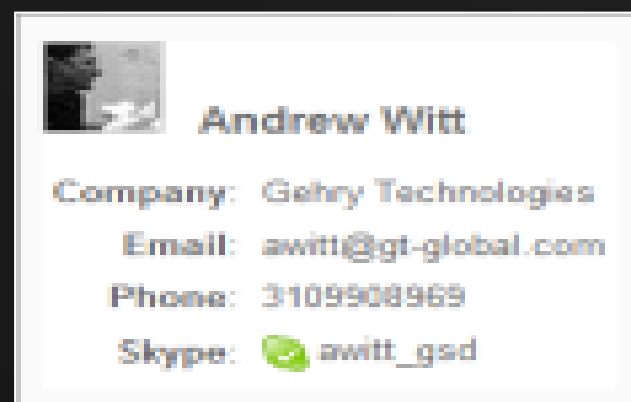
Mashup – Dashboard & Services



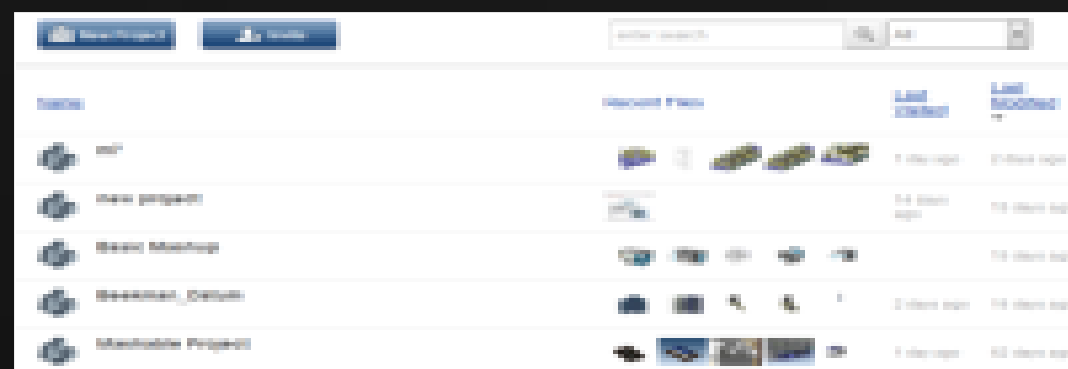
project wall



messages



people & organizations



projects

Sync



# FILES...

Projects - Messages & Events  
Files – Upload, Sync, History  
3D - BIM Object Server & Viewers  
Mashup – Dashboard & Services

tagging & search

< August 2011 >

S	M	T	W	T	F	S
31 0	1 0	2 2	3 0	4 0	5 0	6 0
7 0	8 0	9 1	10 0	11 0	12 0	13 0

Andrew Witt added 11 files

☒ Show all files at this time

Sync to this update >

file history

☒ Upload changes from my computer

☒ Lock all selected files once uploaded

☒ 02 Presentation

☒ 01 Print Collateral

☒ 04 Images

☒ Download changes from the server

☒ 03 Posters (Michelle Lee)

☒ 01 Print Collateral (Christopher Reinig)

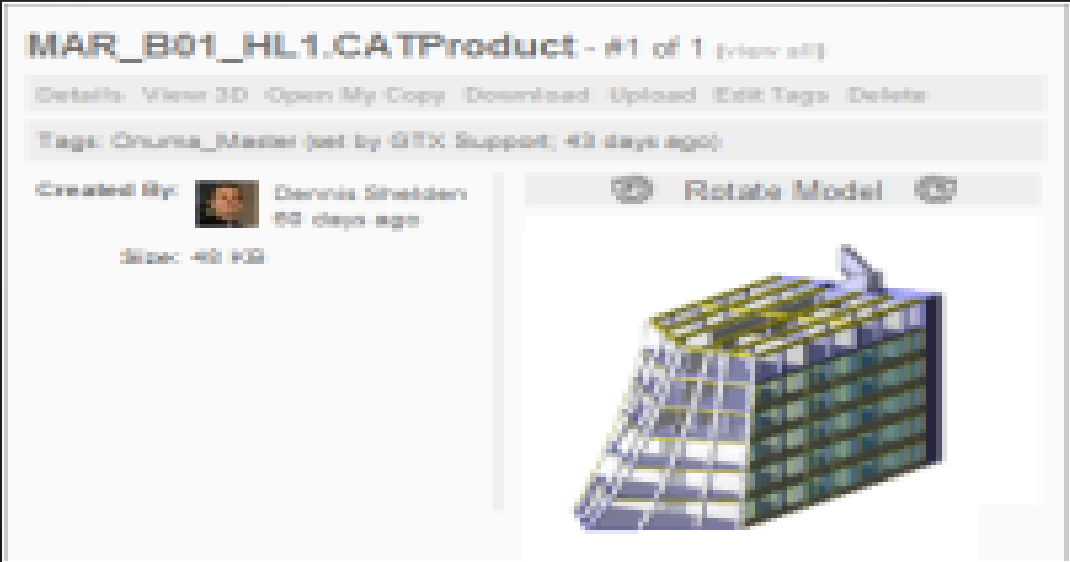
upload / download and sync



Sync



file system and browser



2D and 3D previews

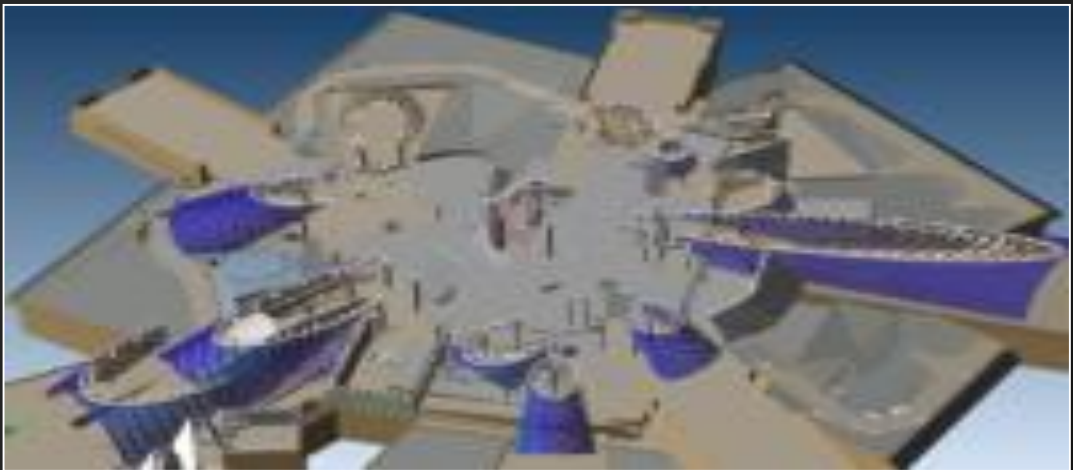


markup



# 3D OBJECTS AND METADATA

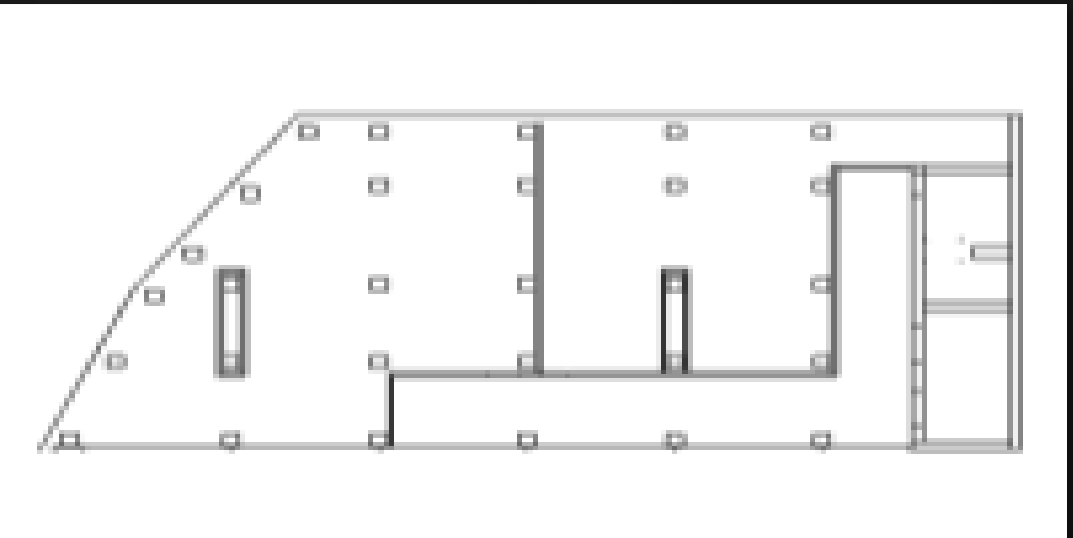
- Projects - Messages & Events
- Files – Upload, Sync, History
- 3D - BIM Object Server & Viewers
- Mashup – Dashboard & Services



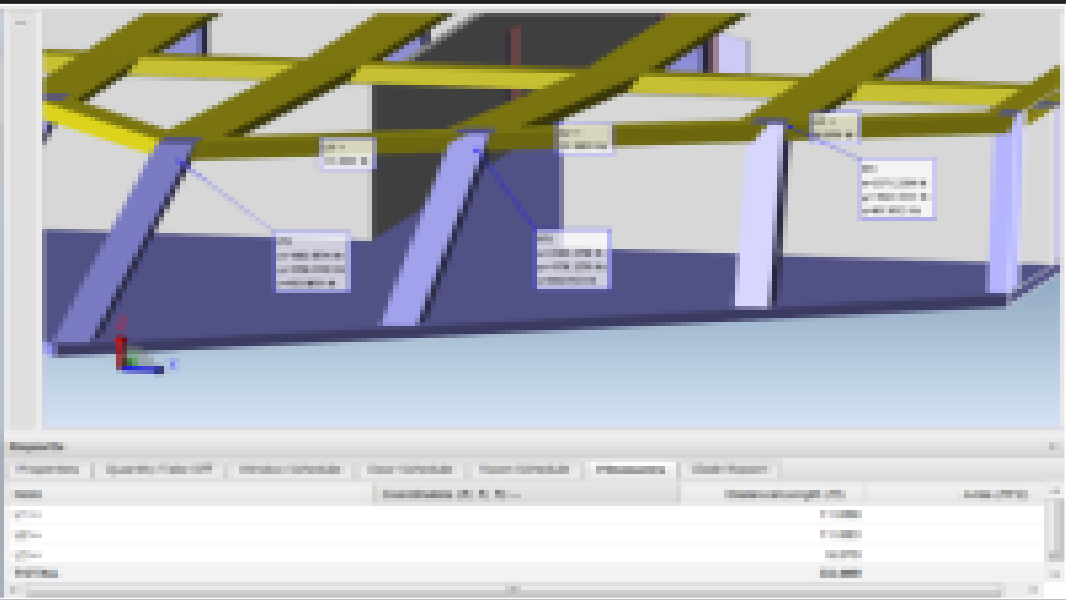
simple, powerful web viewing









clash management



sections and snapshots



measuring & annotation

Properties	Quantity Take Off	Window Schedule	Door Schedule
Element Type	Count	Total Net Surface Area (ft²)	
 Members	28	321.936	
 Plates	8	1,062.143	
 Railings	2	55.425	
 Stairs	3	7,188.447	
 Spaces	4	13,321.238	
<b>TOTAL</b>	<b>115</b>	<b>32,884.481</b>	
 Export to Excel			

quantities and reports



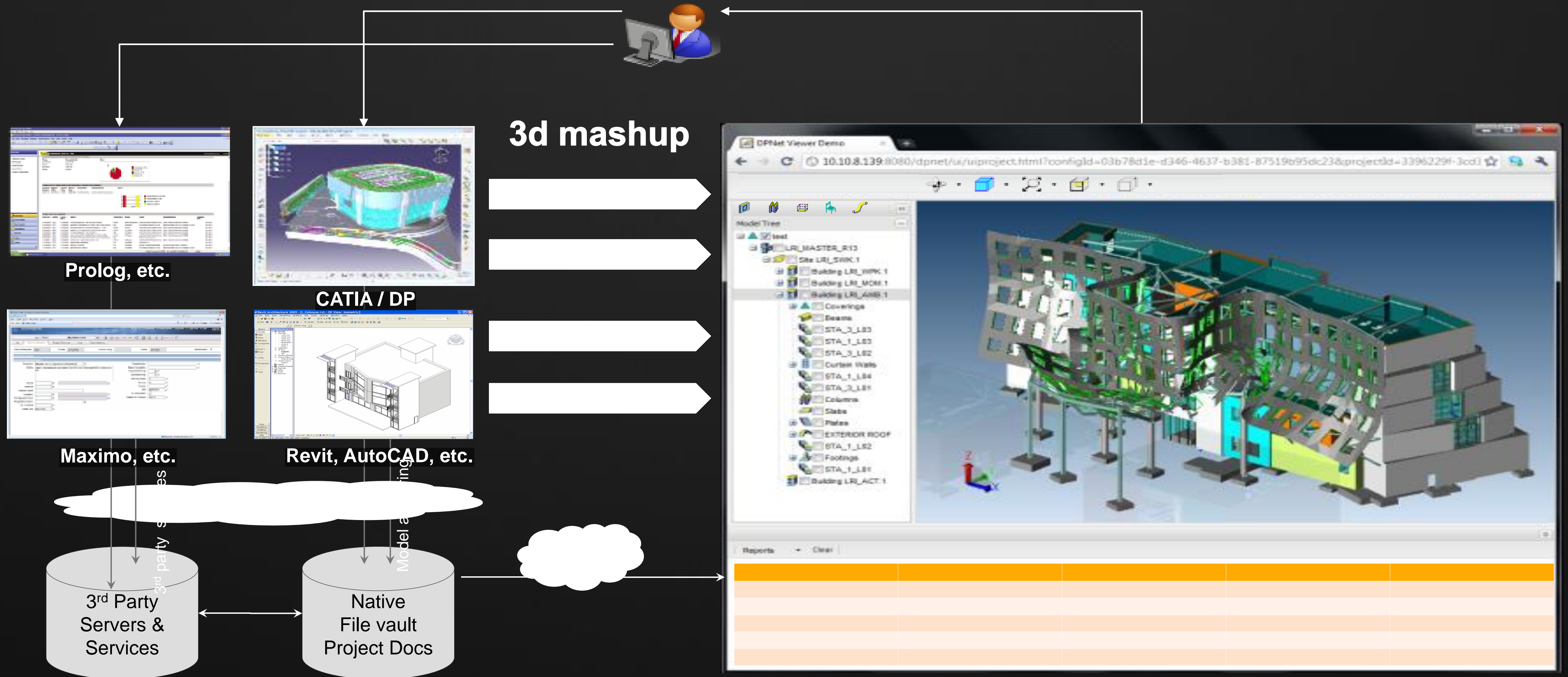
Revit connector

3D

Sync

Neutral 3D

# “MASHUP”...



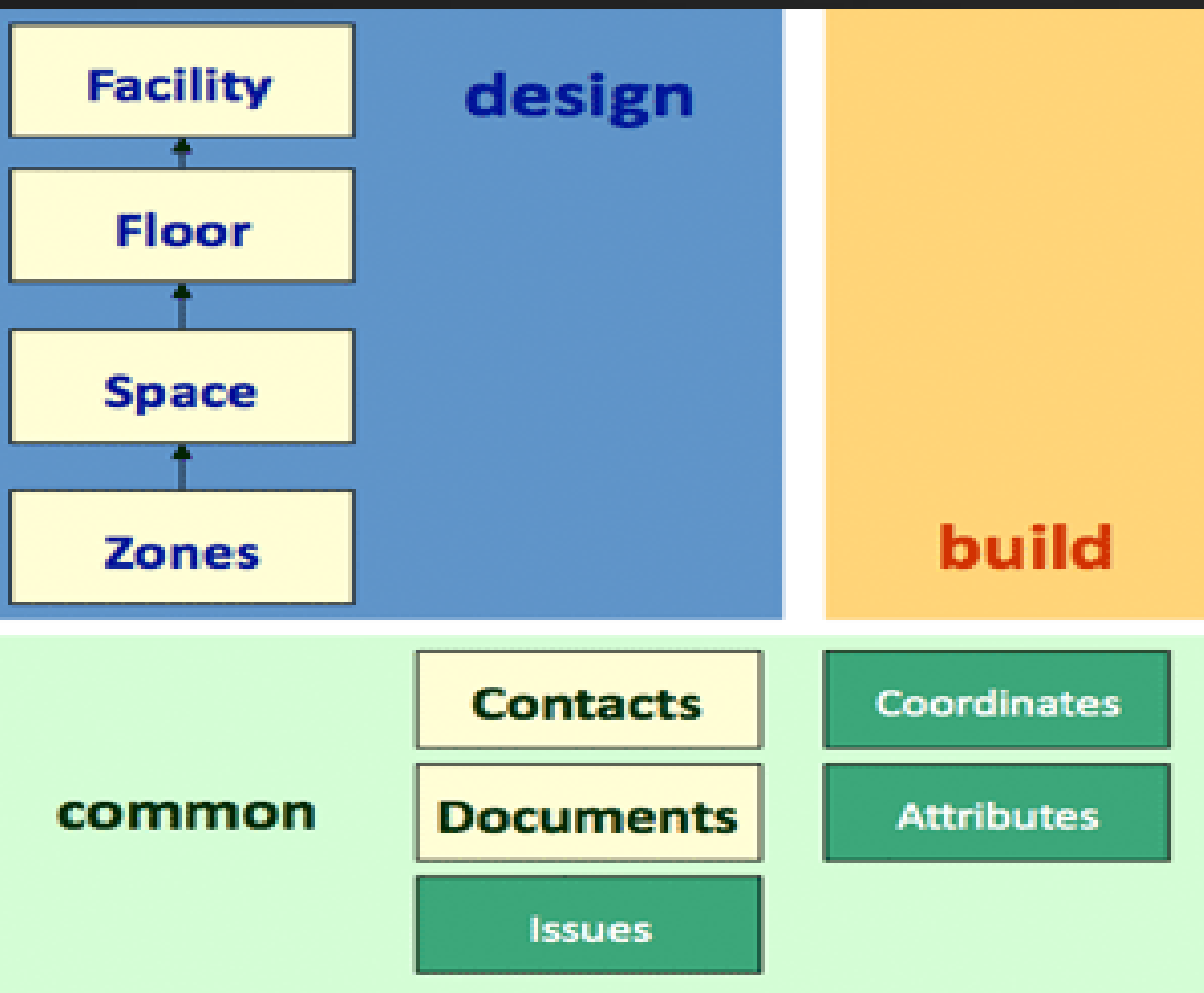


# DEFINITION AND STANDARD

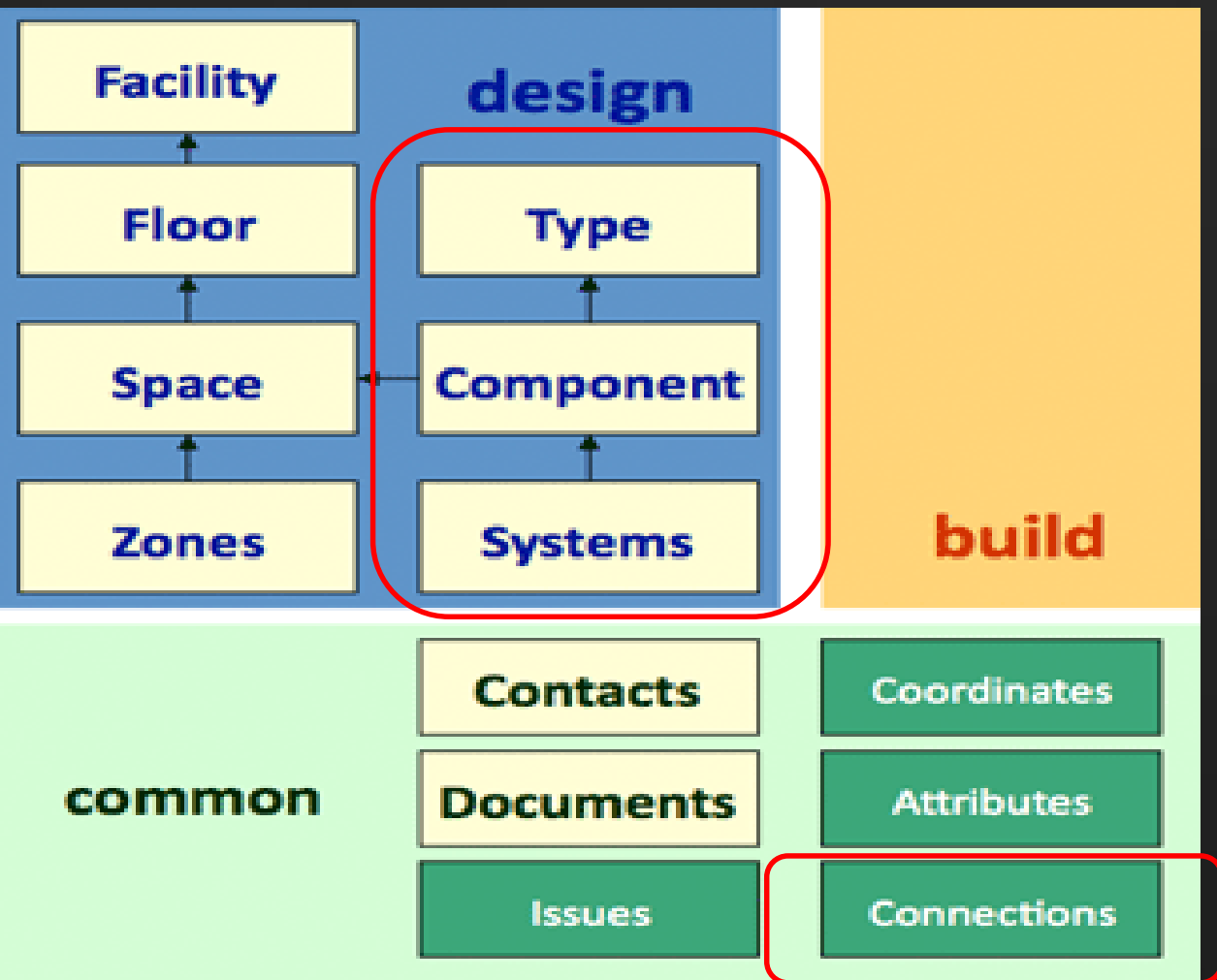
DESIGNER

CONSTRUCTOR

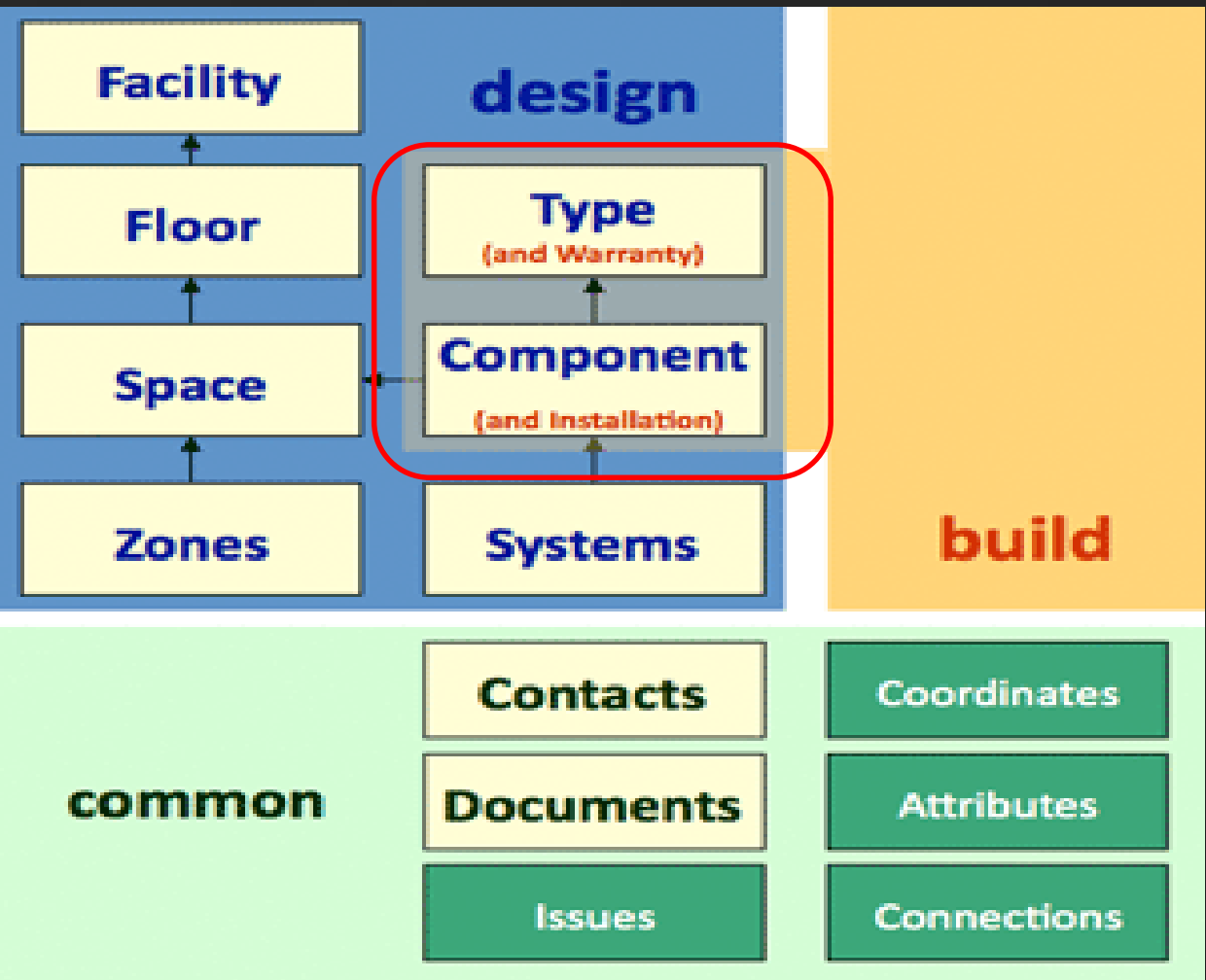
COMMISSIONING AGENT



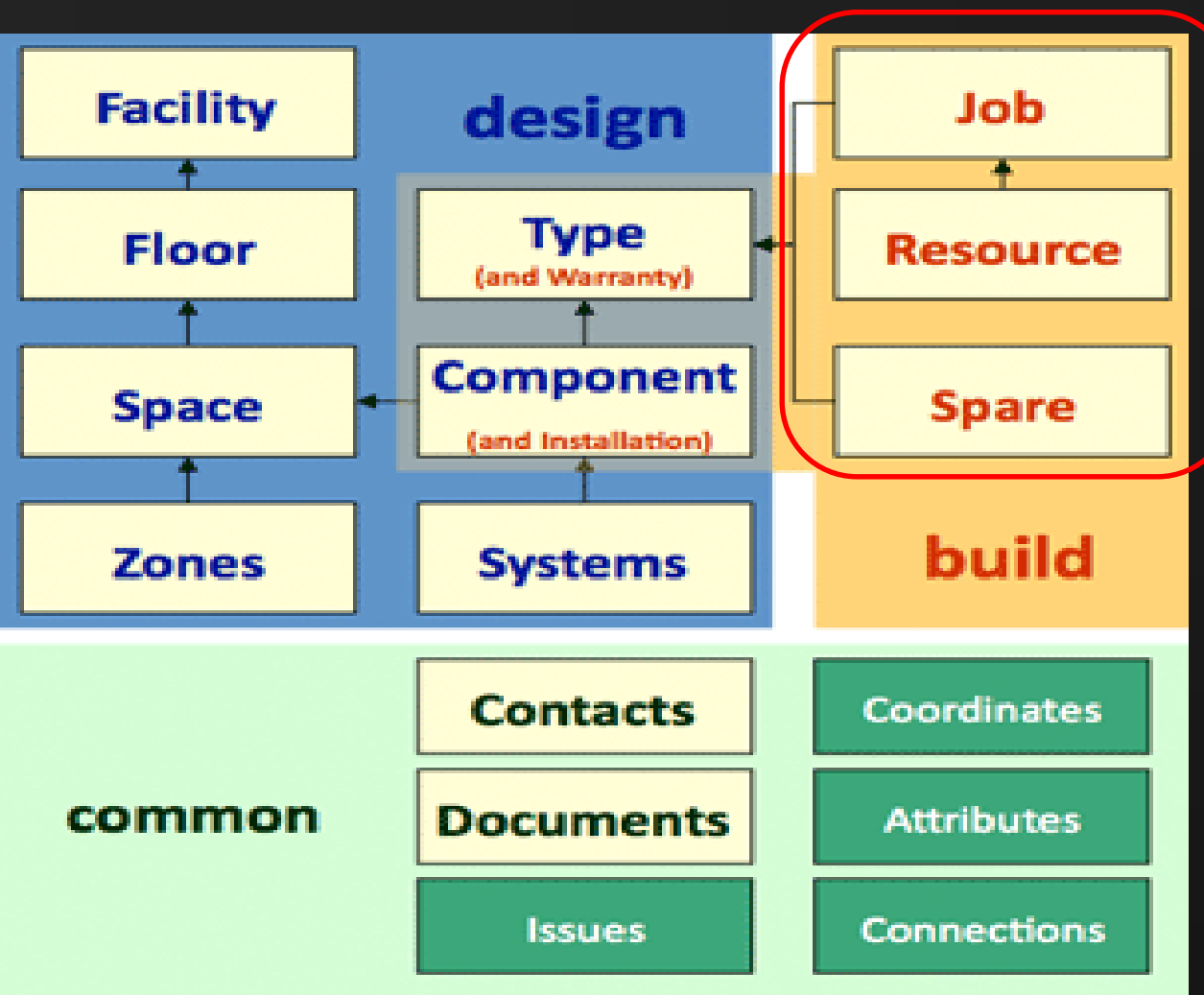
Early Design Stage



Construction Documents Stage



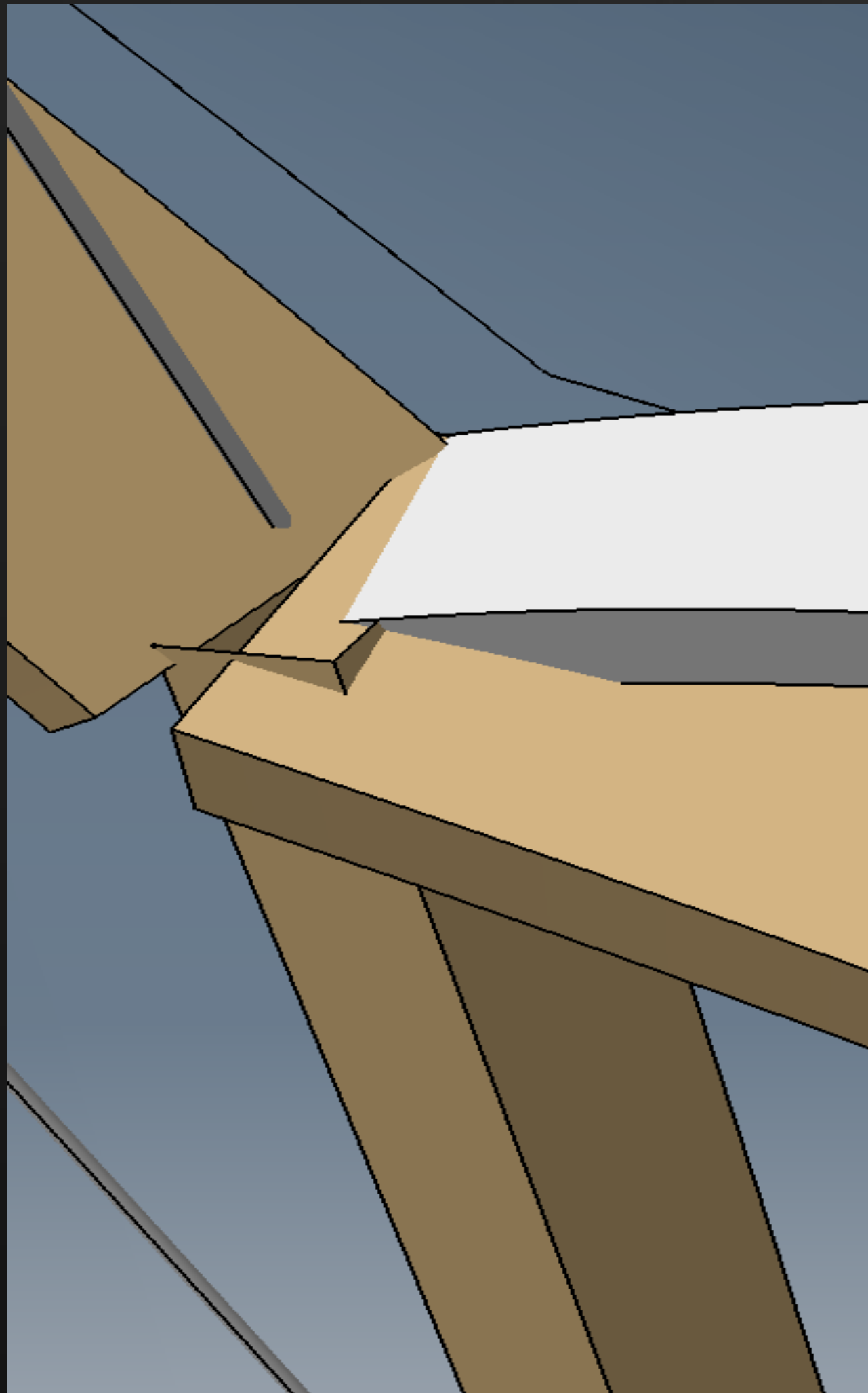
Product Installation Stage



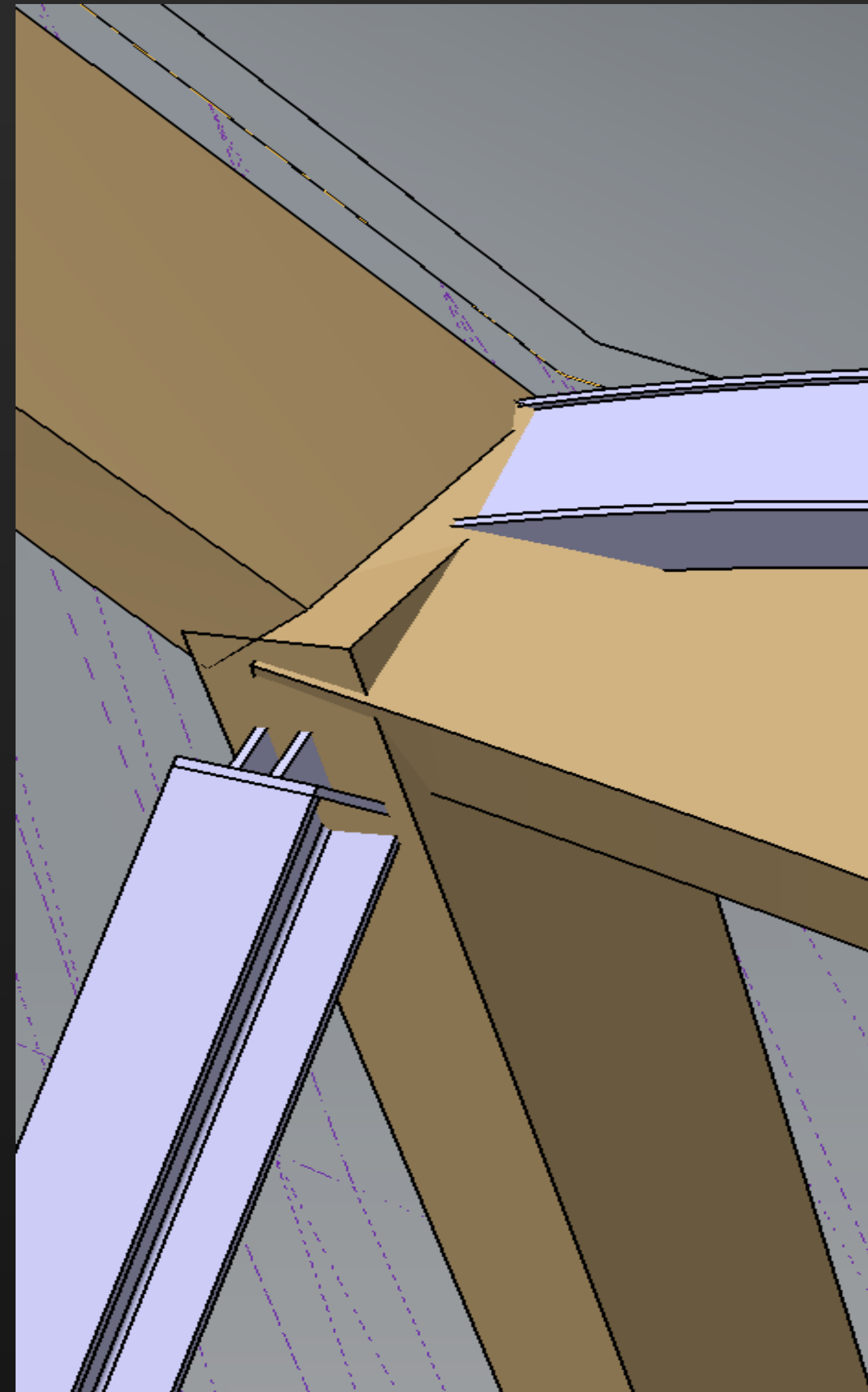
System Commissioning Stage

16 MAJOR DATA HEADINGS

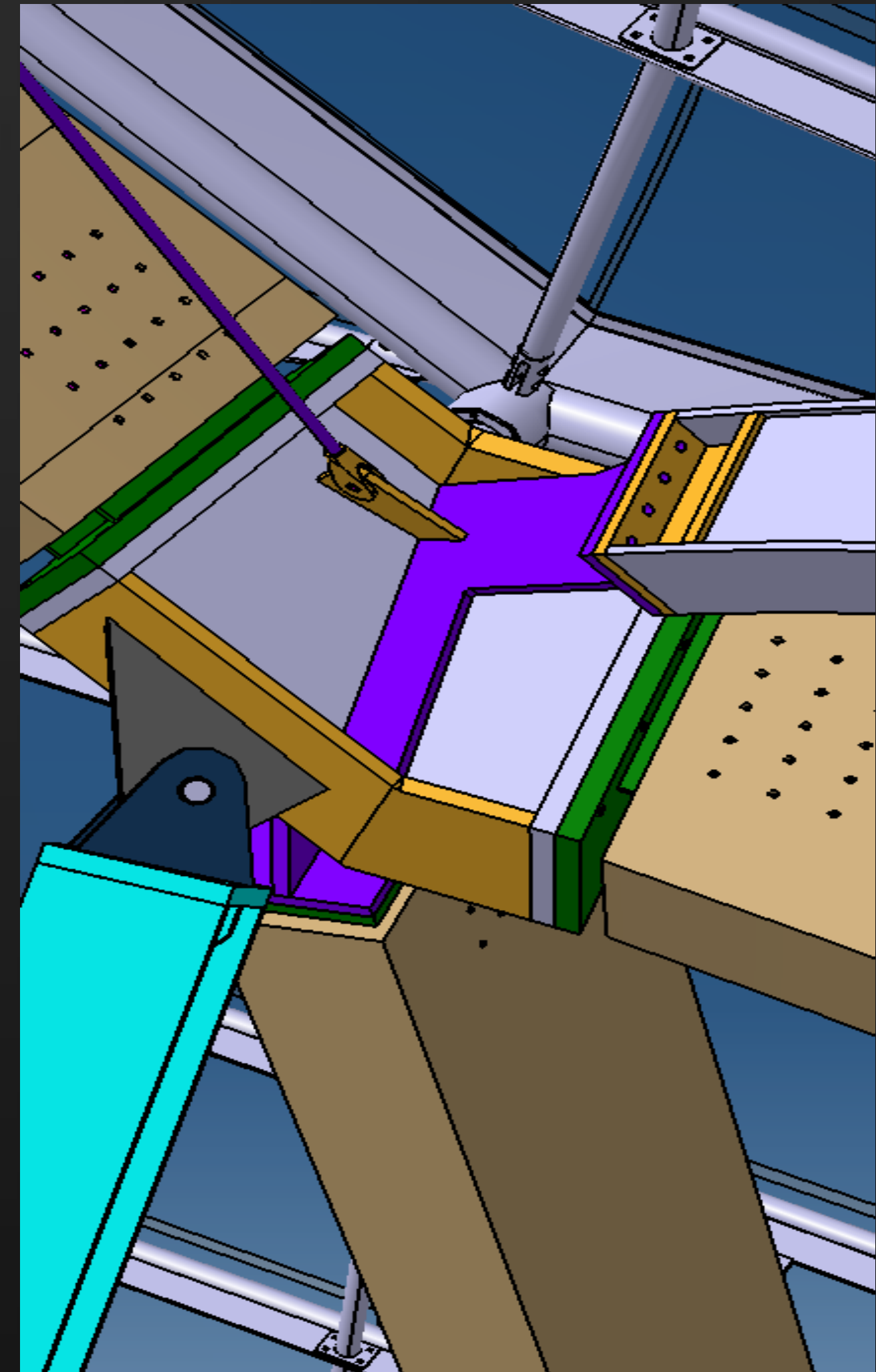
# Data is Multi-Representational / Multi-LOD



Design Development / Phase APD



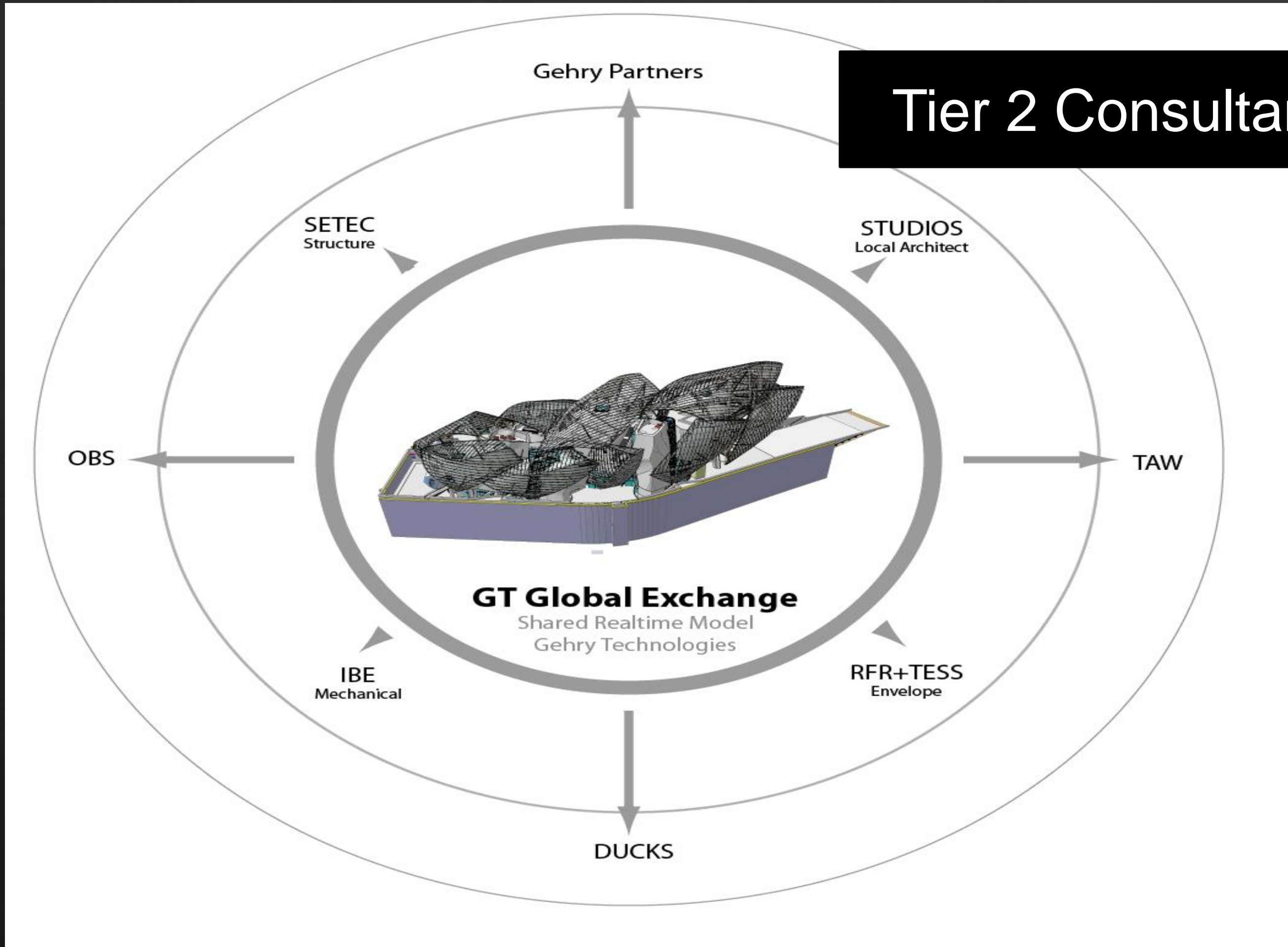
Construction Drawing Phase  
Phase PRO



Shop Drawing Phase / Phase EXE



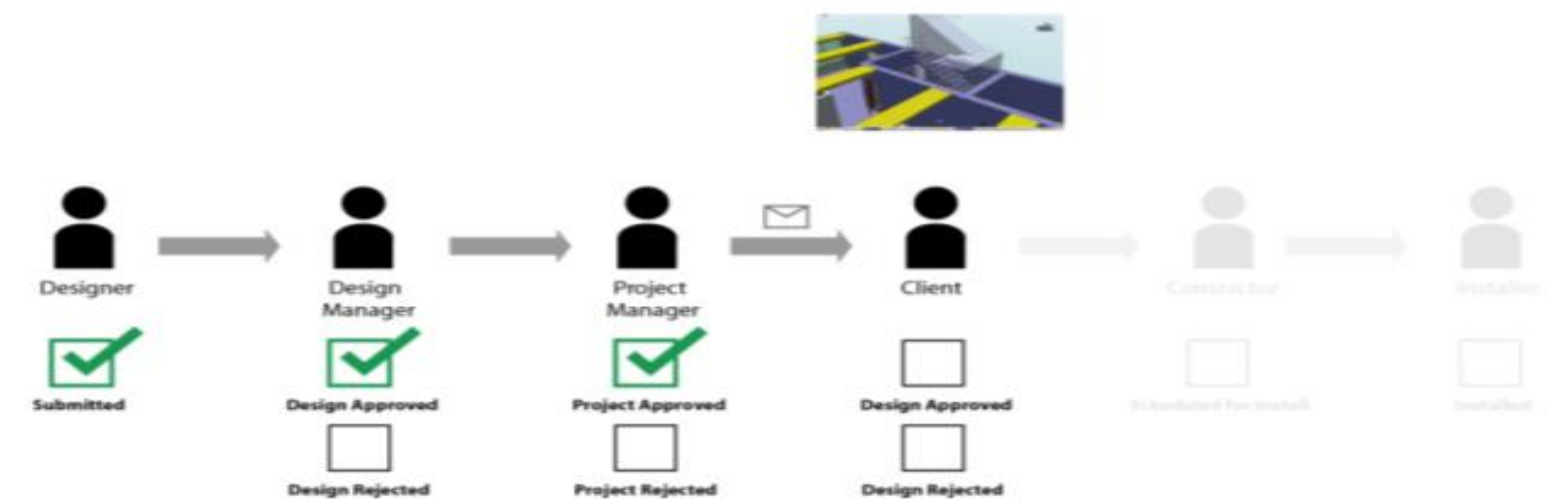
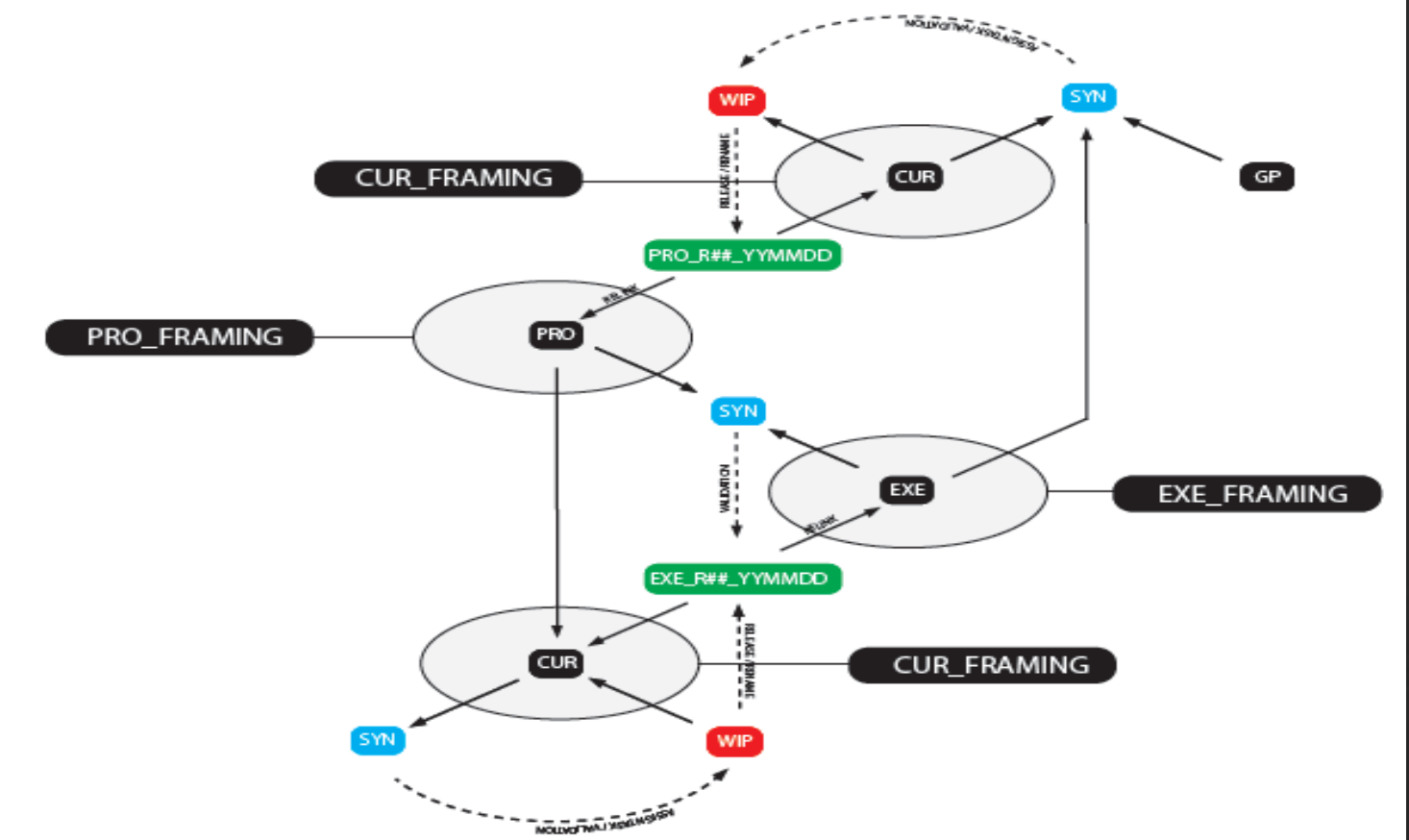
# CORE MODEL COLLABORATION



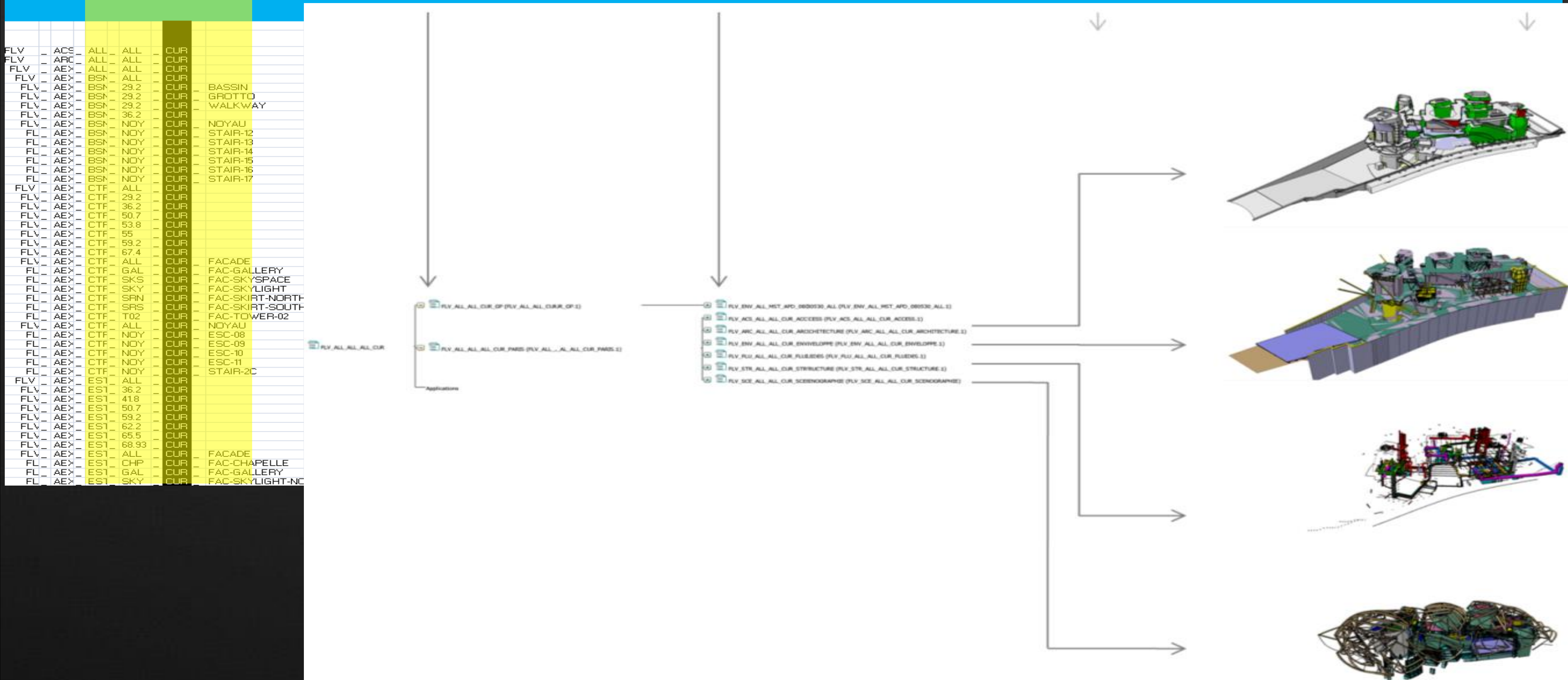
## Tier 2 Consultants

FLV Synthesis Diagram - PRO+EXE  
Revision 02 02 2009

Framing Products  
General Naming Convention



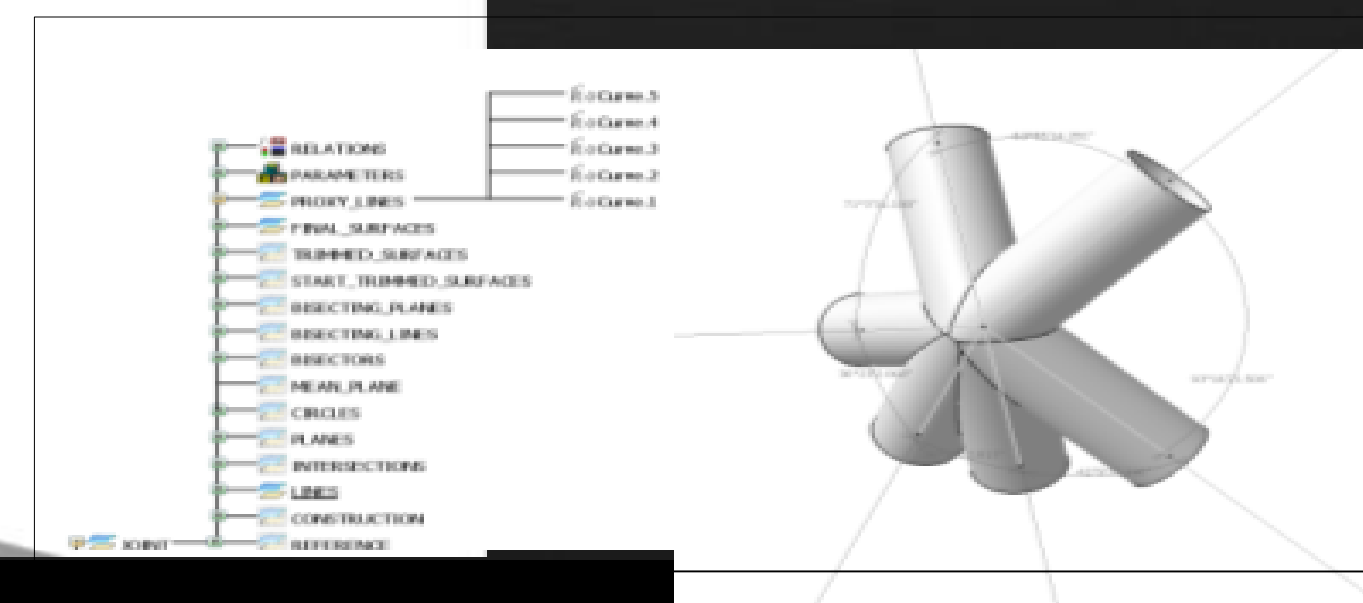
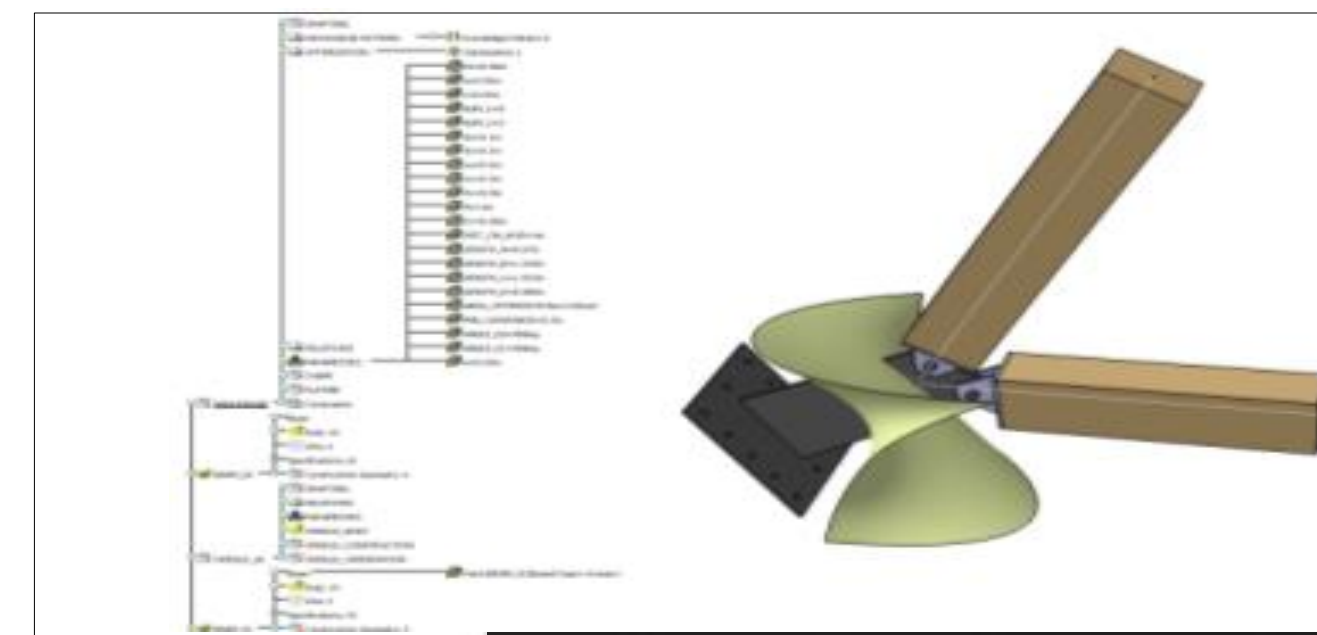
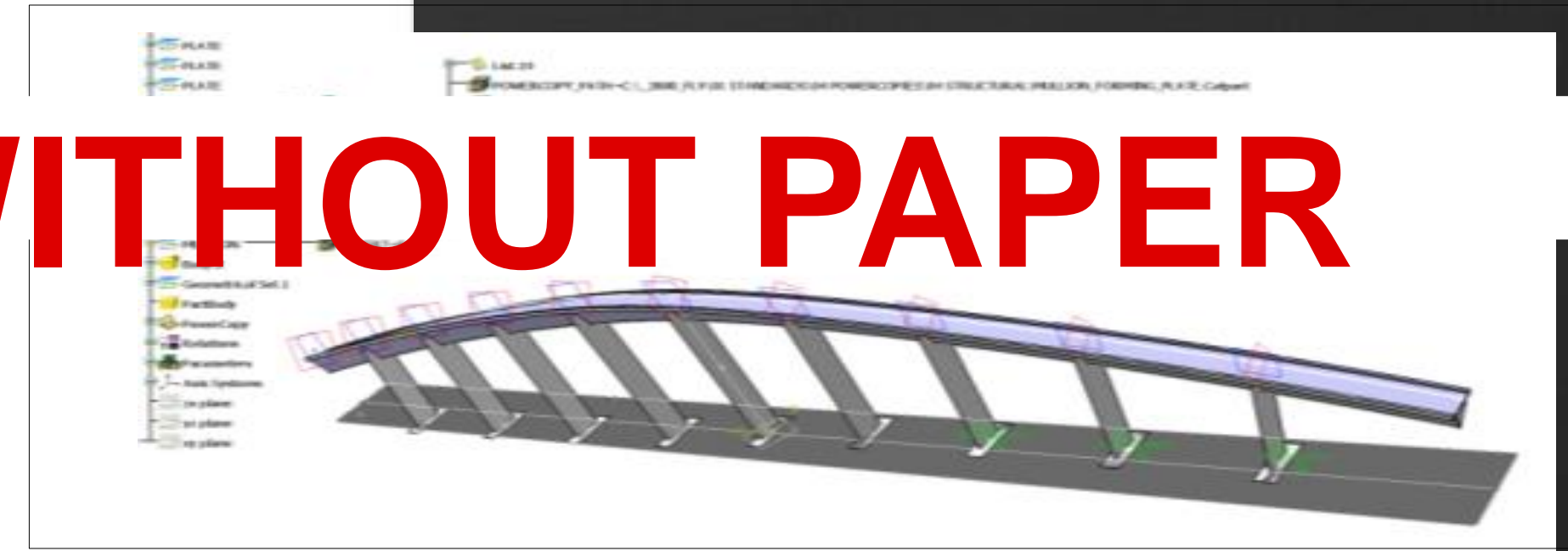
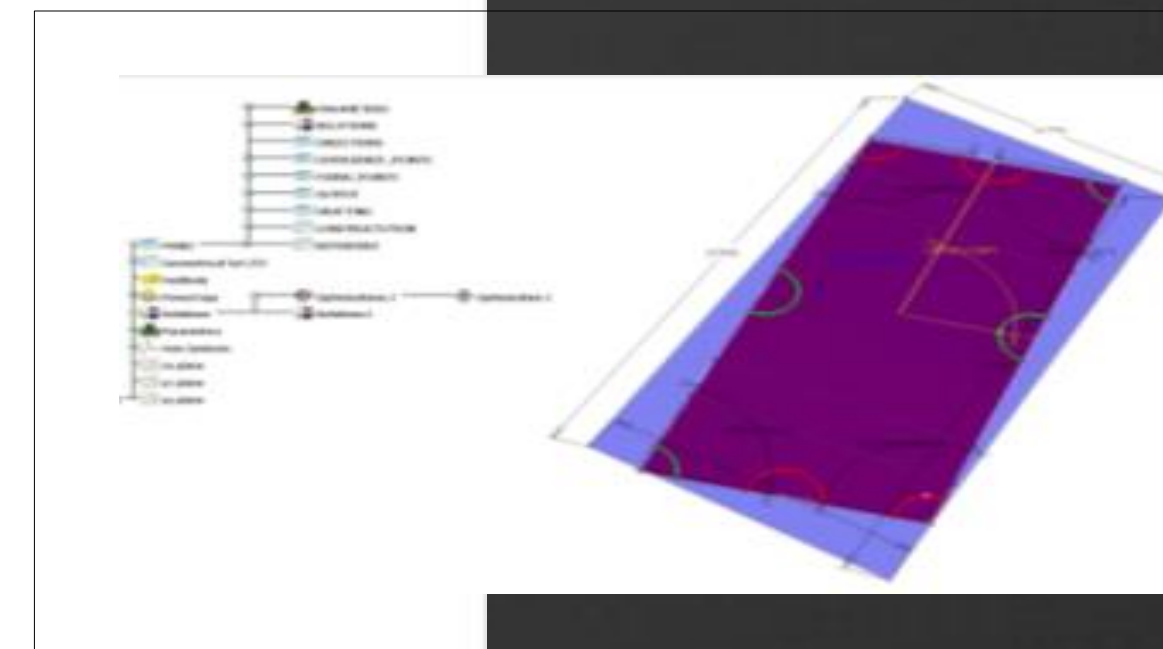
# GLOBAL, ORDERED STRUCTURE

[illegible]



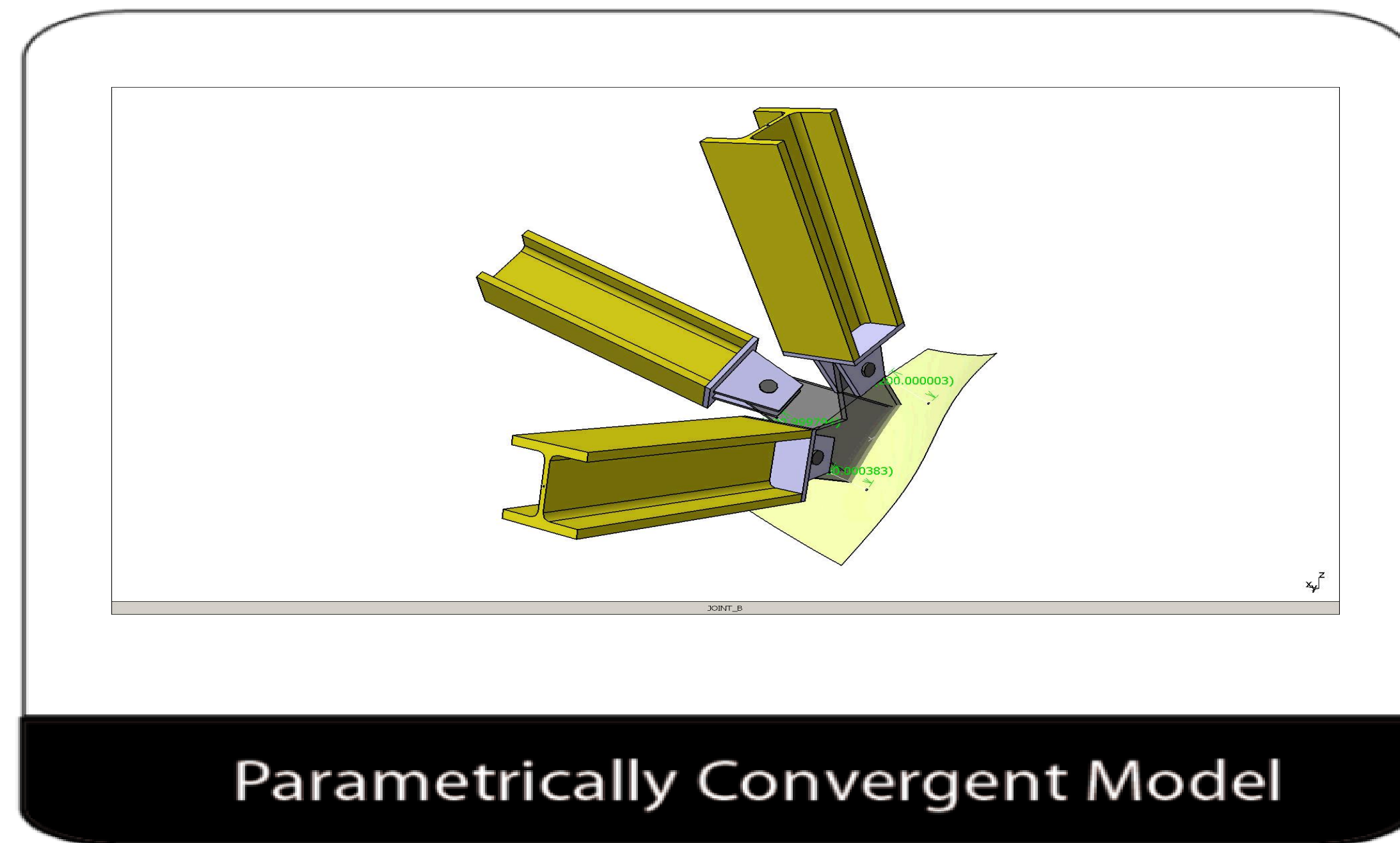


# BIM GENERATED DETAILS WITHOUT PAPER

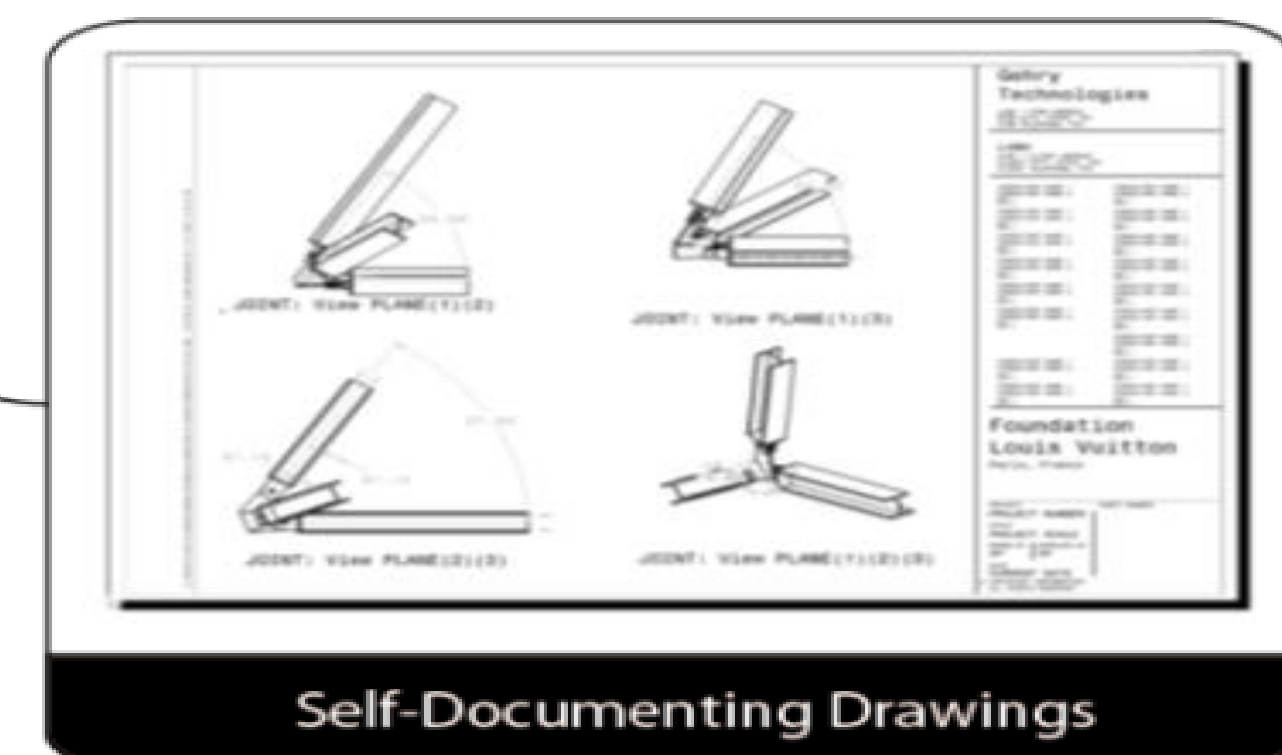
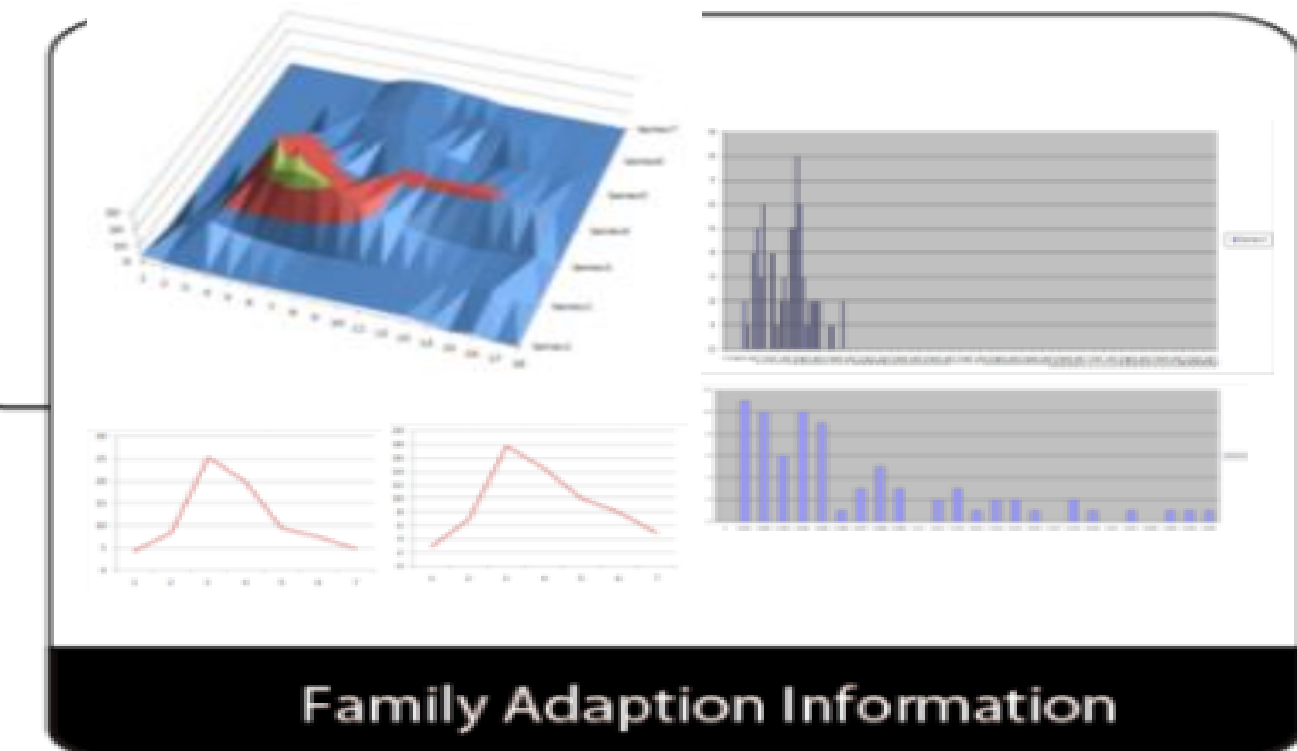
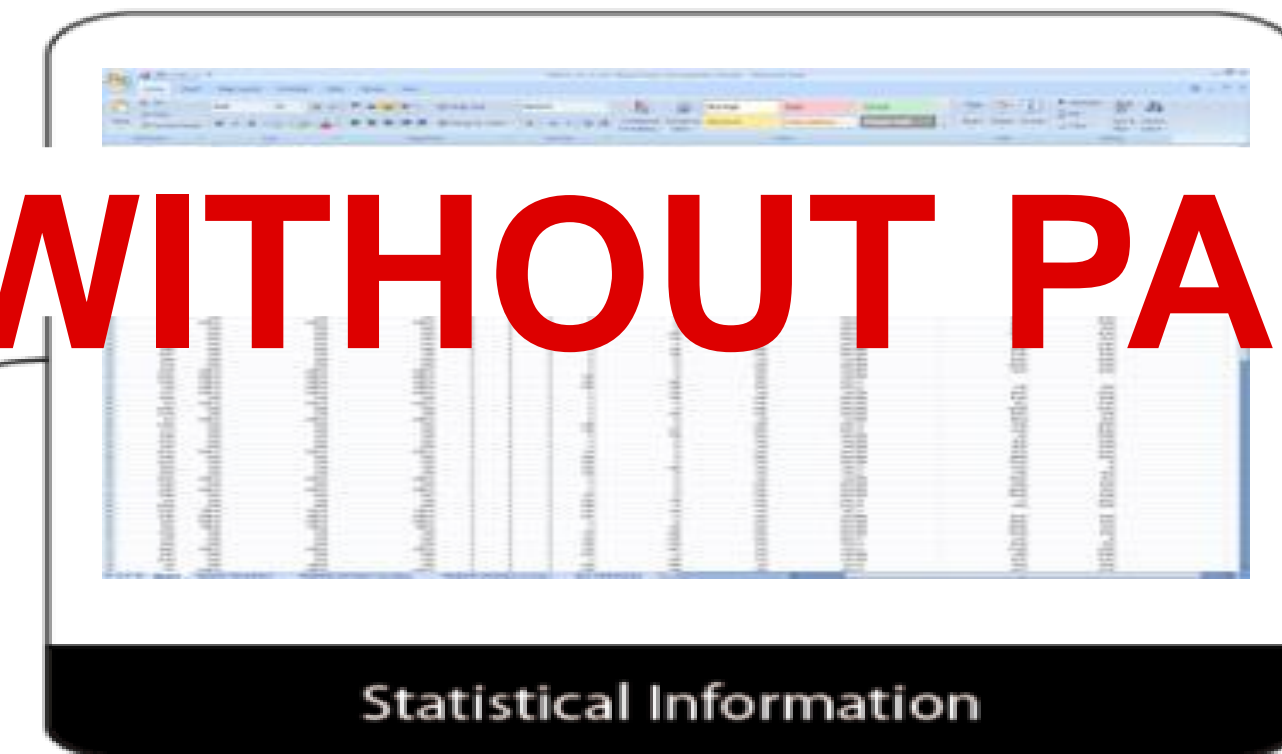




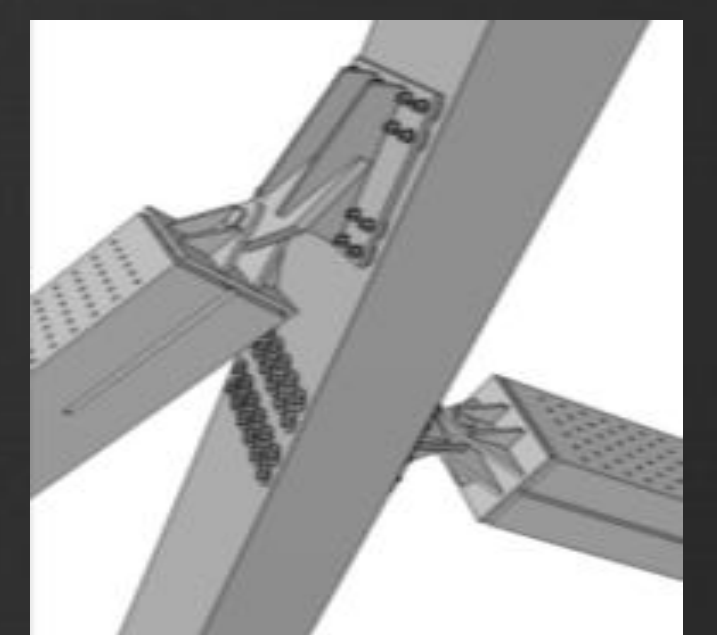
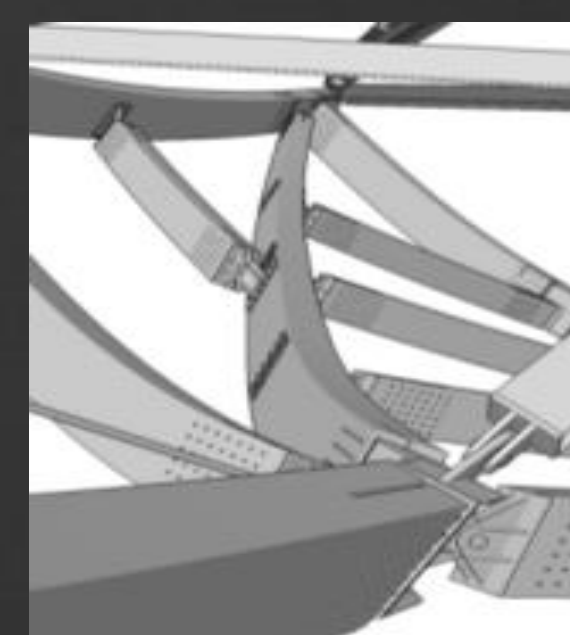
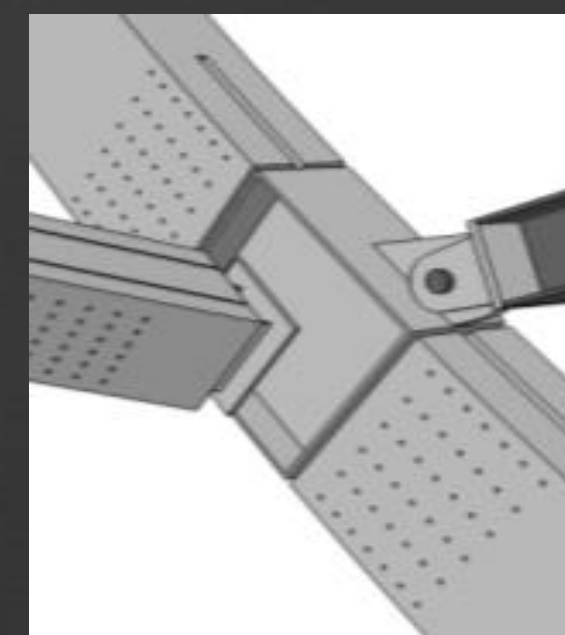
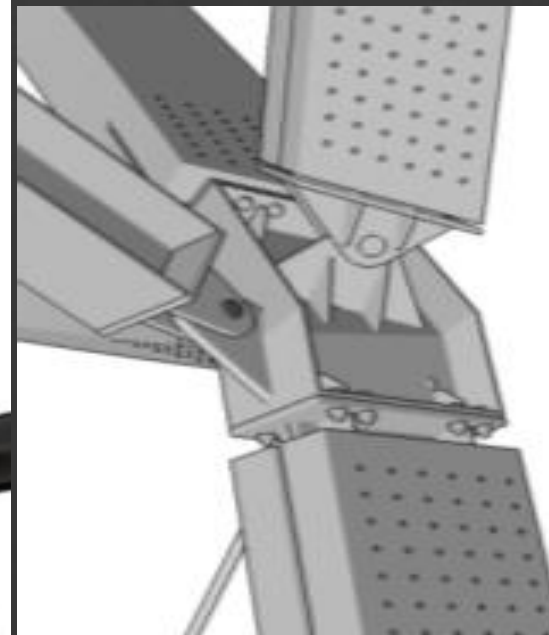
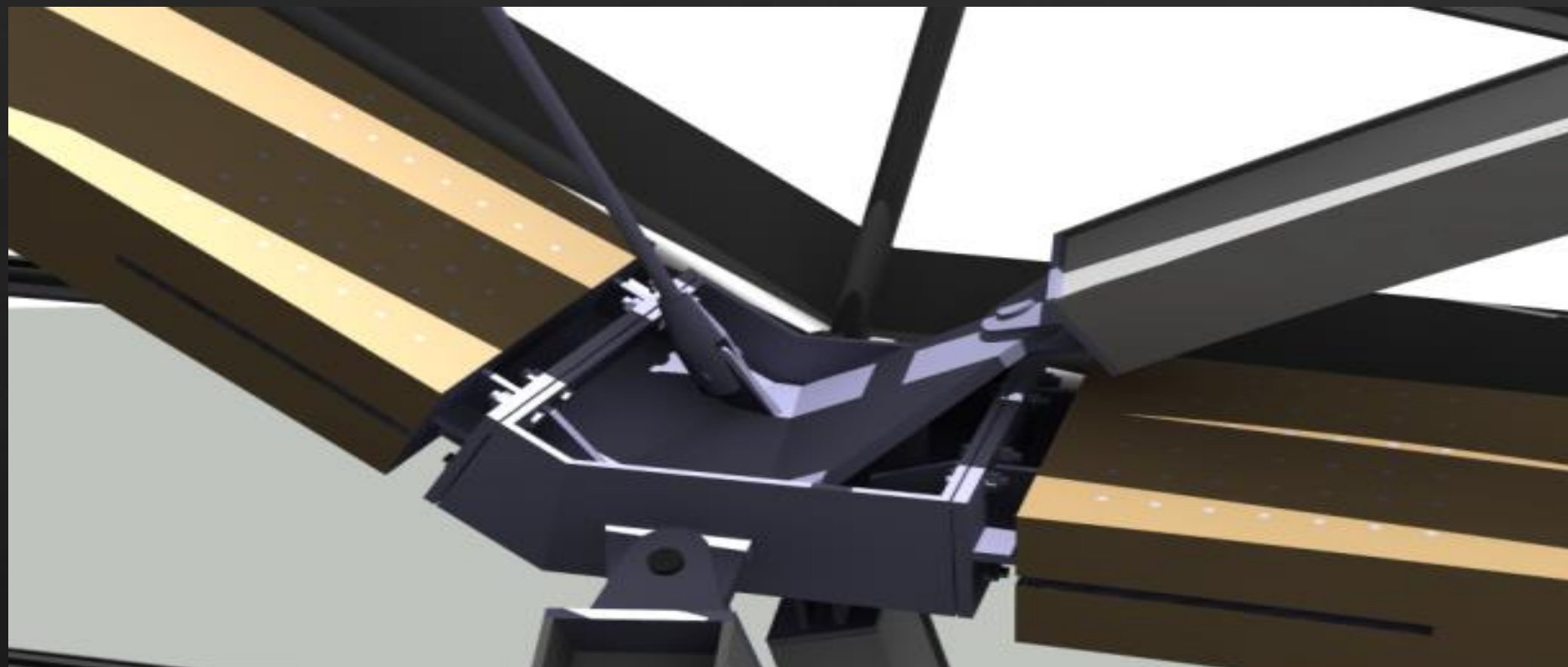
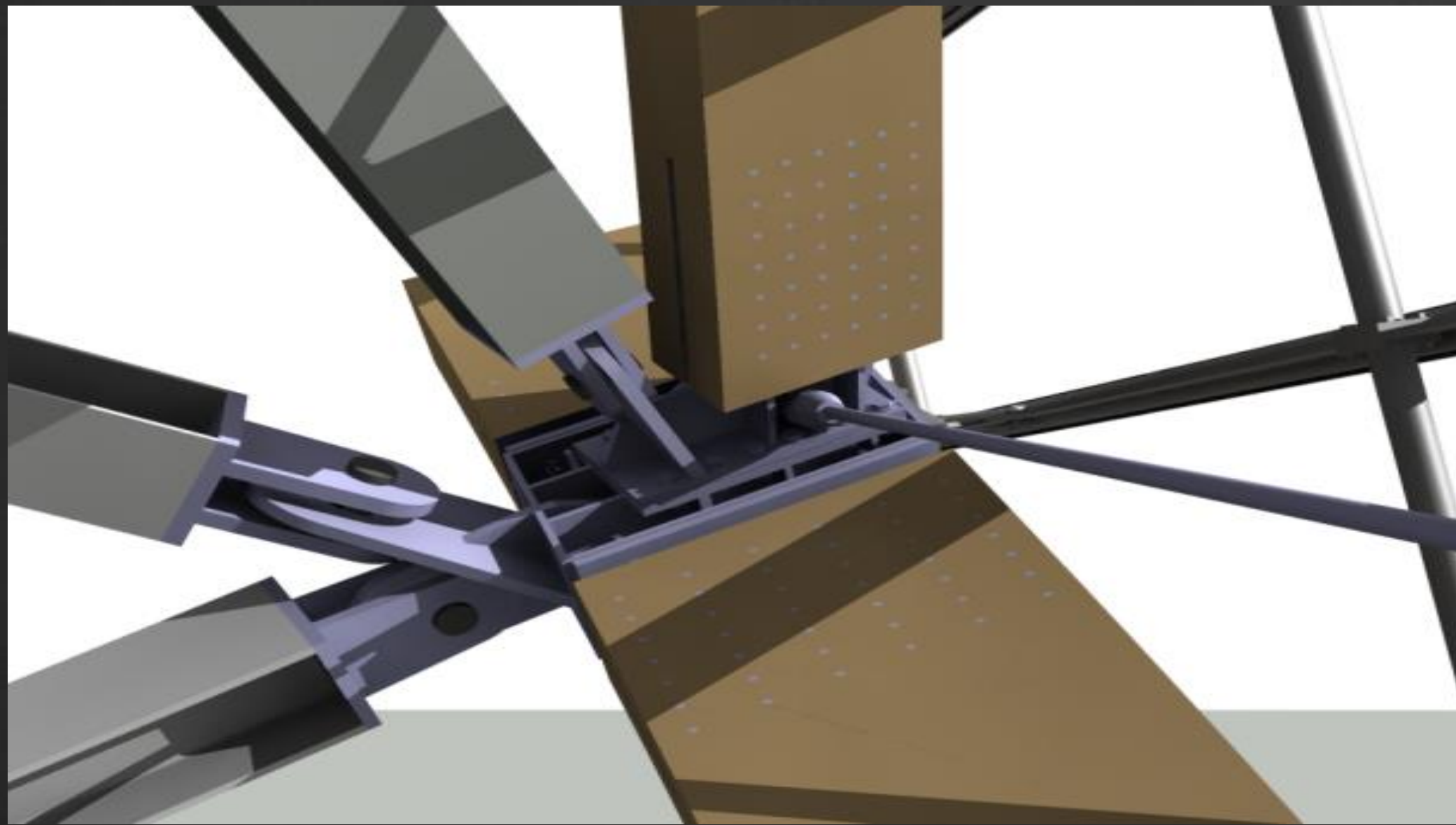
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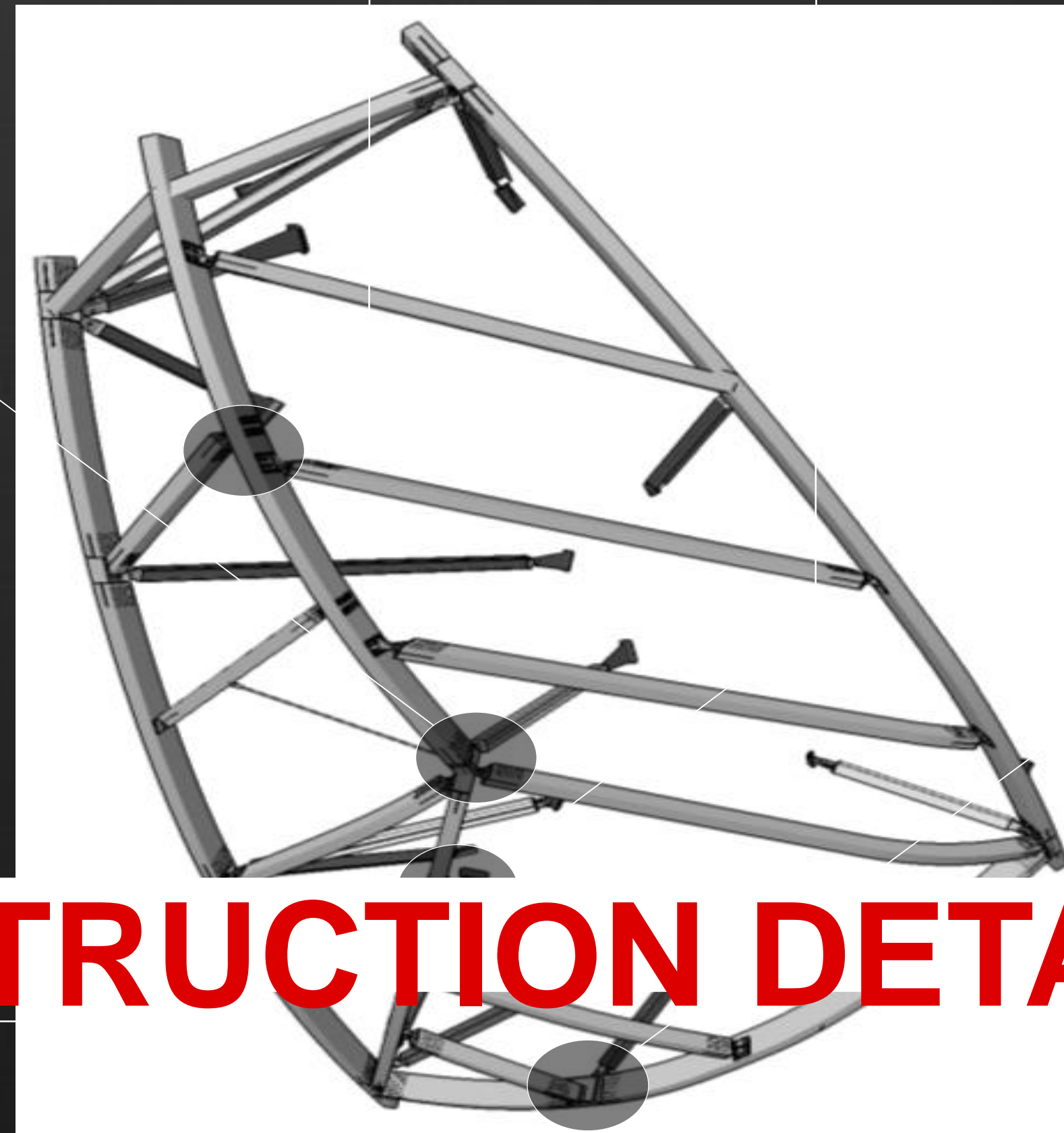
Generative joints



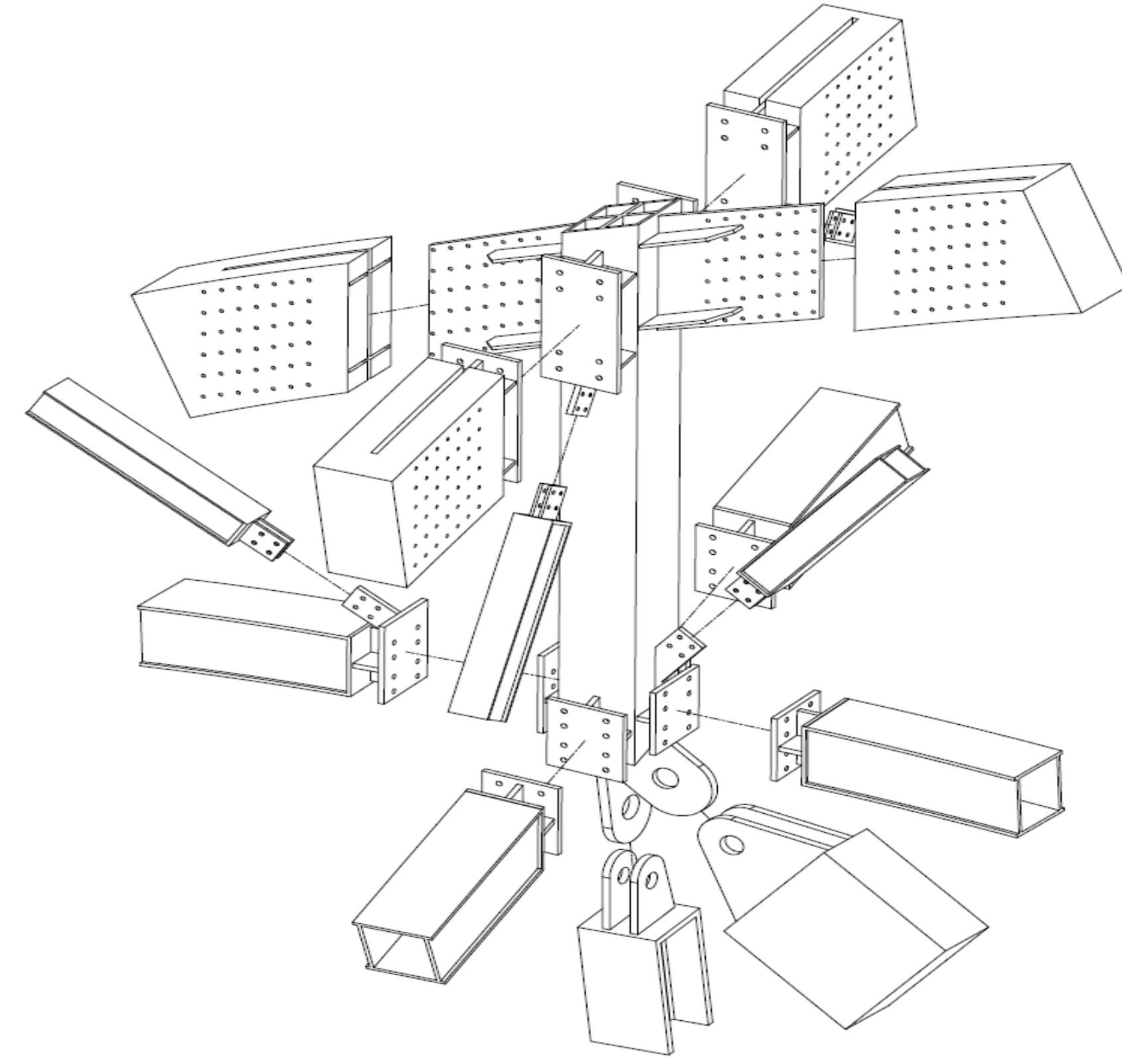
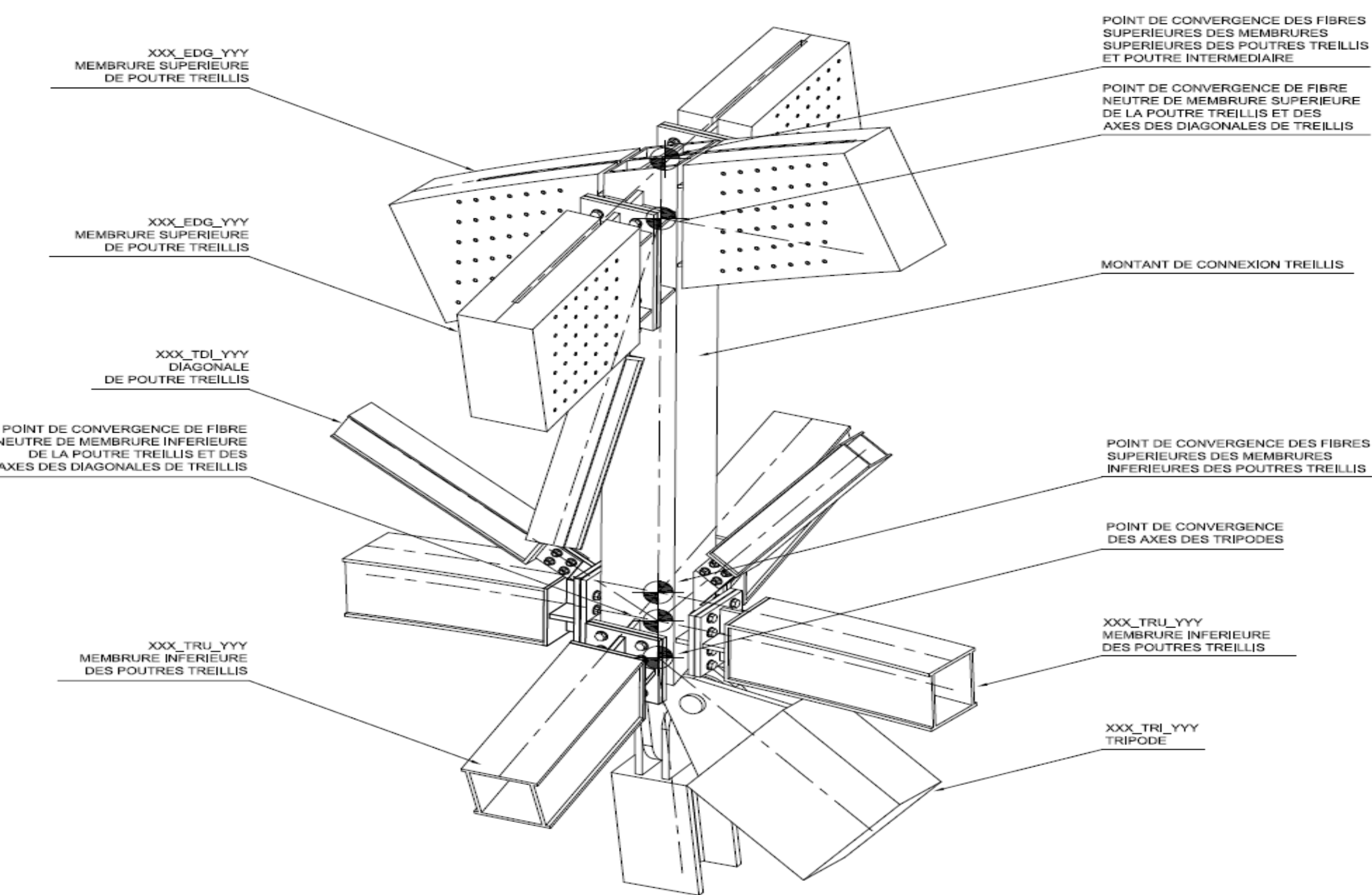




# BIM GENERATED CONSTRUCTION DETAILS

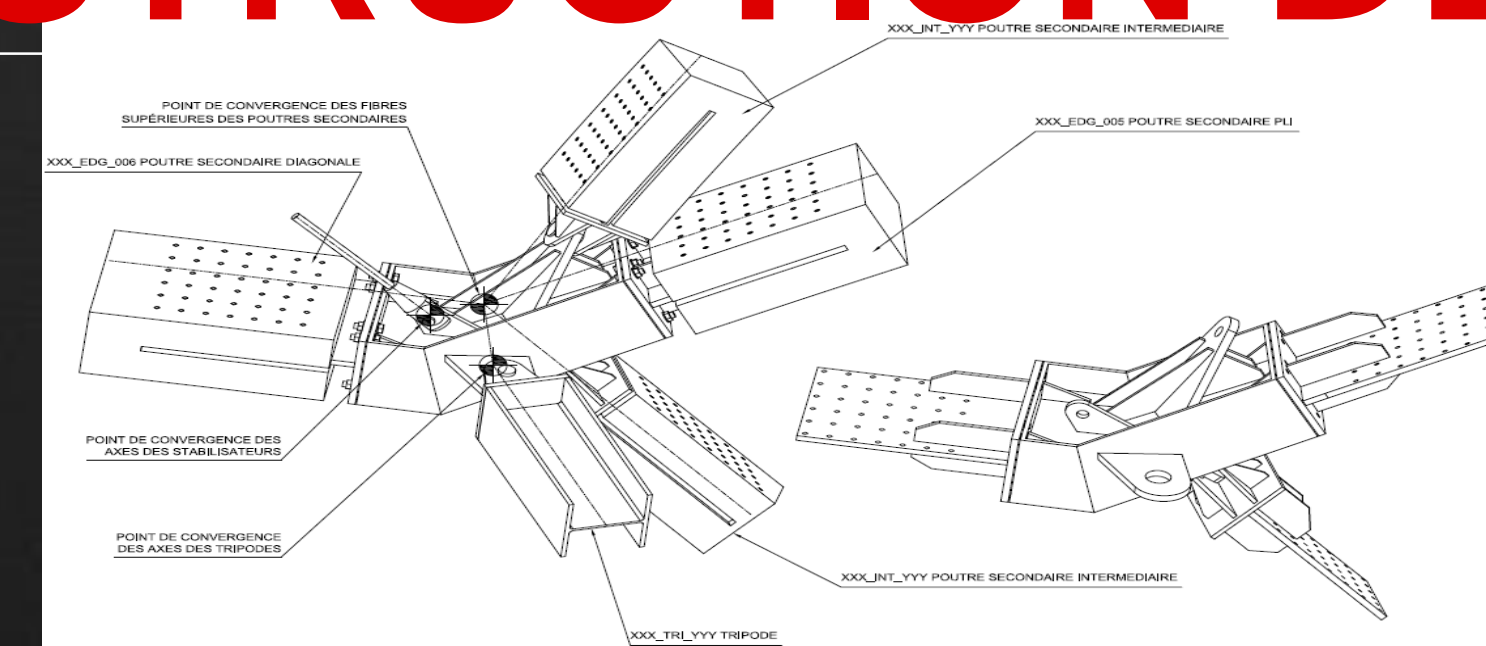
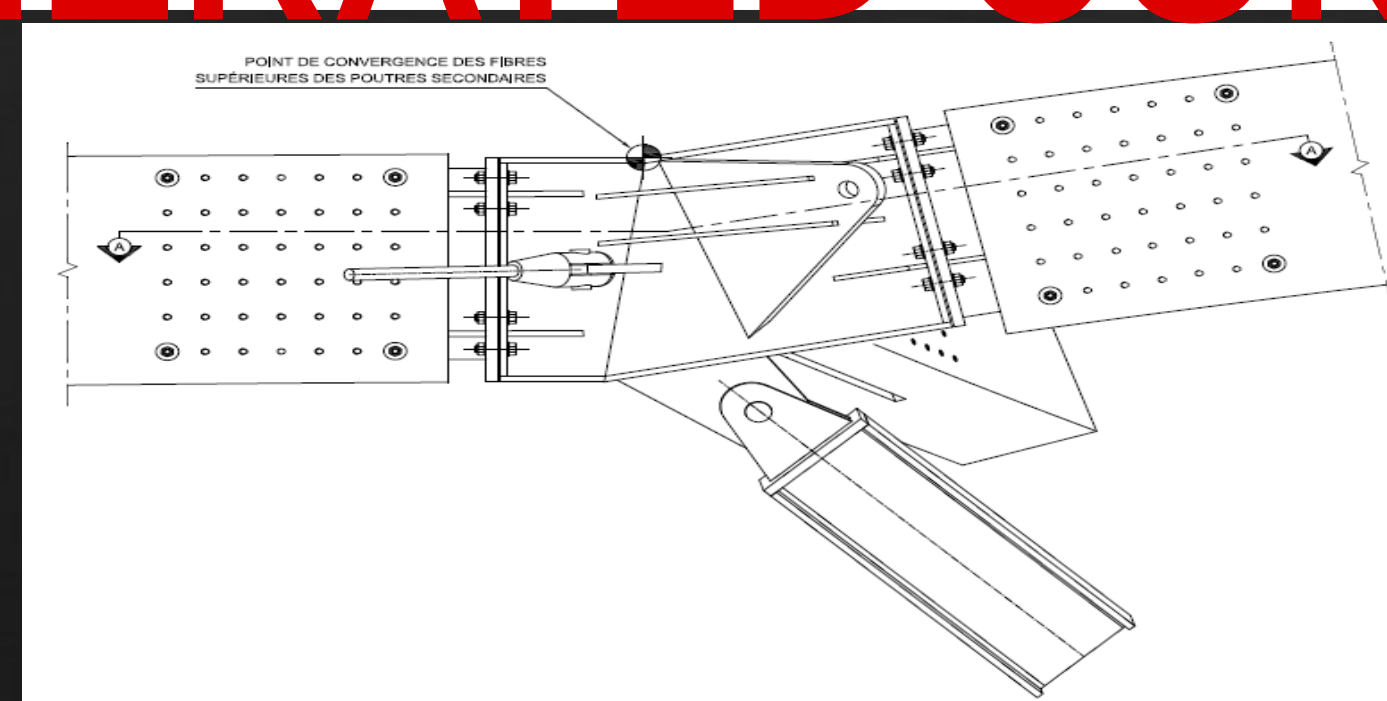
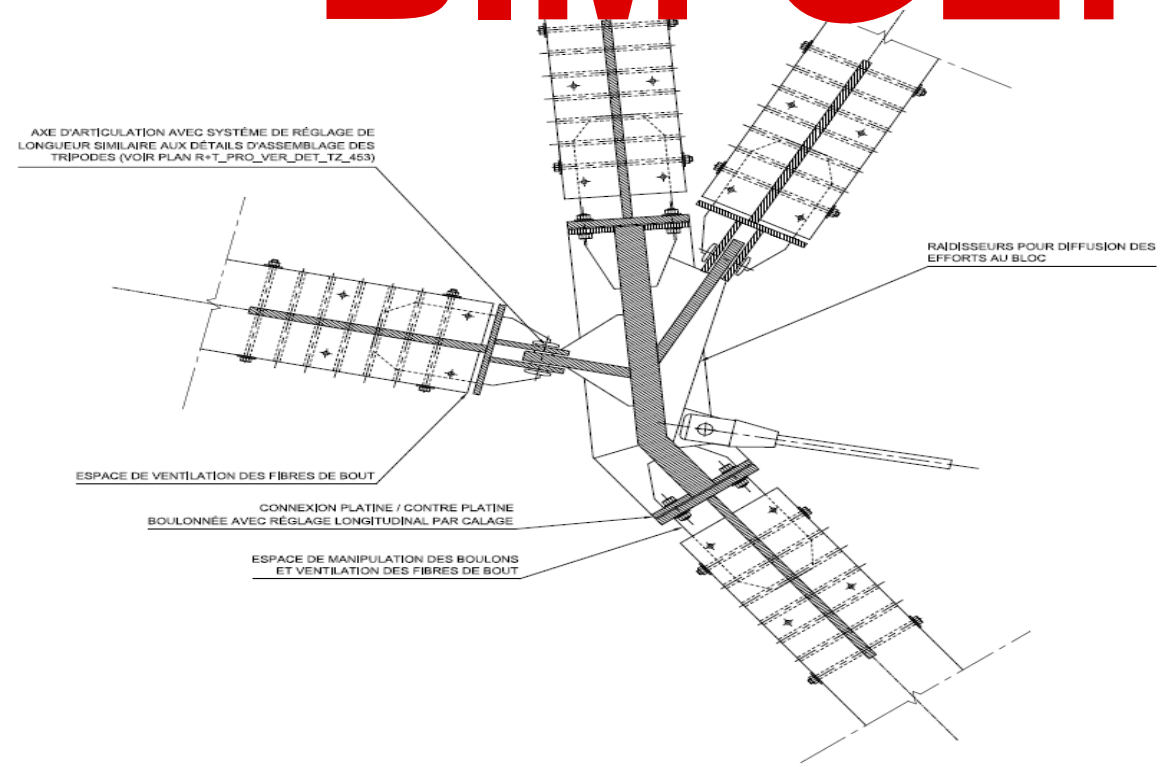




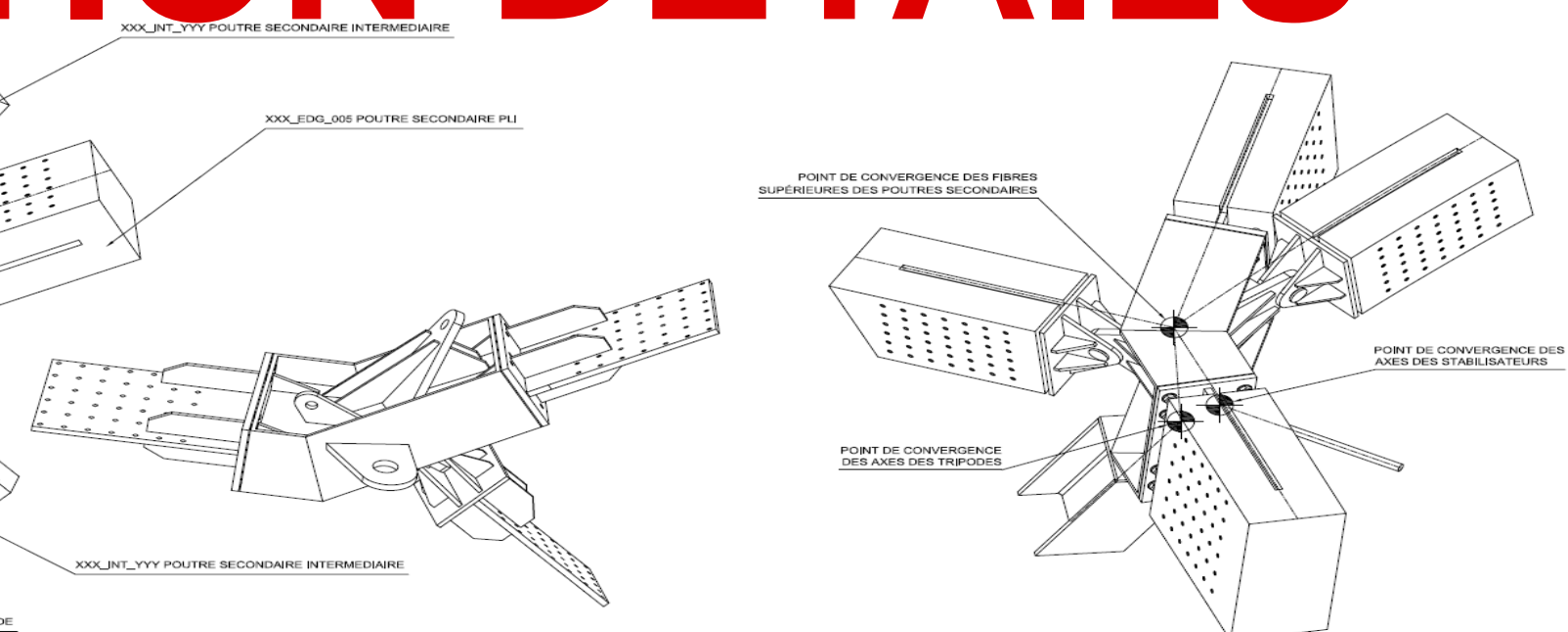


2 **Vue 01\_B : Eclaté du système de connexion**  
N/A

# BIM GENERATED CONSTRUCTION DETAILS



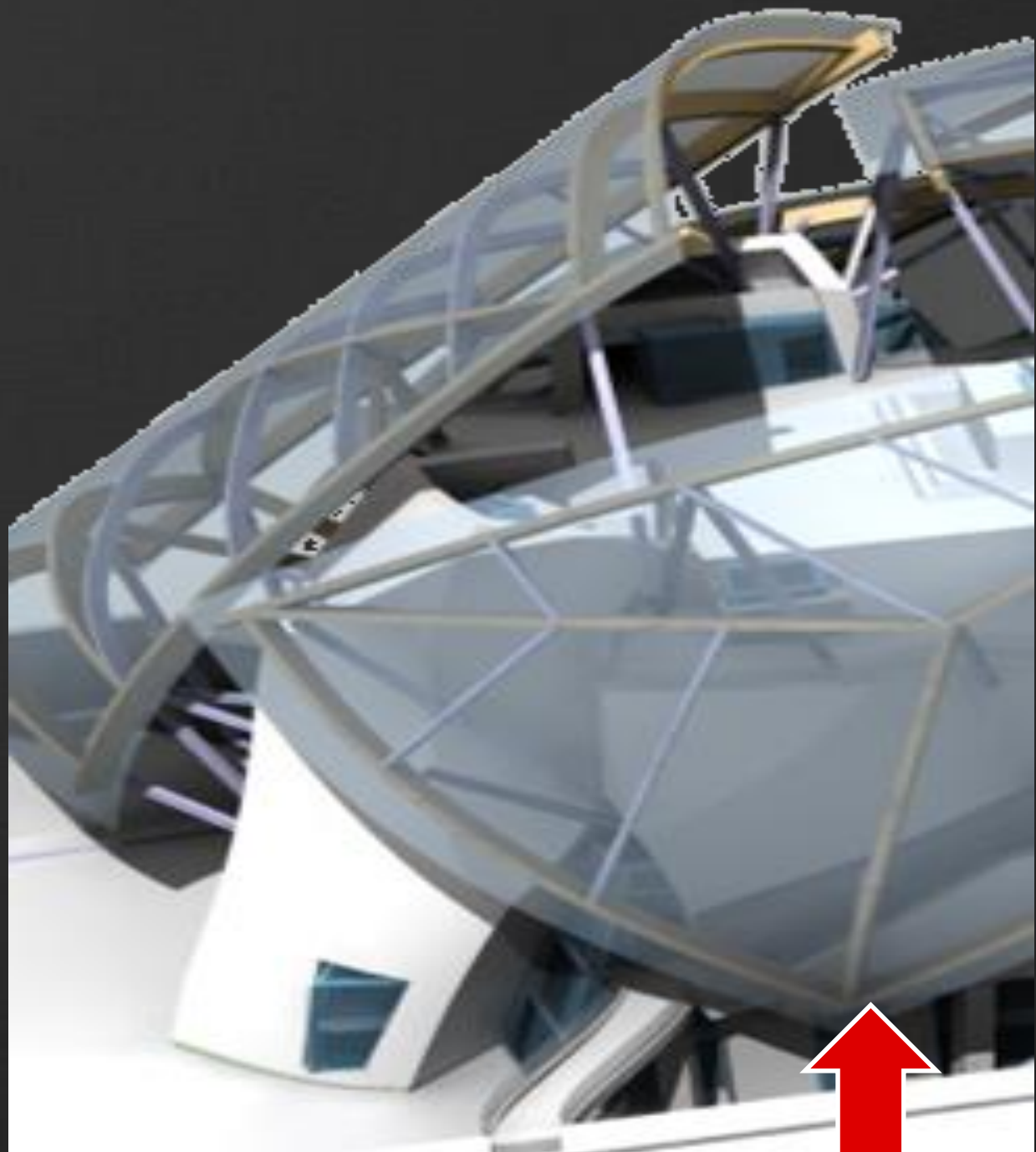
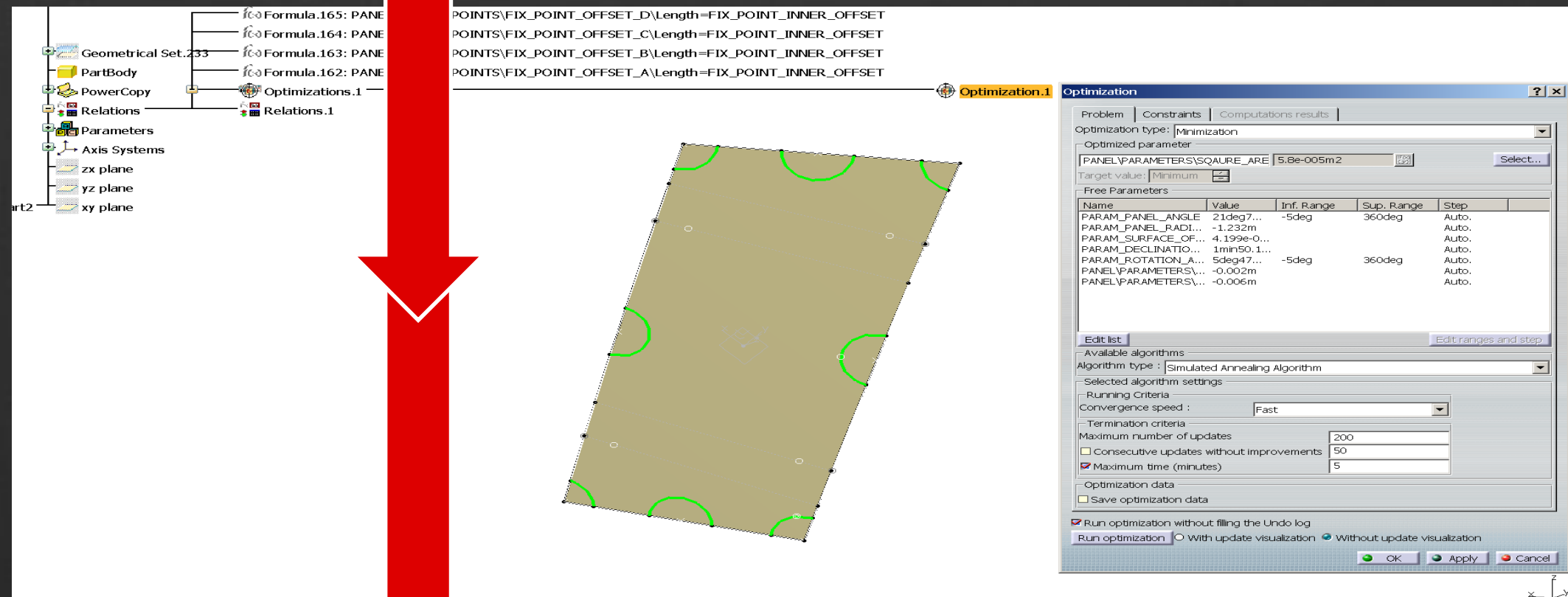
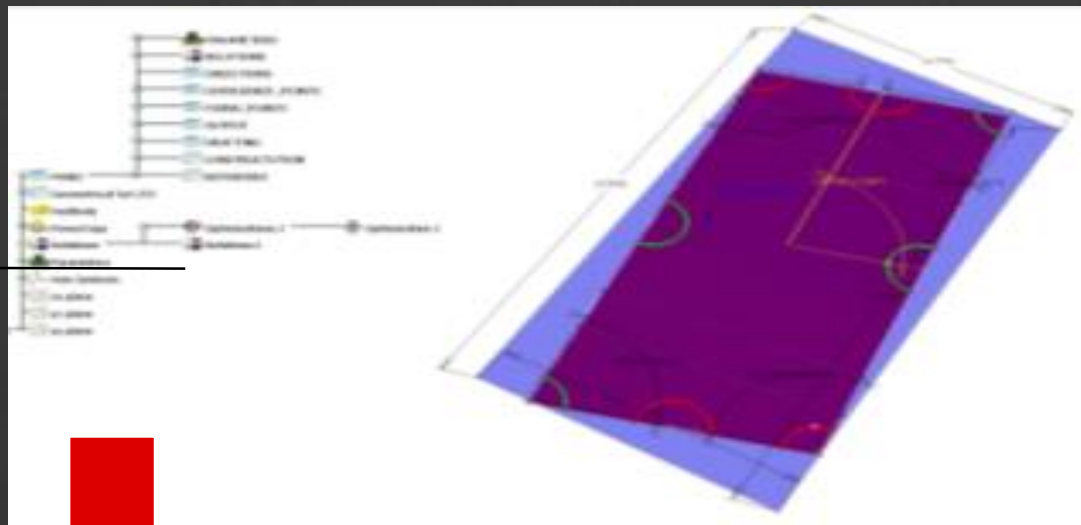
1 **Vue 01 : 3D Indicative**  
N/A



2 **Vue 02 : 3D Indicative des pièces d'assemblage**  
N/A

3 **Vue 02 : 3D Indicative**  
N/A



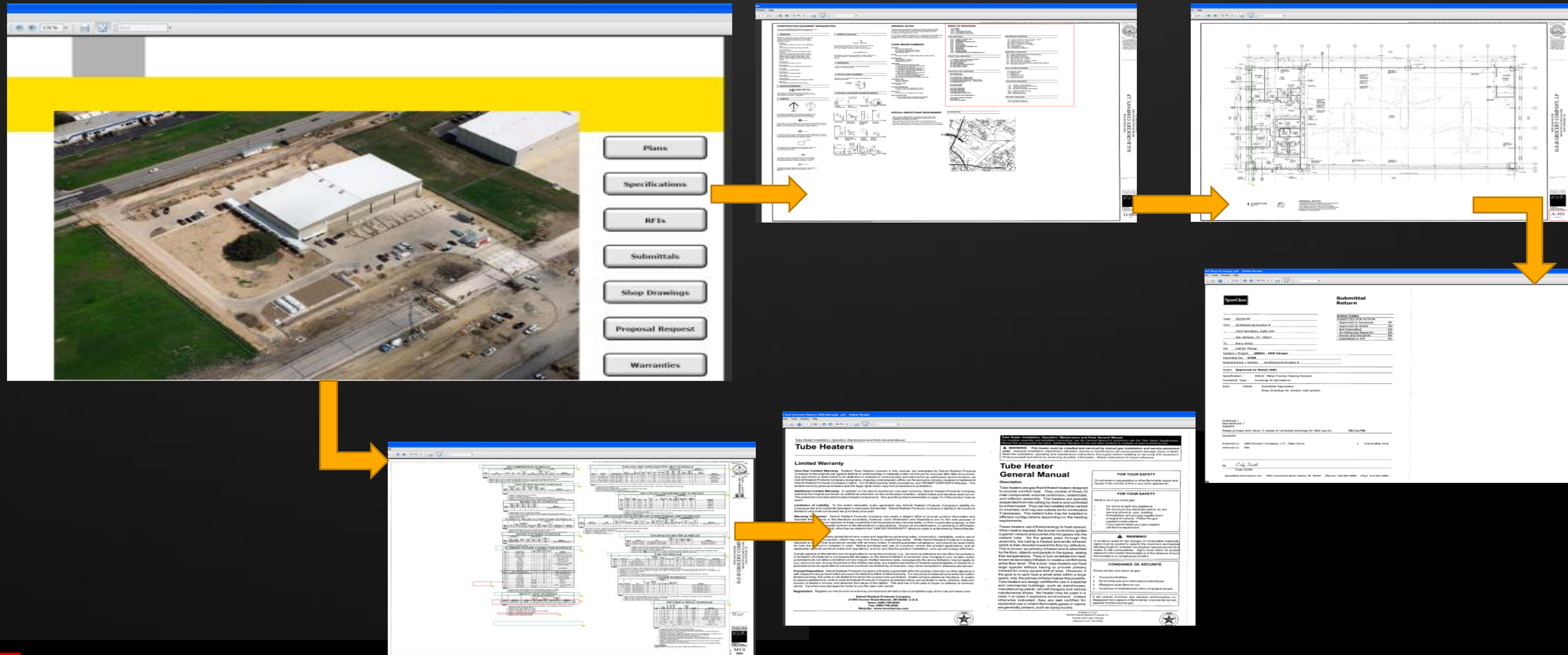


# BIM TO FABRICATION... NO PAPER...



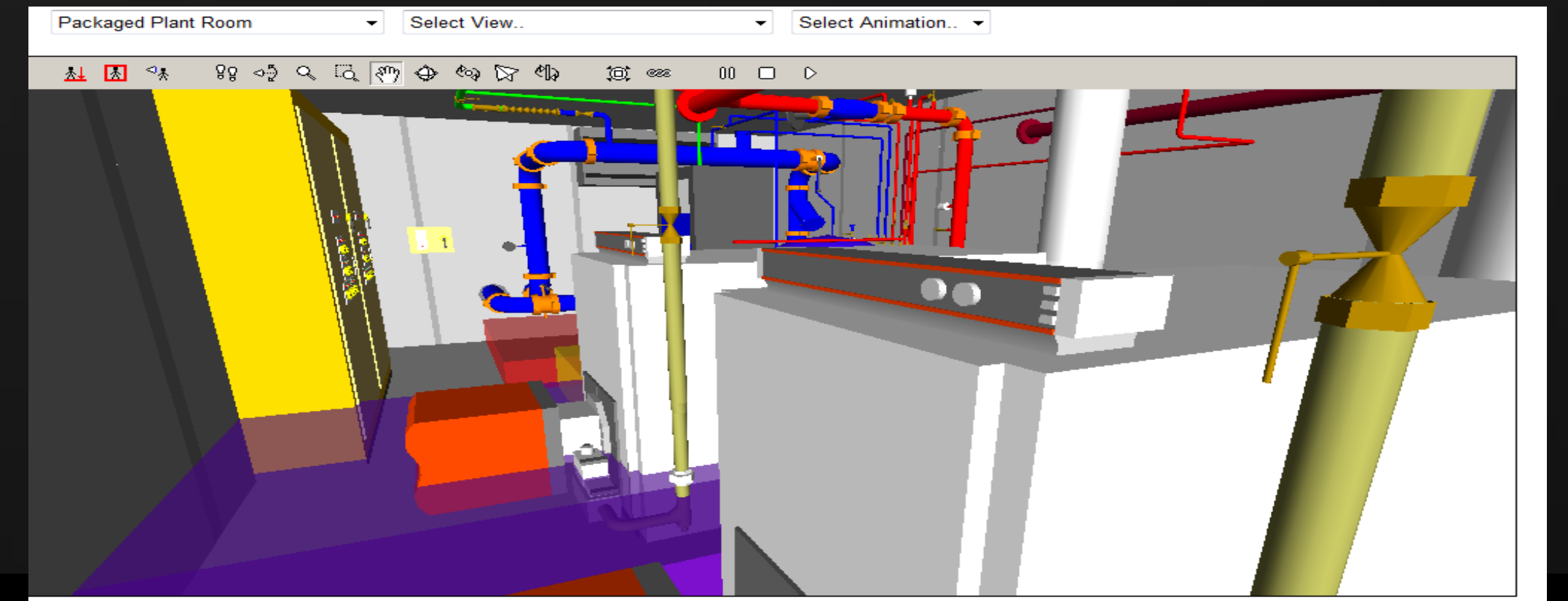
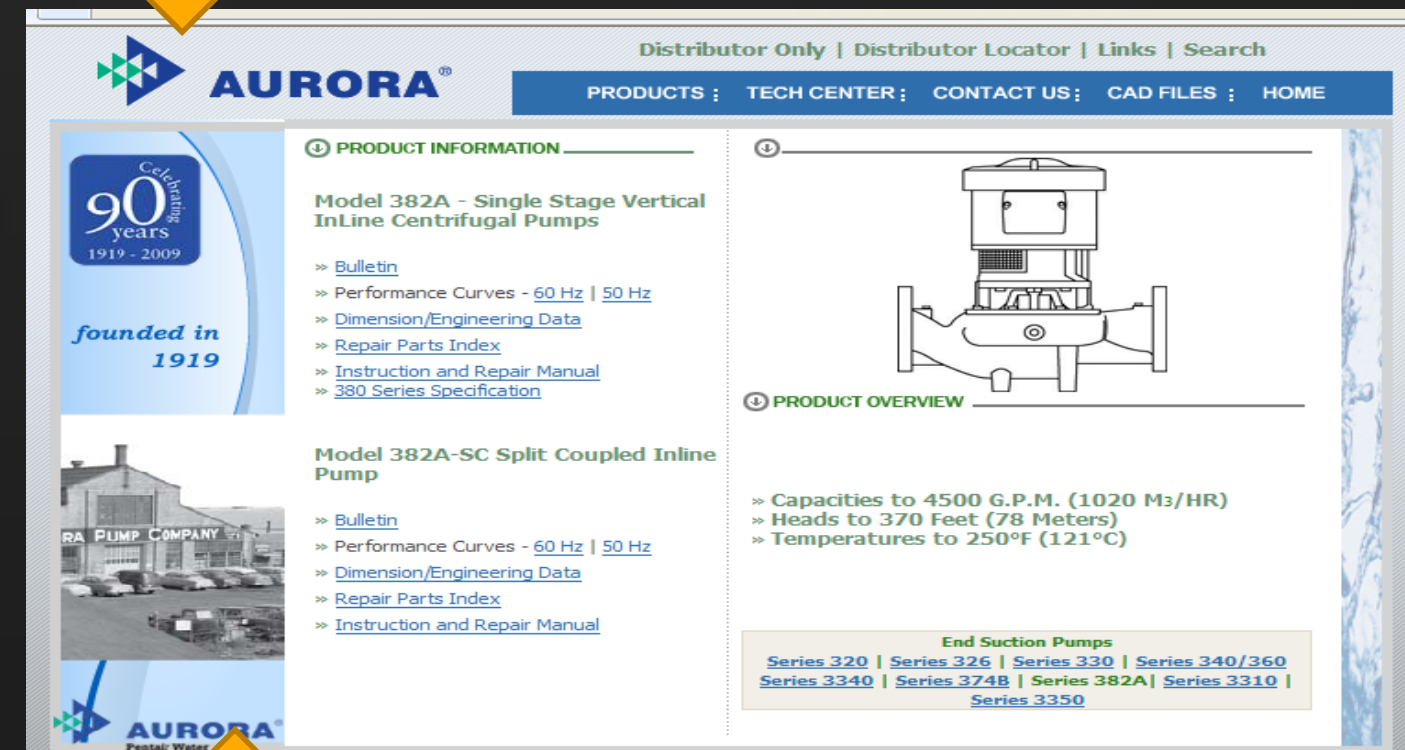
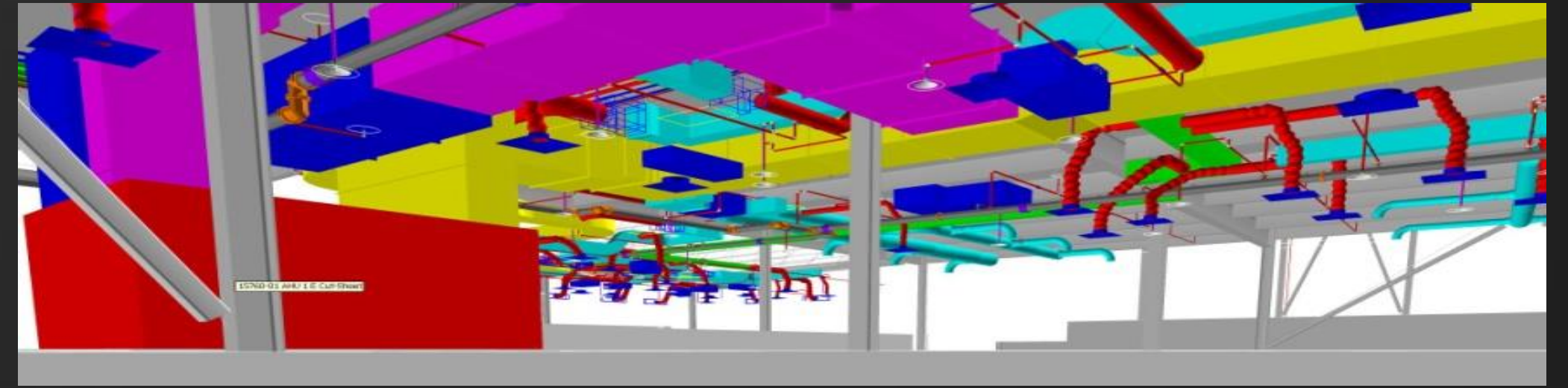
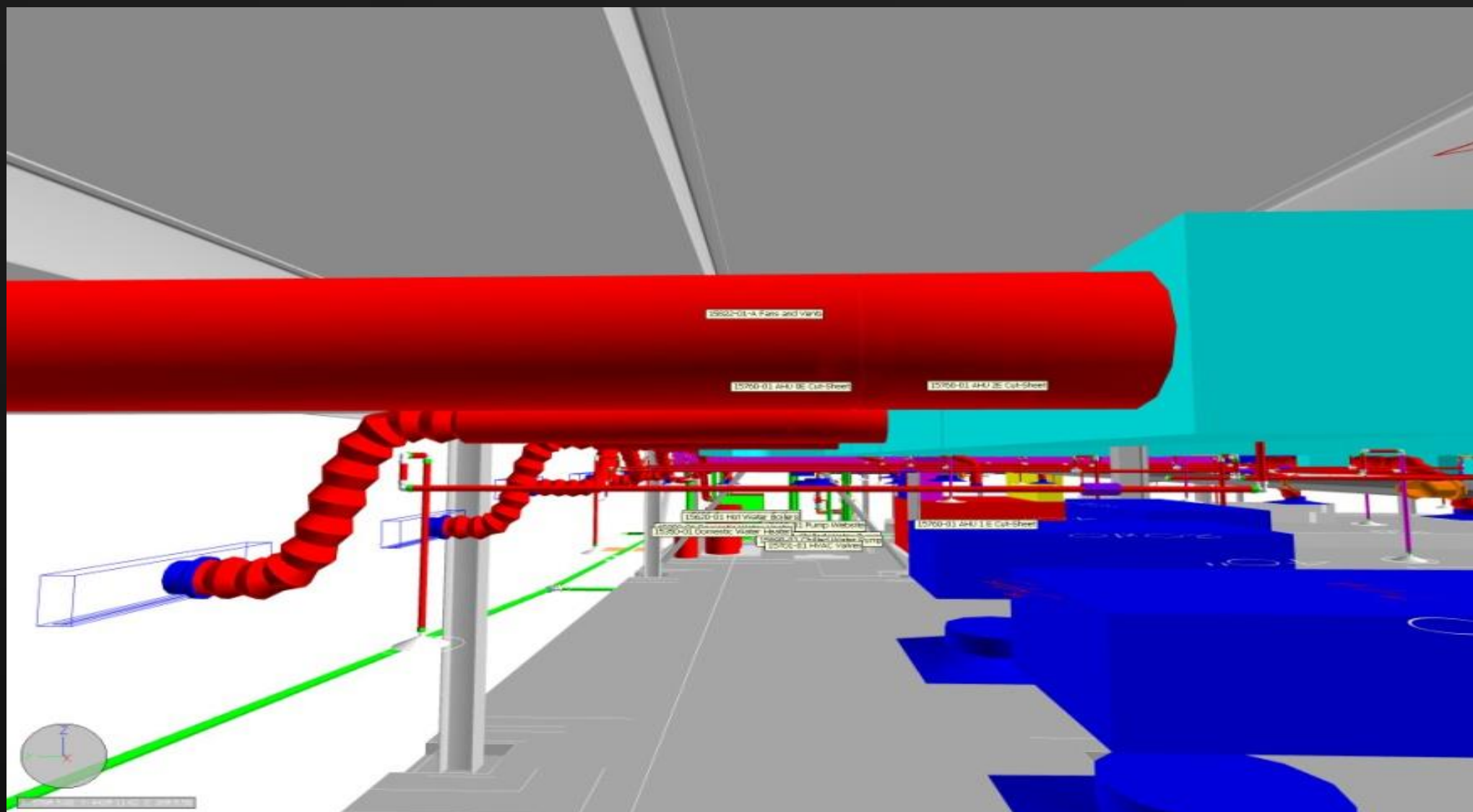
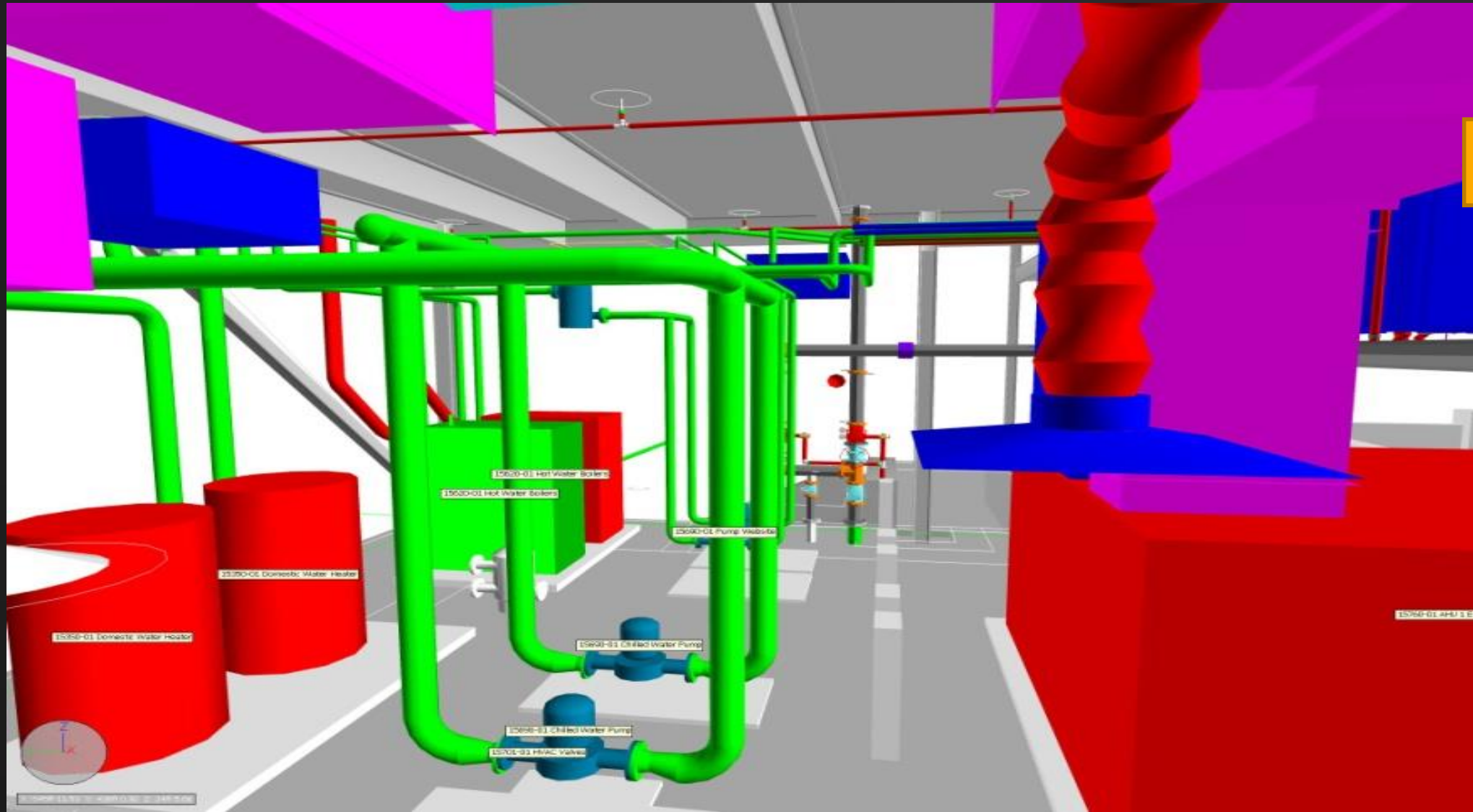
# Projects with no BIM models :

## As Built, Submittal and RFI hyper linking.





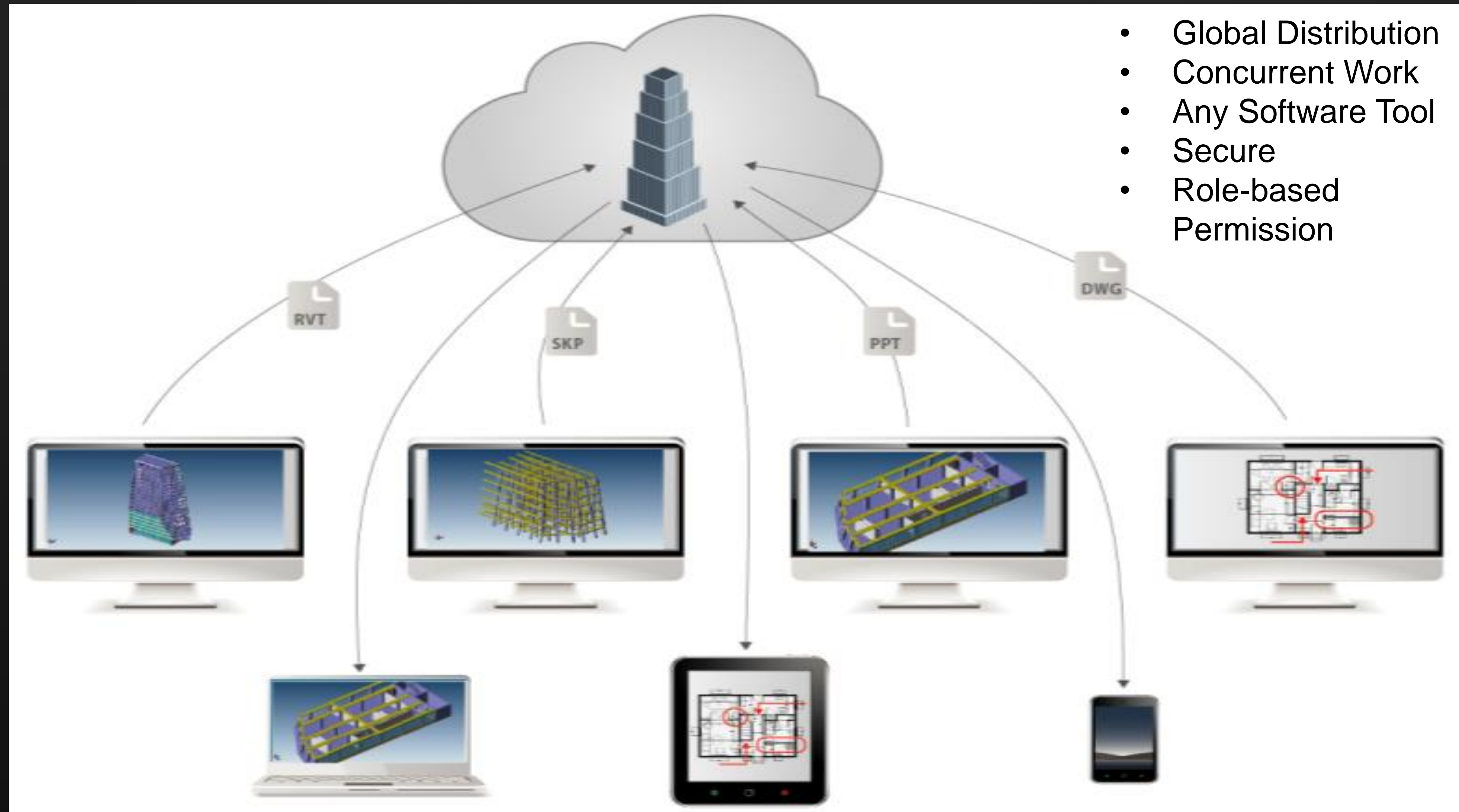
# HYPERLINKING – “THE LOW HANGING FRUIT”



The final updated model is hyperlinked to the final submittal information to create a valuable information package to the facility manager.



# COLLABORATION, DISTRIBUTION, ANALYSIS OF MISSION CRITICAL BIM CONTENT



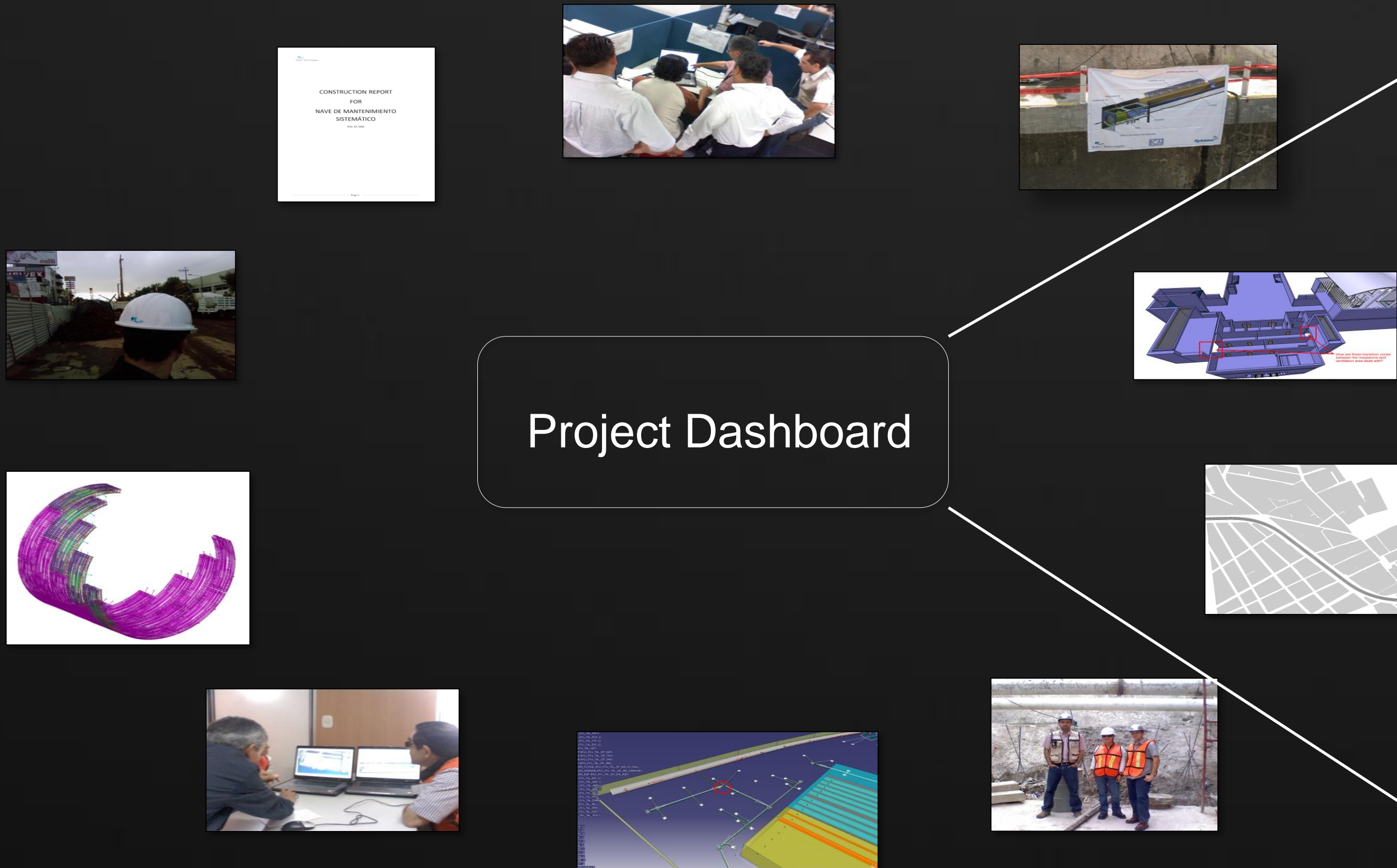
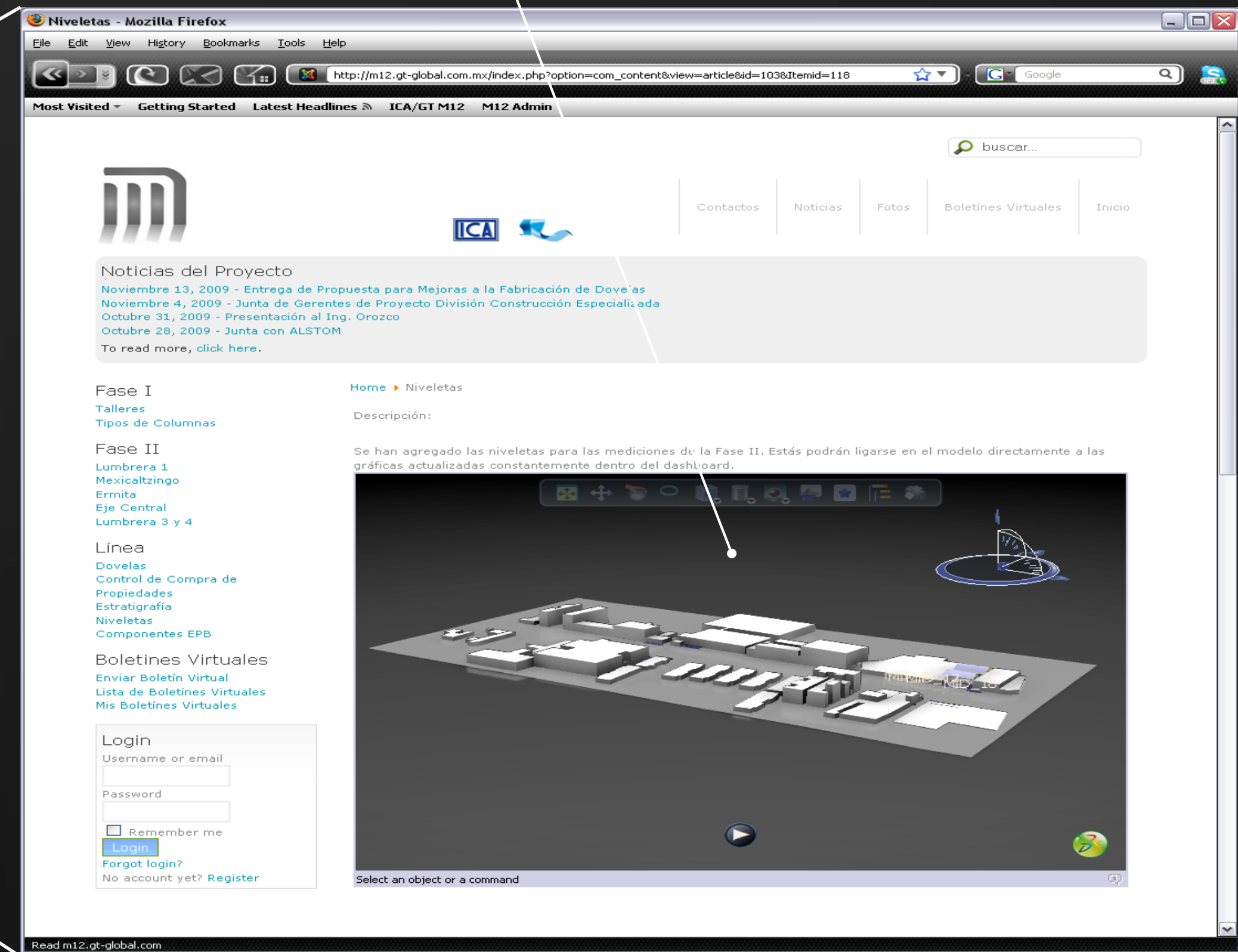


# 3D ENABLED DASHBOARD

- Project Transparency
- Team Collaboration
- Transparency

“Live” 3D Model

Project Dashboard



# CLOUD BIM BASED PROJECT DASHBOARD





ContatosNoticiasFotosBoletines VirtualesInicio

buscar...

### Noticias del Proyecto

Noviembre 21, 2009 - Visita ITESM Campus Guadalajara al Proyecto  
Noviembre 13, 2009 - Entrega de Propuesta para Mejoras a la Fabricación de Dovelas  
Noviembre 4, 2009 - Junta de Gerentes de Proyecto División Construcción Especializada  
Octubre 31, 2009 - Presentación al Ing. Orozco

Para leer mas, haz clic aquí.

#### Fase I

Talleres  
Tipos de Columnas

#### Fase II

Lumbrera 1  
Atlalilco  
Mexicaltzingo  
Ermita  
Eje Central  
Lumbrera 3 y 4

#### Línea

Dovelas  
Control de Compra de Propiedades  
Estratigrafía  
Niveletas  
Componentes EPB

#### Boletines Virtuales

Enviar Boletín Virtual  
Lista de Boletines Virtuales  
Mis Boletines Virtuales

#### Adicionales

Cámara Lumbrera  
Cursos Online  
Manuales  
GT @ LMCC  
Gehry Technologies

#### Administración

Submit an Article  
How to embed a 3DXML  
Cool Iris

Home ▶ Mexicaltzingo



#### Información

Partes: Preliminares, Nivel Anden, Nivel Mezzanine, Instalaciones

Volúmenes: [Arquitectónicos y Estructurales](#) [Instalaciones](#)

Reporte: [Clic Aquí](#)

Secuencia de Construcción (Último Cronograma Recibido): [Clic Aquí](#)


Manual Modelo de Simulación: [Clic Aquí](#)



Video de Simulación: [Clic Aquí](#)



MXZ SIN

**Descripción:** Sofía Castillo es la encargada de coordinar el trabajo realizado por Gehry Technologies. Mexicaltzingo ha sido coordinado en todas las disciplinas incluyendo Instalaciones, Arquitectura y Estructura desde Nivel de Anden hasta nivel de Acceso.





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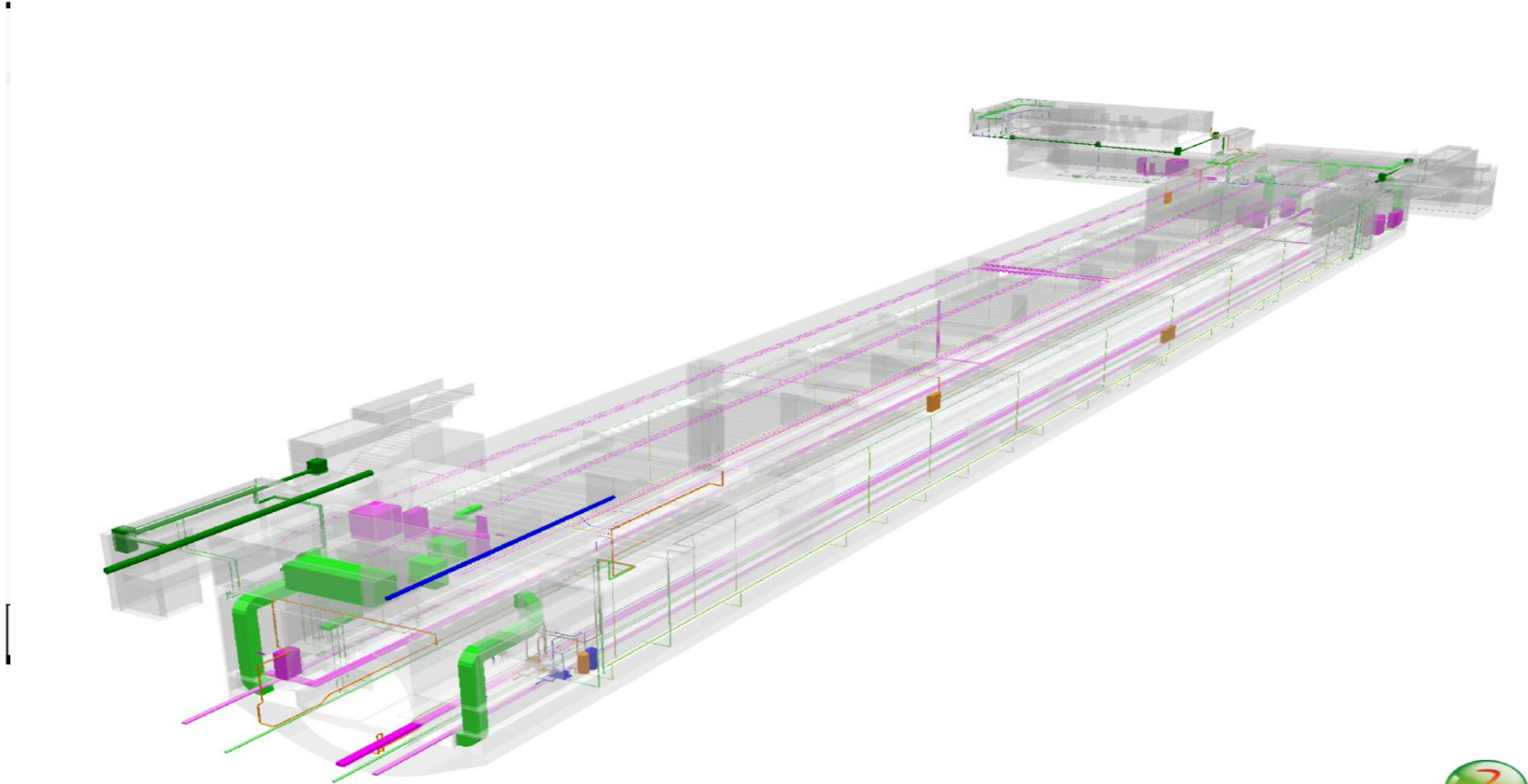
Volúmenes: [Arquitectónicos y Estructurales](#) [Instalaciones](#)

Reporte: [Clic Aquí](#)

Secuencia de Construcción (Último Cronograma Recibido): [Clic Aquí](#)

Manual Modelo de Simulación: [Clic Aquí](#)

Video de Simulación: [Clic Aquí](#)





# CLOUD BIM BASED PROJECT DASHBOARD



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## Login

Hola, Lucas Reames  
[Finalizar sesión](#)

## Conectado

Lucas Reames

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Boletin Virtual

Mis Boletines Virtuales

Enviar Boletin Virtual

Boletin Virtual

Lumbrera

Administrar Búsquedas

Búsqueda avanzada

Mostrar Boletines Virtuales cerrados


Mostrar sólo Boletines Virtuales NO asignados

Resetear Filtros de Búsqueda

Guardar Búsqueda

Página 1 2

	Fecha	Código de Boletin Virtual Asunto	Responsable	Prioridad	Estado	Acción
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000020 (0 LBL_REPLIES) This drawing shows the caion...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000019 (0 LBL_REPLIES) What pushes the shield...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000018 (0 LBL_REPLIES) How does the secondary crane...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000017 (0 LBL_REPLIES) What is the process for...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000016 (0 LBL_REPLIES) The length of the second...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000015 (0 LBL_REPLIES) Clash with aft of the bridge...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000014 (0 LBL_REPLIES) What mechanism slides Ring D...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000013 (0 LBL_REPLIES) What mechanism slides Ring D...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000012 (0 LBL_REPLIES) Depending on how the...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000011 (0 LBL_REPLIES) Is the cutterhead put into...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000010 (0 LBL_REPLIES) How will the first screw...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000009 (0 LBL_REPLIES) Can the straps for the first...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000008 (0 LBL_REPLIES) Space for saffold to be...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000007 (0 LBL_REPLIES) Clash electrical wires	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>
<input type="checkbox"/>	24/09/2009	LUMBRERA 1-0000000006 (0 LBL_REPLIES) Space between cranes and...	Ismail Benamar	normal	abierto	<a href="#">Borrar</a>



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Viendo Boletin Virtual MEXICALTZINGO-0000000051

Versión para imprimir

Mover Boletin Virtual a

Mexicaltzingo

Mover

Asunto	Responsable	Estado	Prioridad
INS - Electricas necesitan mas informacion	Ezequiel Ramirez	en Esp	normal

Actualizar

Cerrar

Borrar

Campos Custom

División

Arquitectura

Estructura

Instalaciones

Programa de Construcción

DWG Referencia

PMDf-09-IE-612230-II-0012-00000-P-A.dwg

DP Referencia

M12\_F02\_MXZ\_ESN\_100\_INS\_ELE

Resolución

Fecha Limite

Actualizar

Click aquí para Responder

Historia de Mensajes

Sofia Castillo

escribió:  
scastillo@gt-global.com  
Lunes, 26 Octubre 2009 13:23:56 -0500

Sofia Castillo

escribió:  
scastillo@gt-global.com  
Lunes, 26 Octubre 2009 13:19:21 -0500

Sofia Castillo

escribió:  
scastillo@gt-global.com  
Lunes, 26 Octubre 2009 13:18:10 -0500

Conflicto con drenajes



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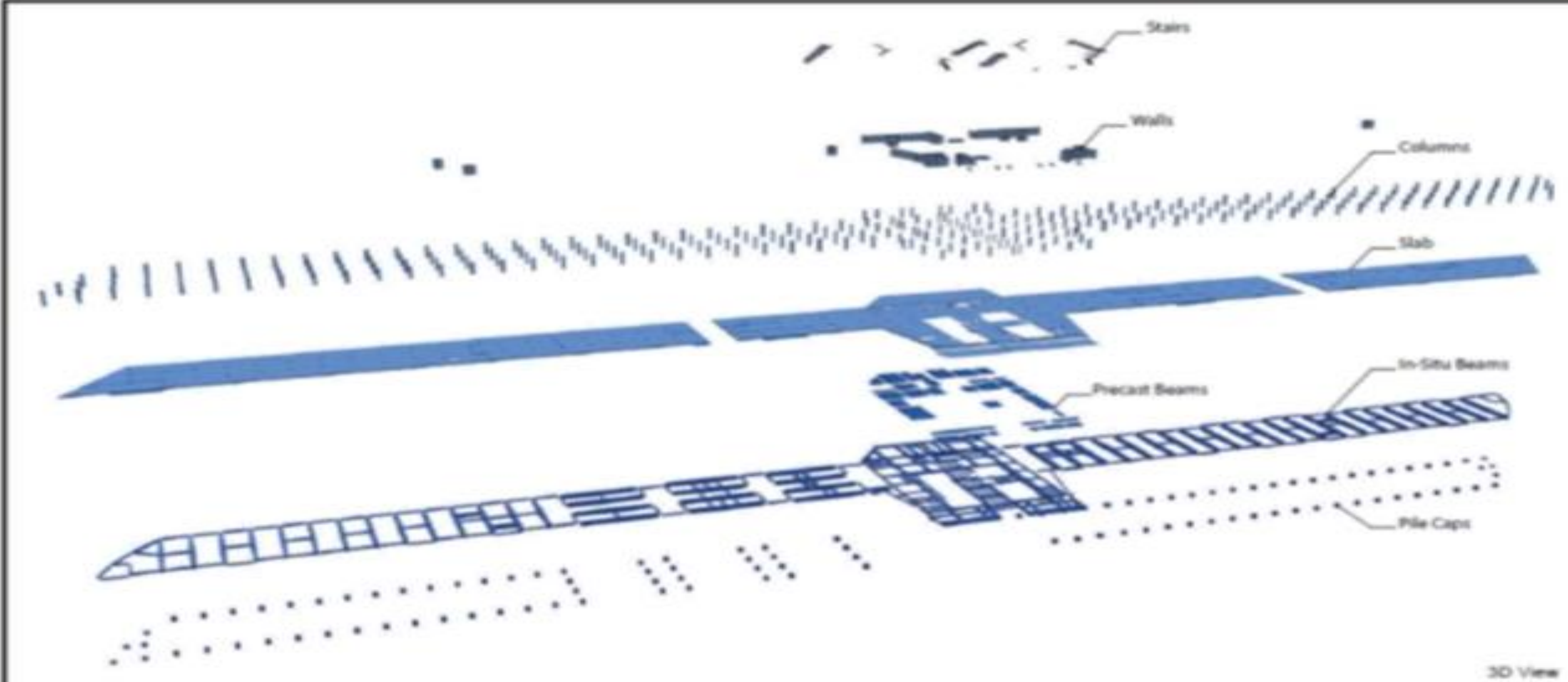
XHTML and CSS valid

Joomla!

Designed by joomlaxe



# Decision Support Dashboards



Notes:

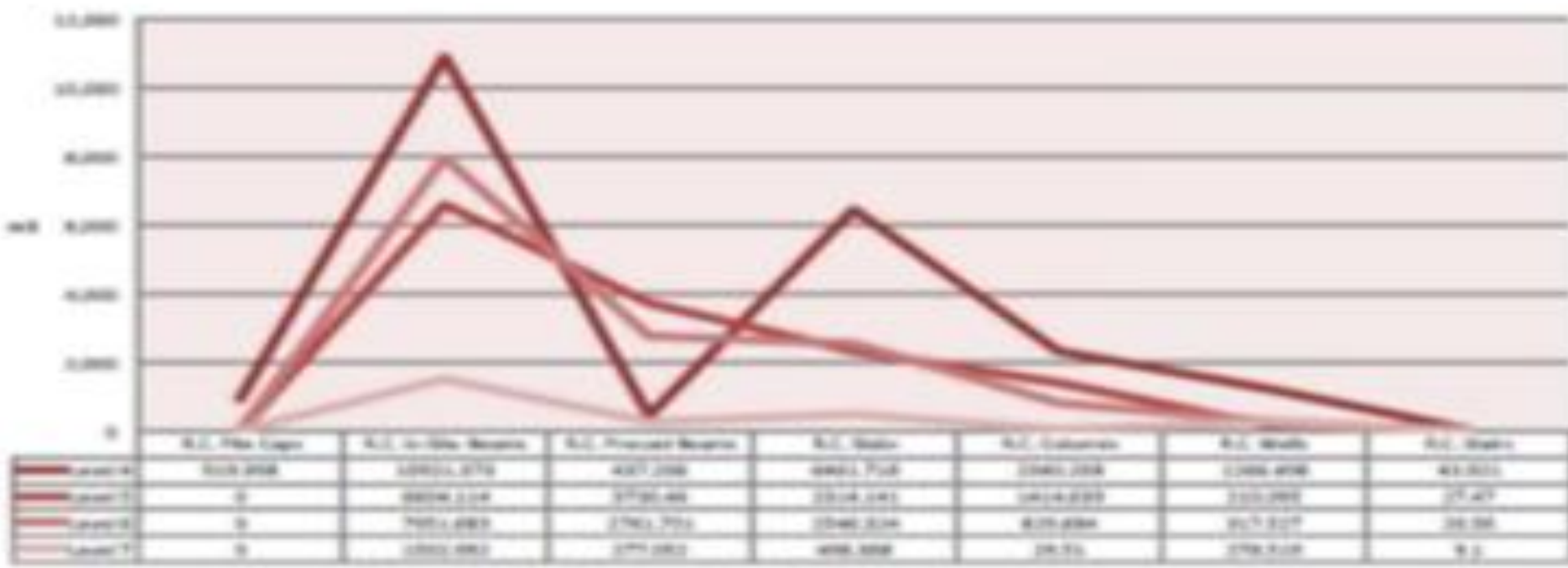
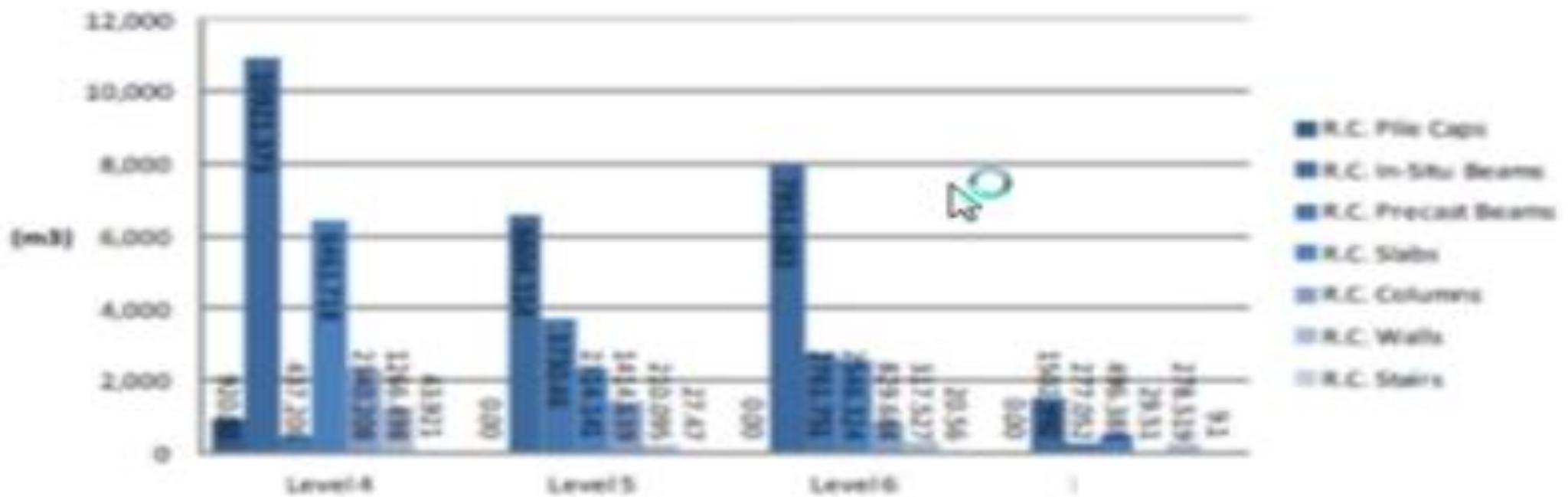
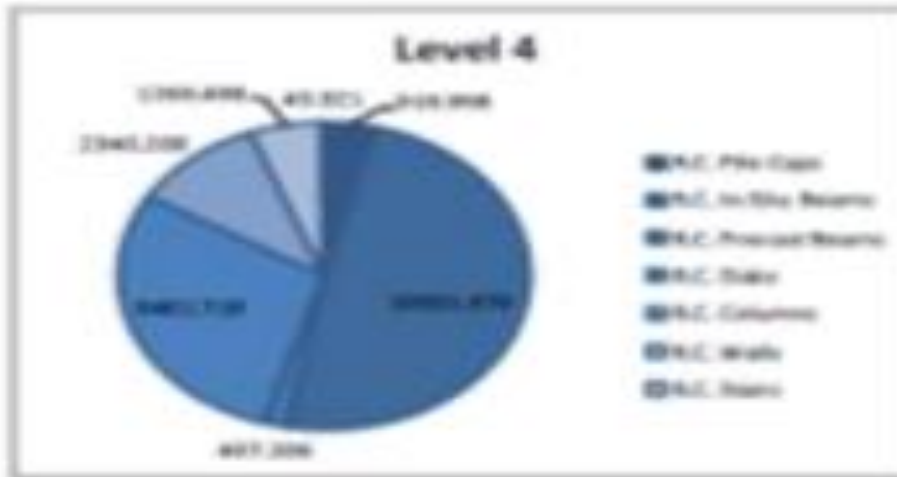
Beams are associated with the level of the slab they are attached to ie. slab you are standing on.

Only R.C. walls are shown in the 3D view. Block walls have been omitted.

Walls are trimmed to base of T-Beams with minor openings omitted.

In-situ and precast tiles are associated with the employer's envisaged solution.

The graphs below are divided to show both R.C. by component type and by level.





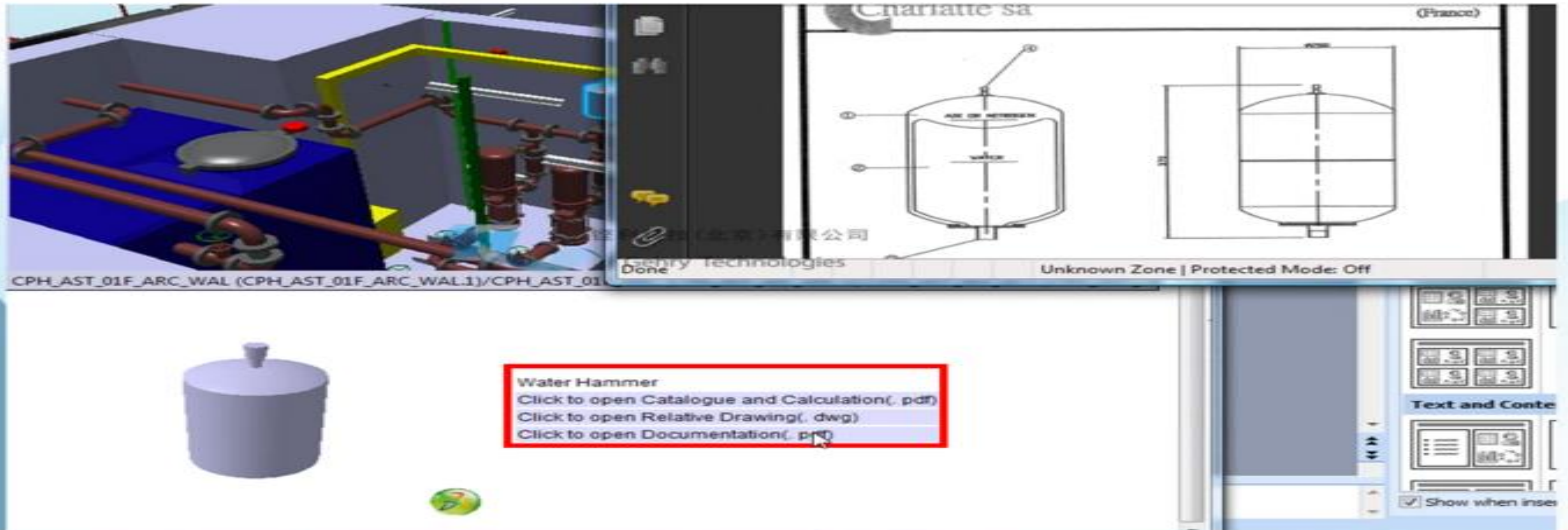
# Decision Support Dashboards





# VIZUALIZE BUILDING DATA

## FM Technology Bi-directional link between BIM & FM Information



6/5/2012 12:20:40 AM

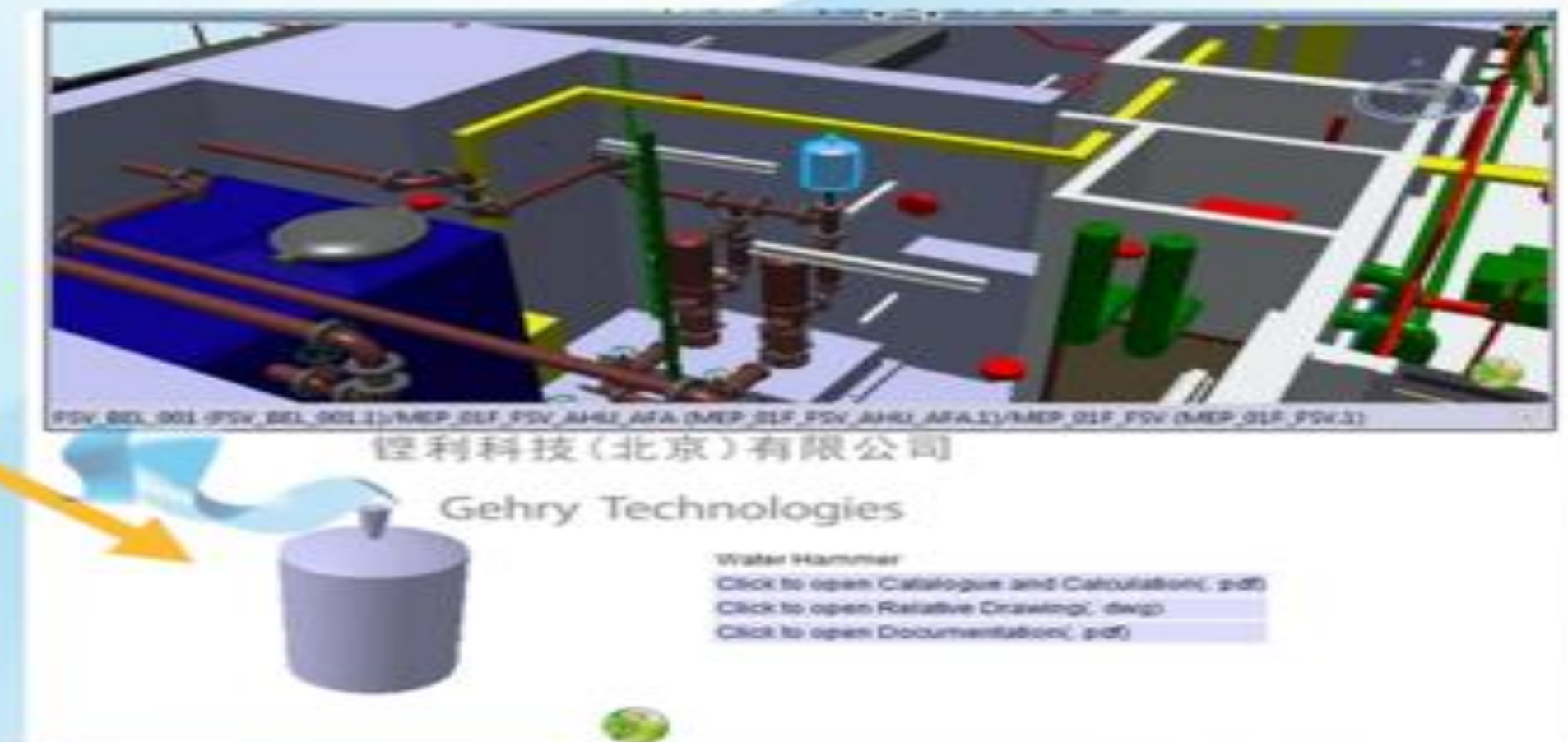


# BIDIRECTIONAL DATA FLOW



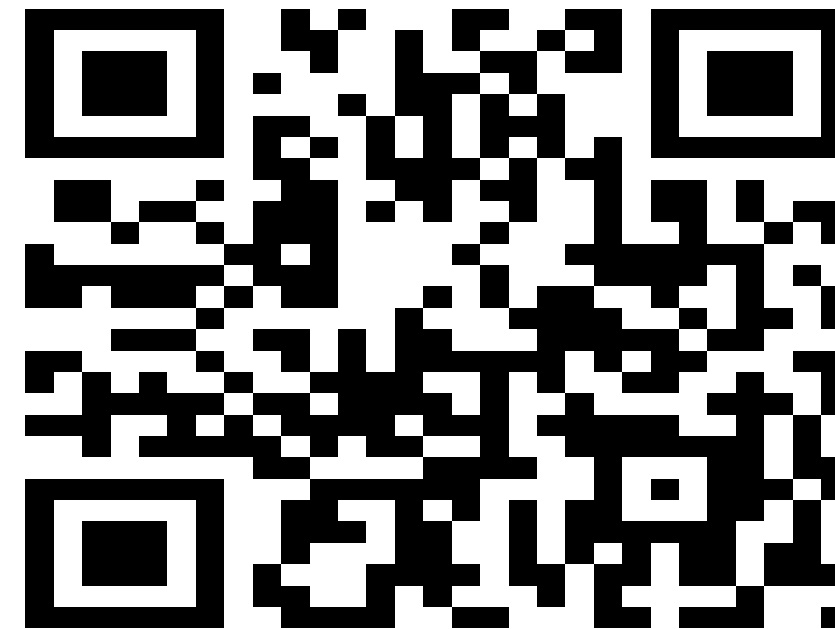
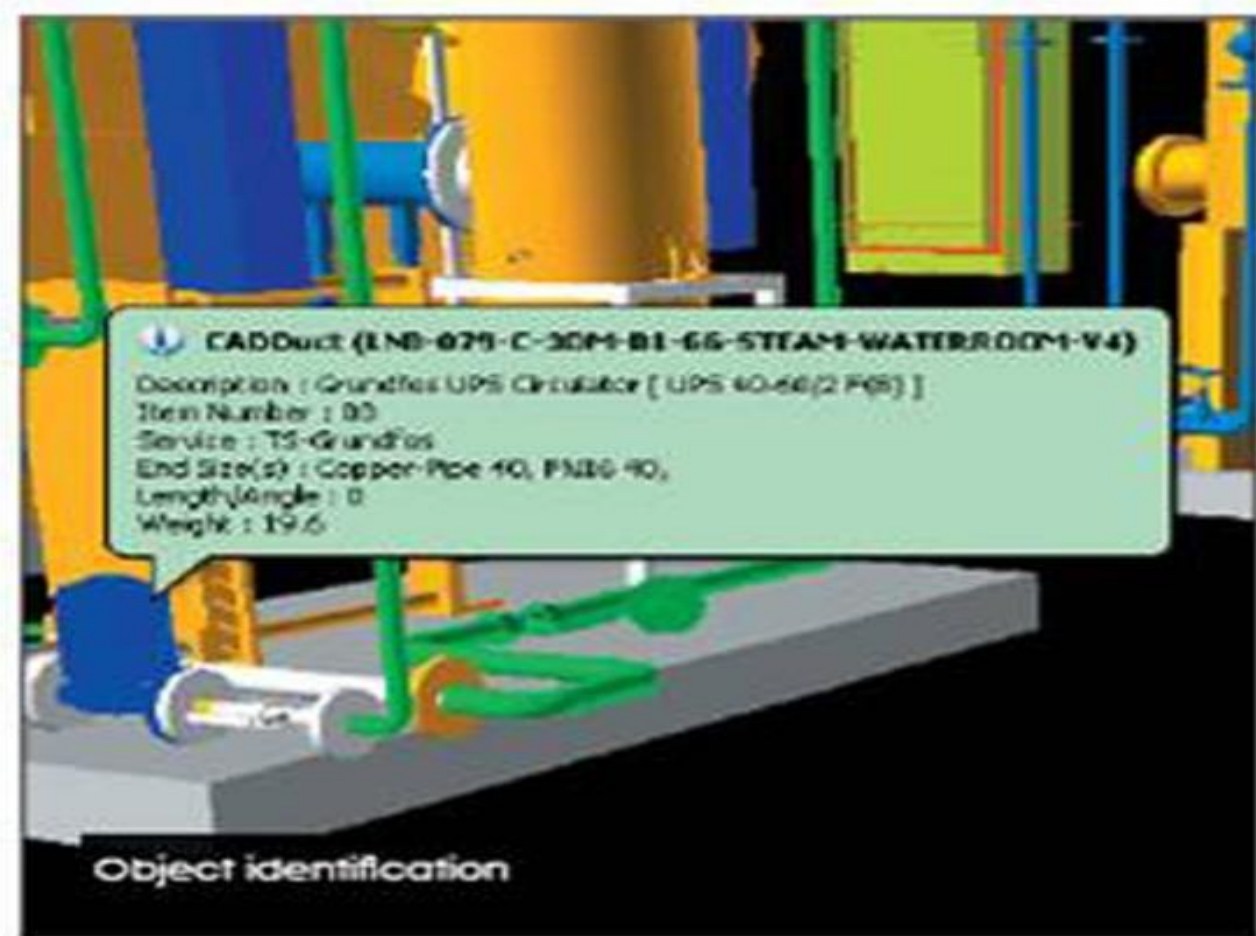
## Inventory Query Integrated with BIM Model

Type	Name	Basic Inventory	Existing Inventory	Storage Location	Function
Fire Services	Sprinker Head	8	0	B/7	<a href="#">View Submitted Form</a>
Fire Services	Hose Reel	2	0	B/8	<a href="#">View Submitted Form</a>
Plumbing	Y-Strainer	3	2	B/6	<a href="#">Add Form</a> <a href="#">View Submitted Form</a>
Plumbing	Water Hammer	2	2	B/5	<a href="#">Add Form</a> <a href="#">View Submitted Form</a>
Plumbing	Water Hammer	4	4	B/4	<a href="#">Add Form</a> <a href="#">View Submitted Form</a>





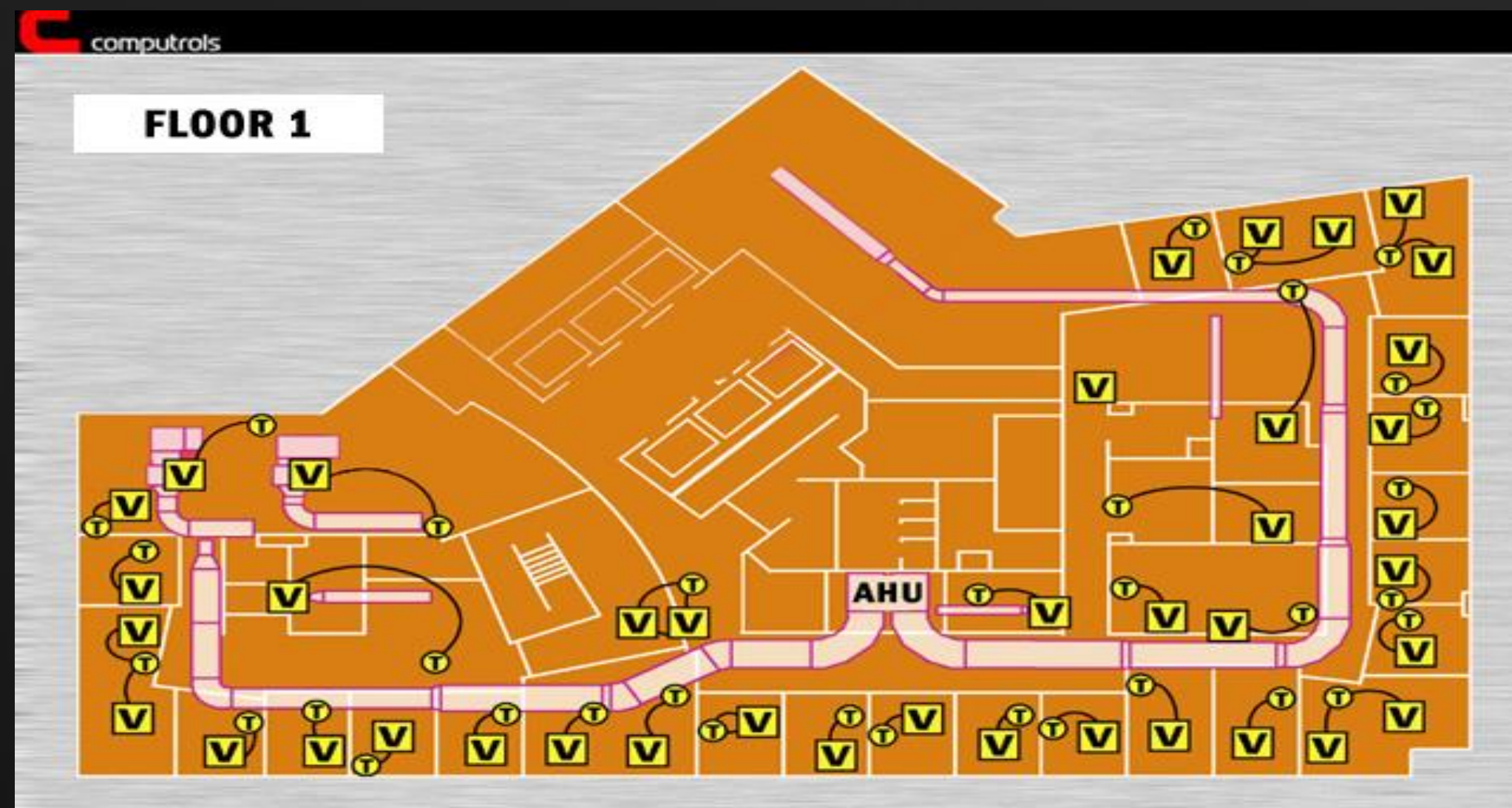
# LINKING THE VIRTUAL TO THE REAL





# INTEGRATION OF BIM AND INTELLIGENT BUILDINGS

Advantages of a BIM model as a backdrop for the BMS/EMS system instead of a 2D visual



V  
E  
R  
S  
U  
S



**A single unified physical model is the source of information – constantly updated.**

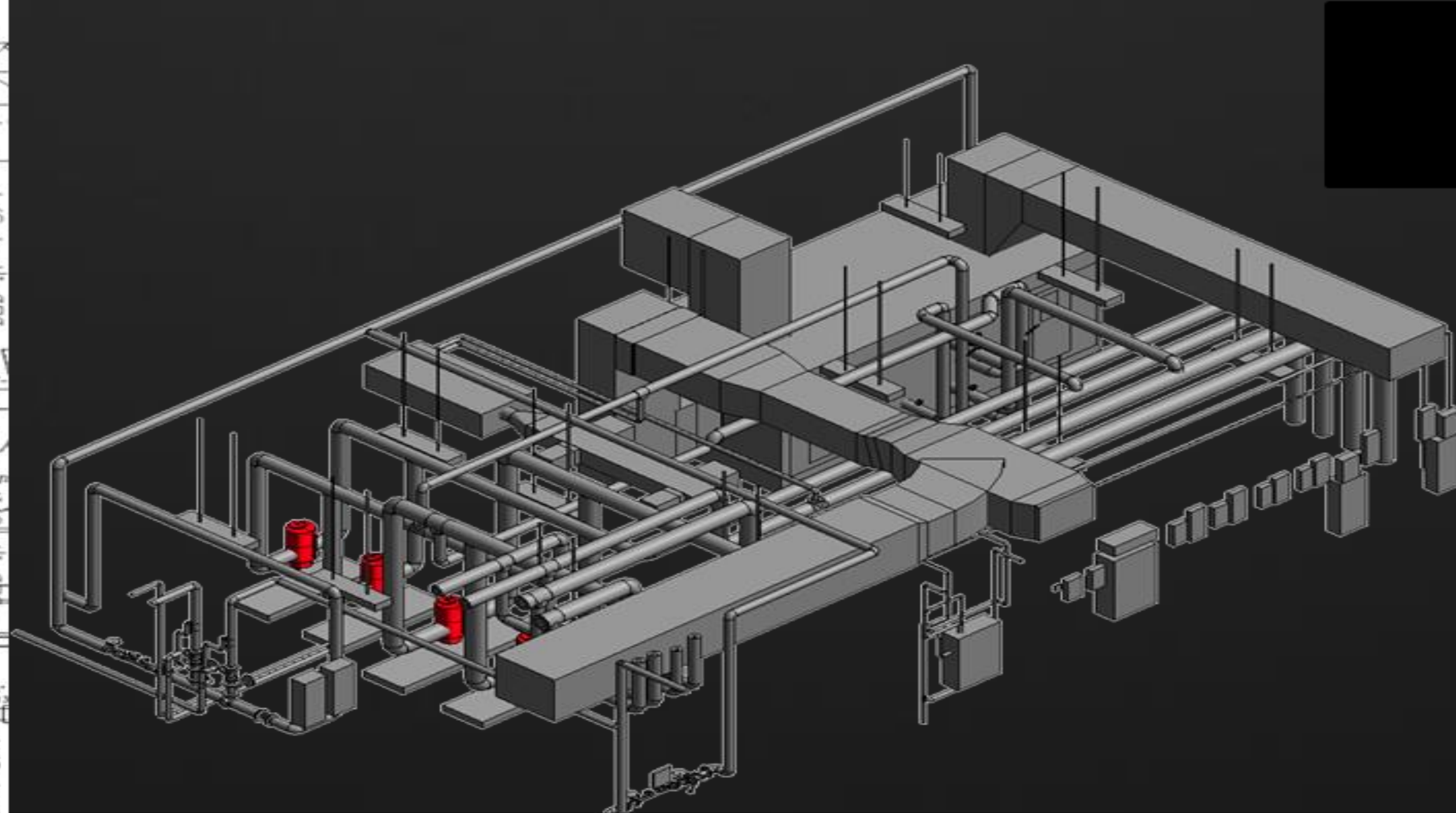
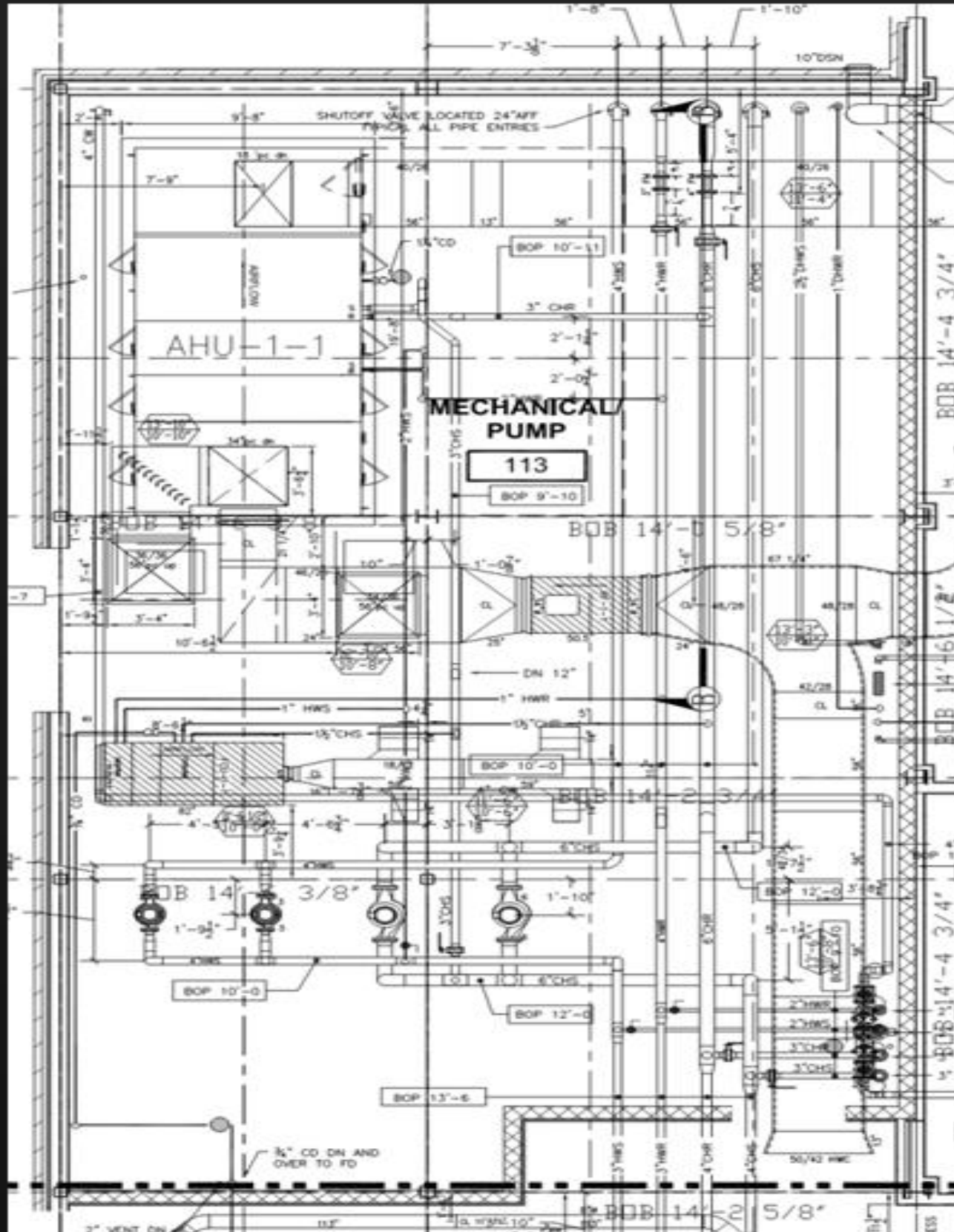




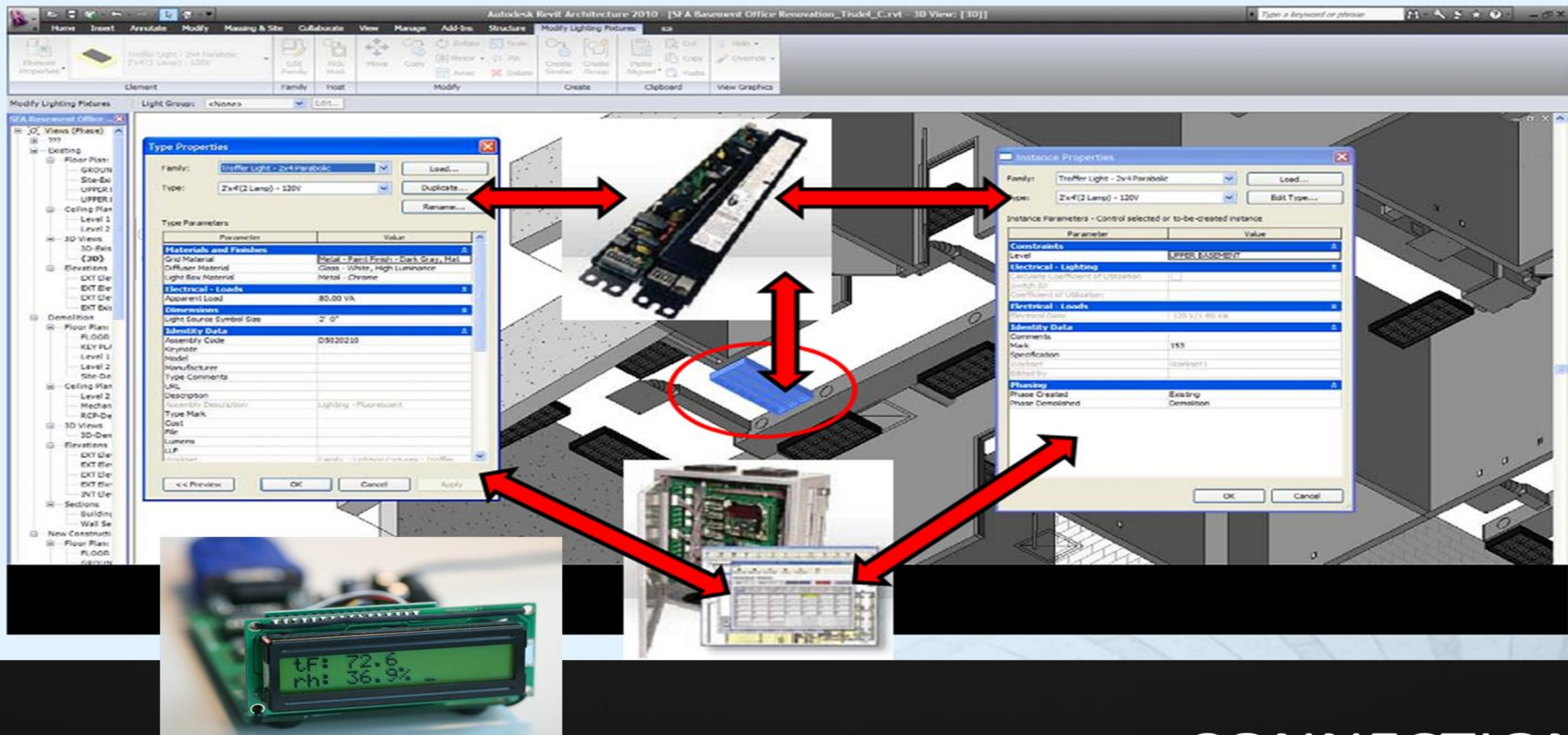
# ASSET DATA CAPTURE



# DISRUPTIVE TECHNOLOGY: FROM REPRESENT TO REPRODUCE



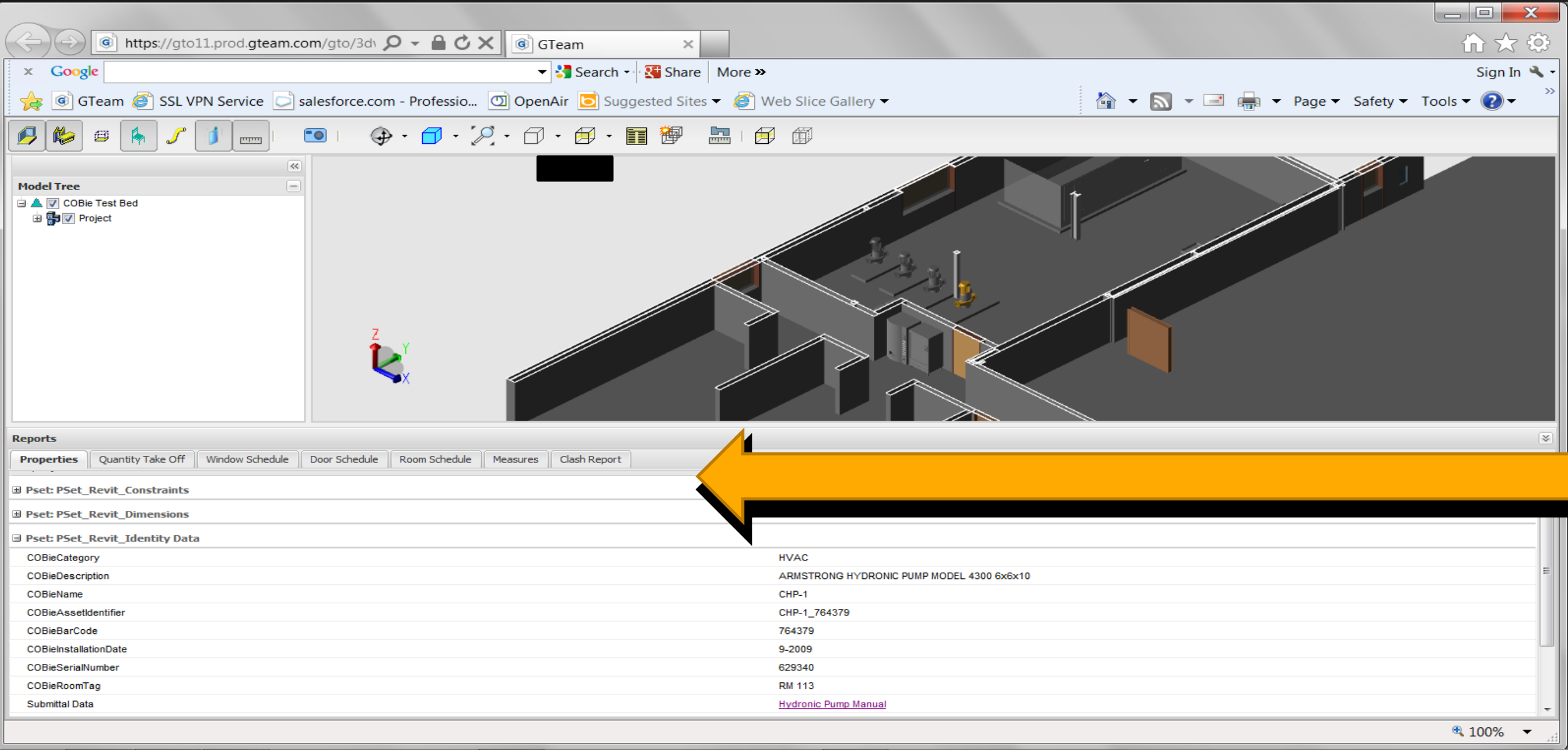
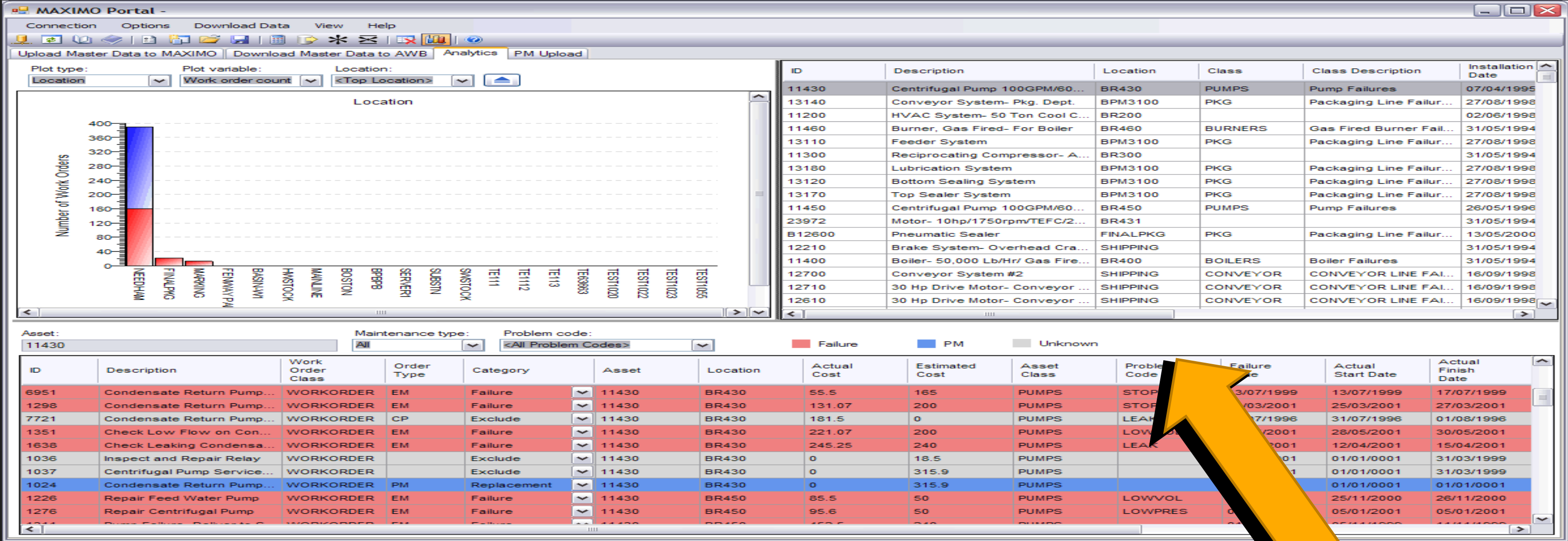




# CONNECTION



# ALL DATA IS INTERCONNECTED







# CLEVELAND CLINIC ABU DHABI

Project Type: Health

Size: 200,000 m<sup>2</sup>

Location: Abu Dhabi

Client:  
Sixco-Samsung JV  
ETA MEP Consultants

Project Team:

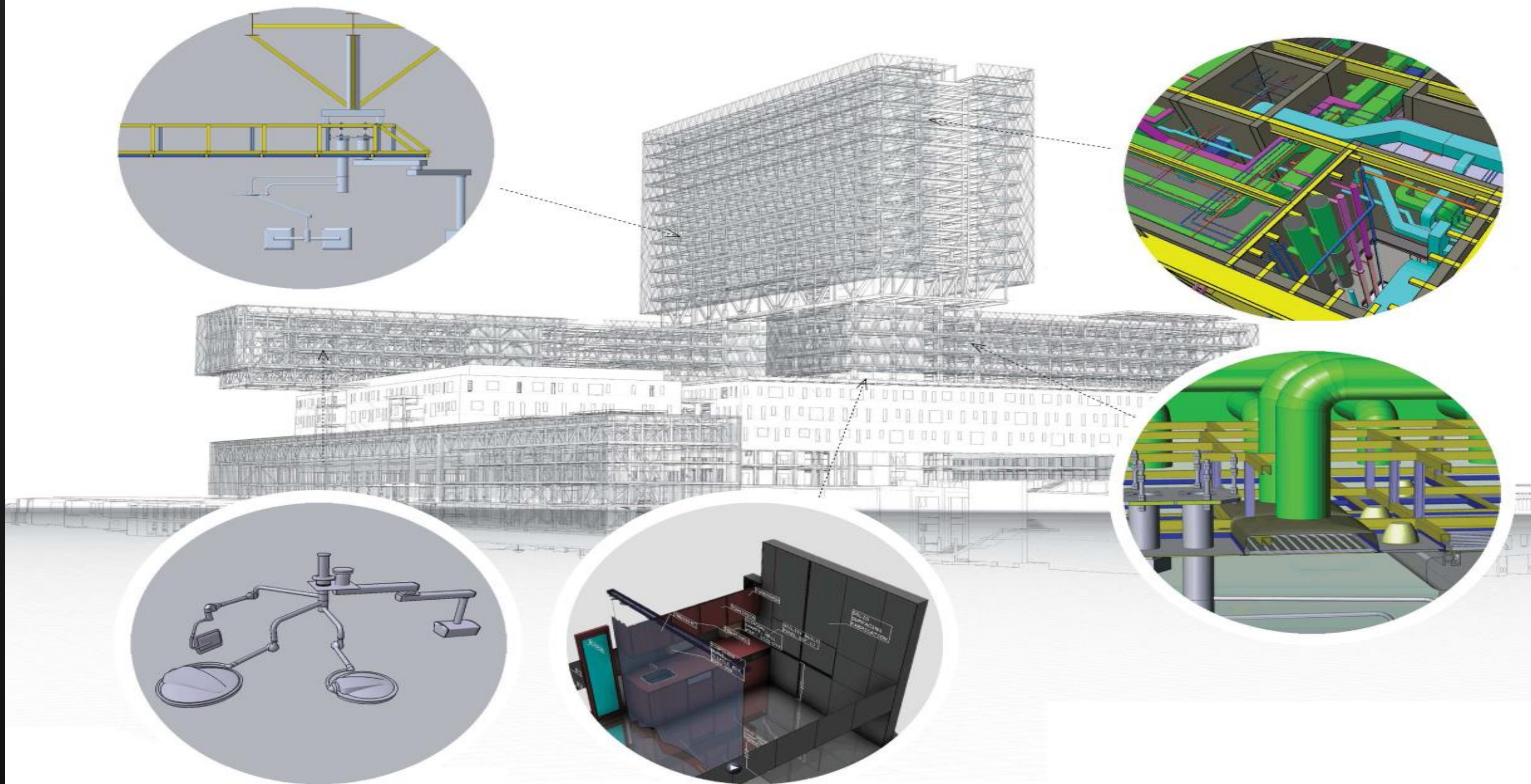
GT-Middle East  
Lionel Lambourn (Director)  
with  
Santino Medina /Daniel  
Carduso/Christopher Reinig  
Ghazala Abbasi

Mubadala Healthcare,  
Aldar Properties  
Aedas  
Aecom  
ETA

Services:

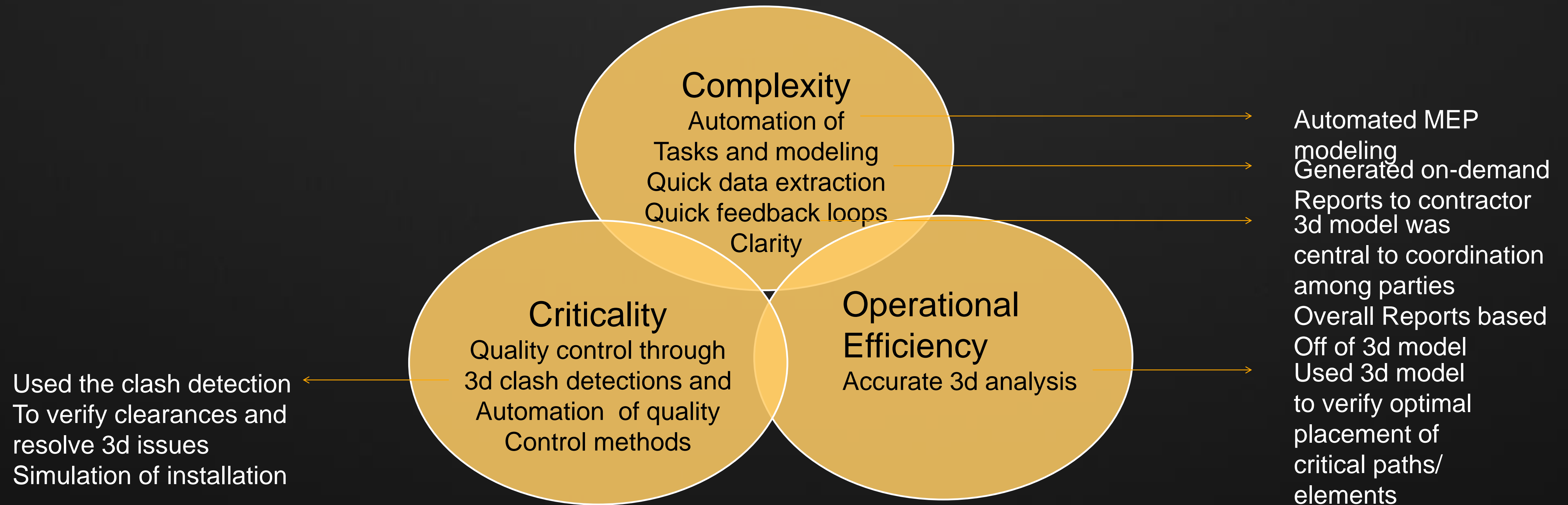
Construction Coordination  
Construction Scheduling  
MEP modeling and coordination





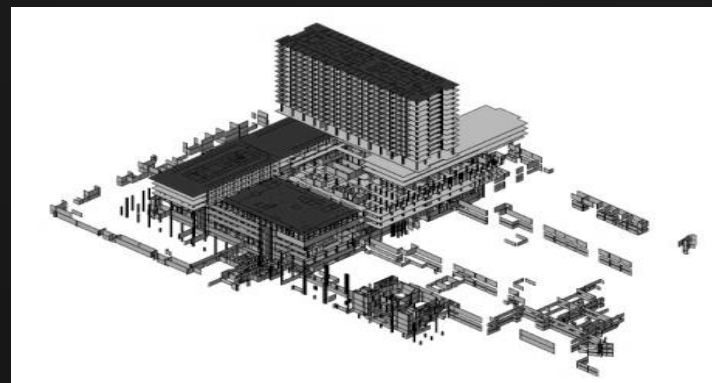
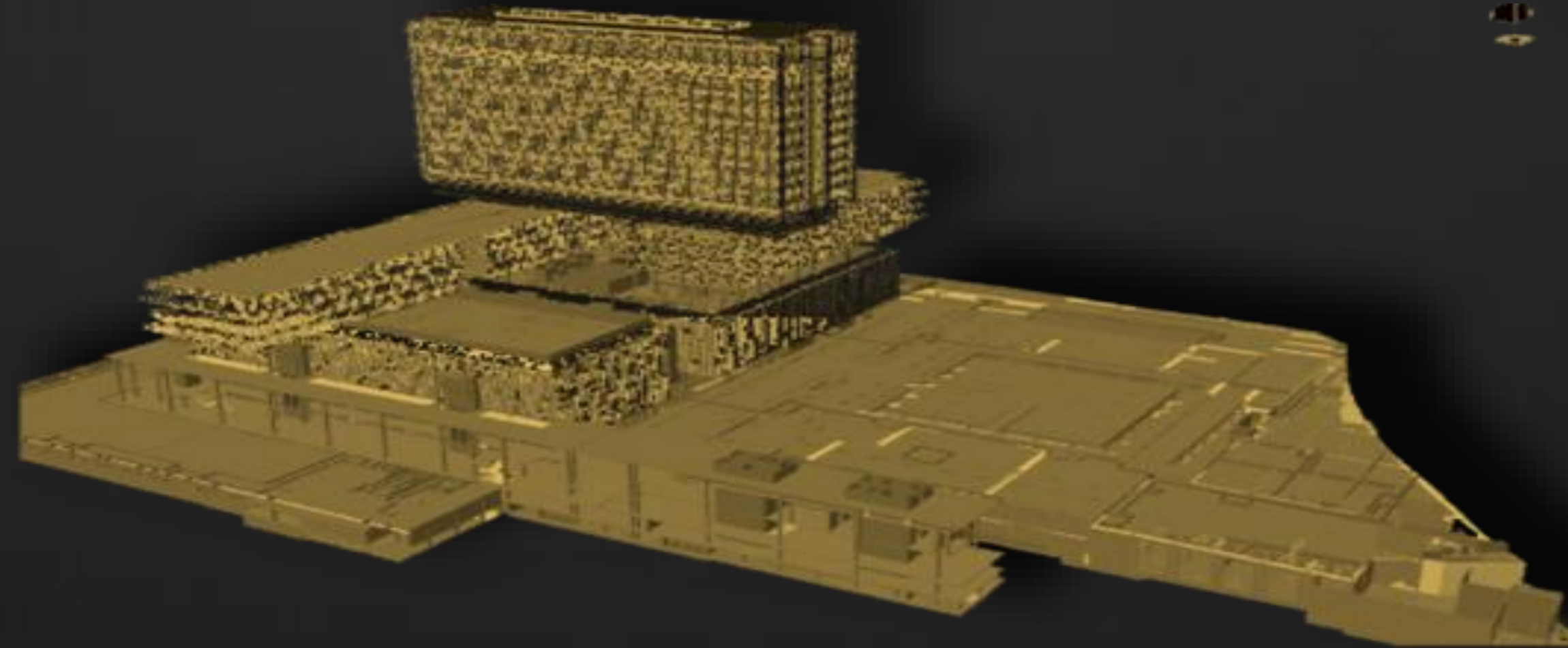


# How does “cloud BIM” address these characteristics for Cleveland Clinic Abu Dhabi?

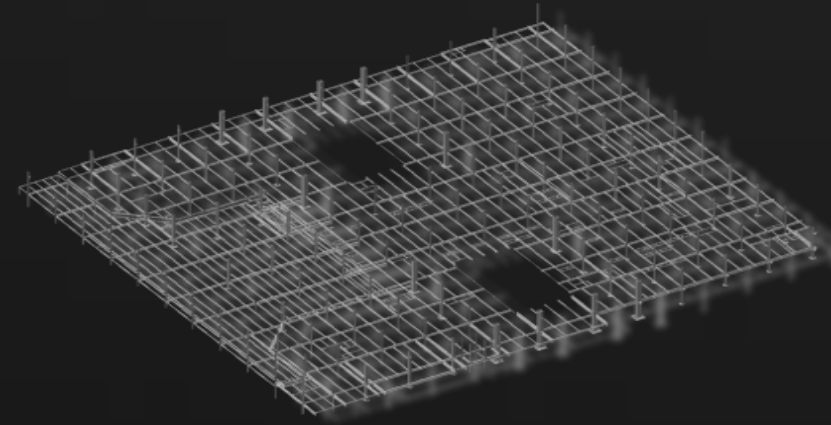




# IFC Interoperability with Subcontractor Models



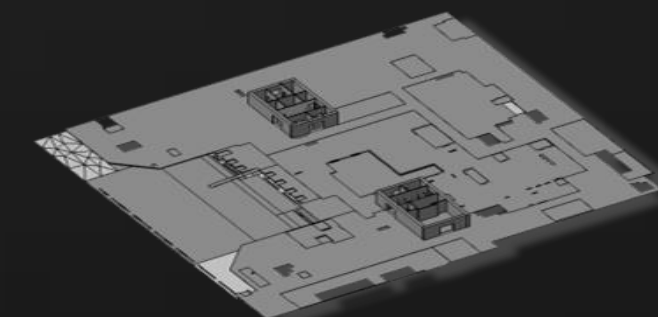
**Architectural Model**  
By AREP



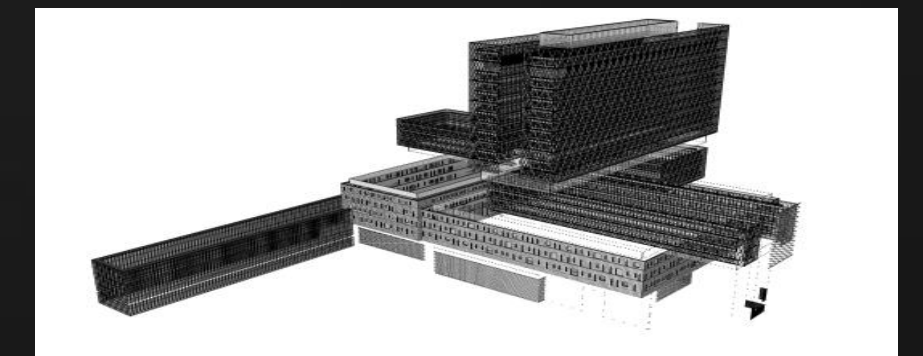
**Steel Model**  
By Eversendai



**MEP Model**  
By ETA



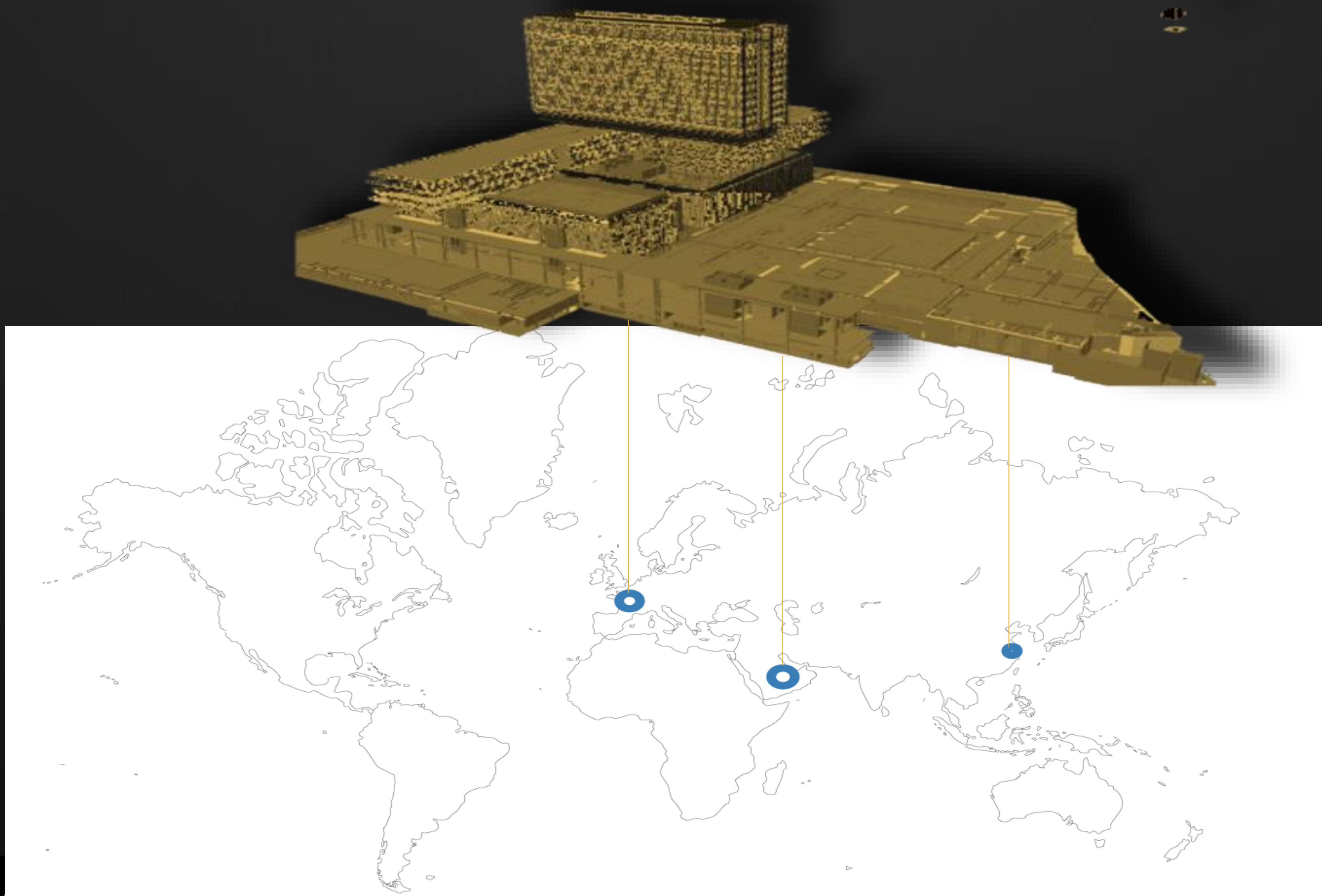
**Concrete Model**  
by DDD



**Facade Model**  
By Yuanda



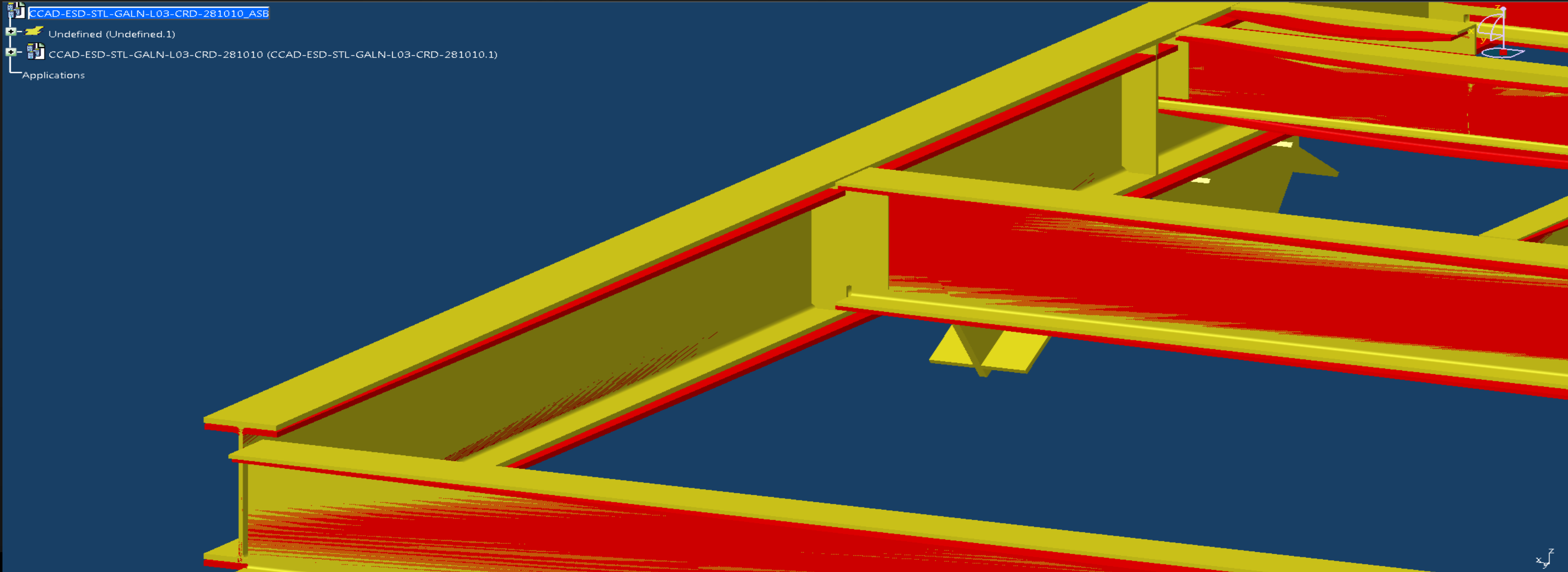
# Global Accessibility





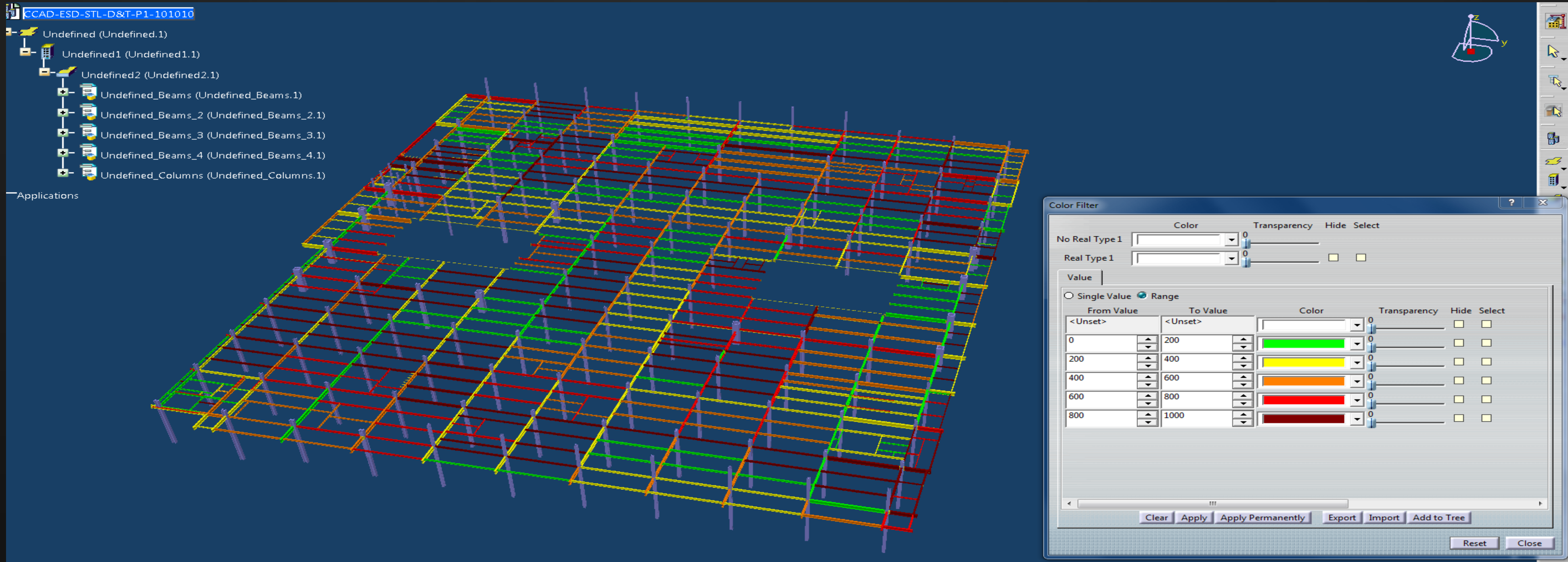
# As-built Coordination

CONSTRUCTION SURVEY REPORT - BEAMS						
CCAD-ESD-STL-D&T-P1-101010						
POINT ID	DESIGN EAST COORD (M)	DESIGN NORTH COORD (M)	DESIGN Z COORD (M)	SURVEY EAST COORD (M)	SURVEY NORTH COORD (M)	SURVEY Z COORD (M)
TS_19754201_S	235153.4016	2711290.011	94.5196	235153.4016	2711290.011	94.5186
TS_19754201_M	235153.4016	2711290.011	94.61960002	235153.4016	2711290.011	94.61760002
TS_19754201_E	235153.4016	2711290.011	94.71960003	235153.4016	2711290.011	94.71660003
TS_15739540_S	235222.3585	2711358.054	94.36	235222.3585	2711358.054	94.356
TS_15739540_M	235223.5397	2711357.891	94.36	235223.5397	2711357.891	94.355
TS_15739540_E	235224.721	2711357.728	94.36	235224.721	2711357.728	94.354
TS_15739510_S	235219.6529	2711358.427	94.36	235219.6529	2711358.427	94.353
TS_15739510_M	235220.8939	2711358.255	94.36	235220.8939	2711358.255	94.352
TS_15739510_E	235222.1348	2711358.084	94.36	235222.1348	2711358.084	94.351
TS_15736617_S	235209.7619	2711340.409	94.36	235209.7619	2711340.409	94.35
TS_15736617_M	235211.1753	2711340.214	94.36	235211.1753	2711340.214	94.349
TS_15736617_E	235212.5886	2711340.019	94.36	235212.5886	2711340.019	94.348
TS_12471006_S	235150.1283	2711348.276	94.7129	235150.1283	2711348.276	94.6999
TS_12471006_M	235150.1283	2711348.276	94.6129	235150.1283	2711348.276	94.5989
TS_12471006_E	235150.1283	2711348.276	94.5129	235150.1283	2711348.276	94.4979
TS_12470767_S	235150.0315	2711347.574	94.7129	235150.0315	2711347.574	94.6969
TS_12470767_M	235150.0315	2711347.574	94.6129	235150.0315	2711347.574	94.5959
TS_12470767_E	235150.0315	2711347.574	94.5129	235150.0315	2711347.574	94.4949
TS_12470743_S	235149.8949	2711346.584	94.7129	235149.8949	2711346.584	94.6939
TS_12470743_M	235149.8949	2711346.584	94.6129	235149.8949	2711346.584	94.5929
TS_12470743_E	235149.8949	2711346.584	94.5129	235149.8949	2711346.584	94.4919
TS_12470719_S	235149.7584	2711345.593	94.7129	235149.7584	2711345.593	94.6909
TS_12470719_M	235149.7584	2711345.593	94.6129	235149.7584	2711345.593	94.5899
TS_12470719_E	235149.7584	2711345.593	94.5129	235149.7584	2711345.593	94.4889
TS_12470695_S	235149.6218	2711344.602	94.7129	235149.6218	2711344.602	94.6879
TS_12470695_M	235149.6218	2711344.602	94.6129	235149.6218	2711344.602	94.5869
TS_12470695_E	235149.6218	2711344.602	94.5129	235149.6218	2711344.602	94.4859



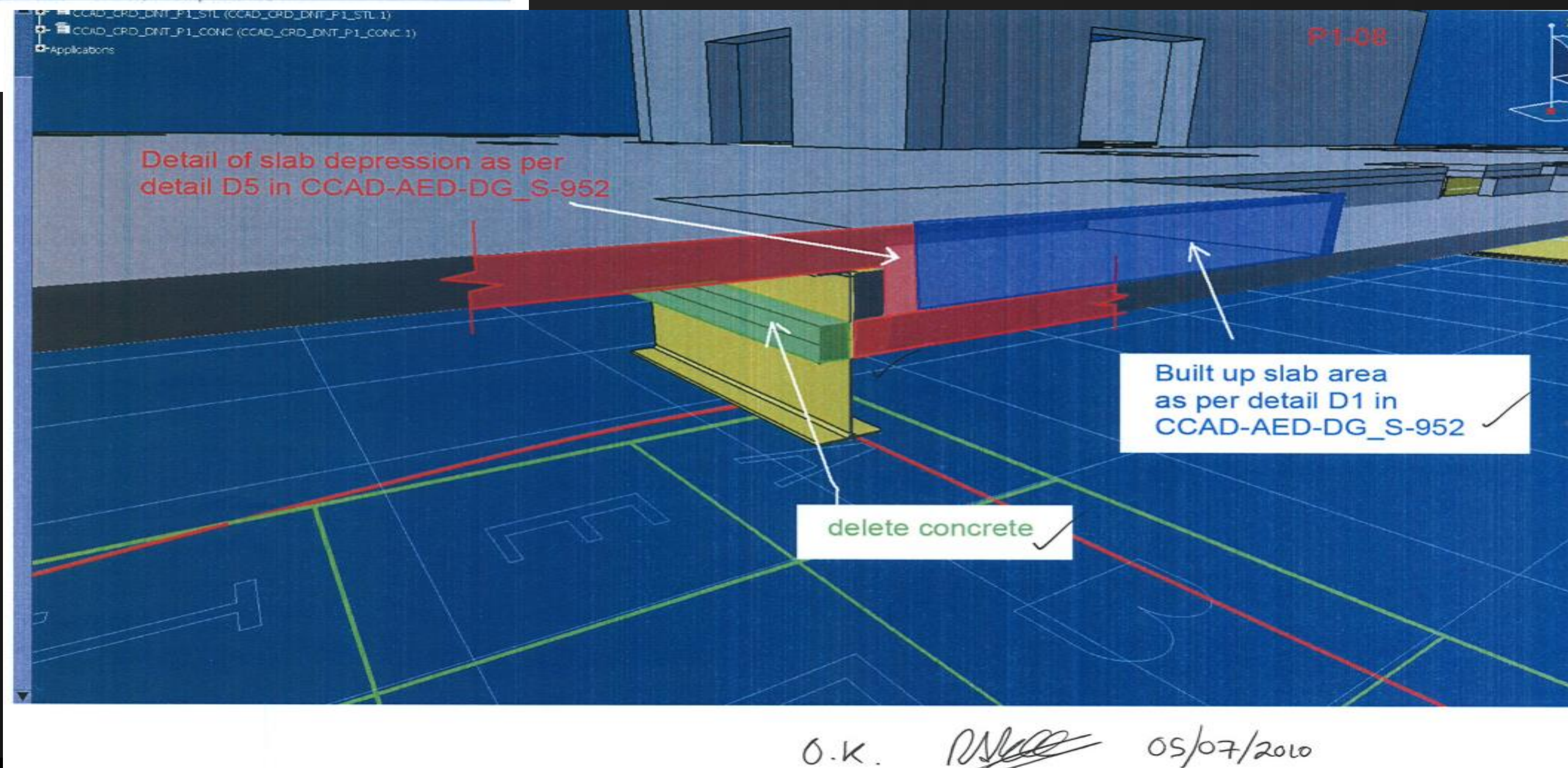
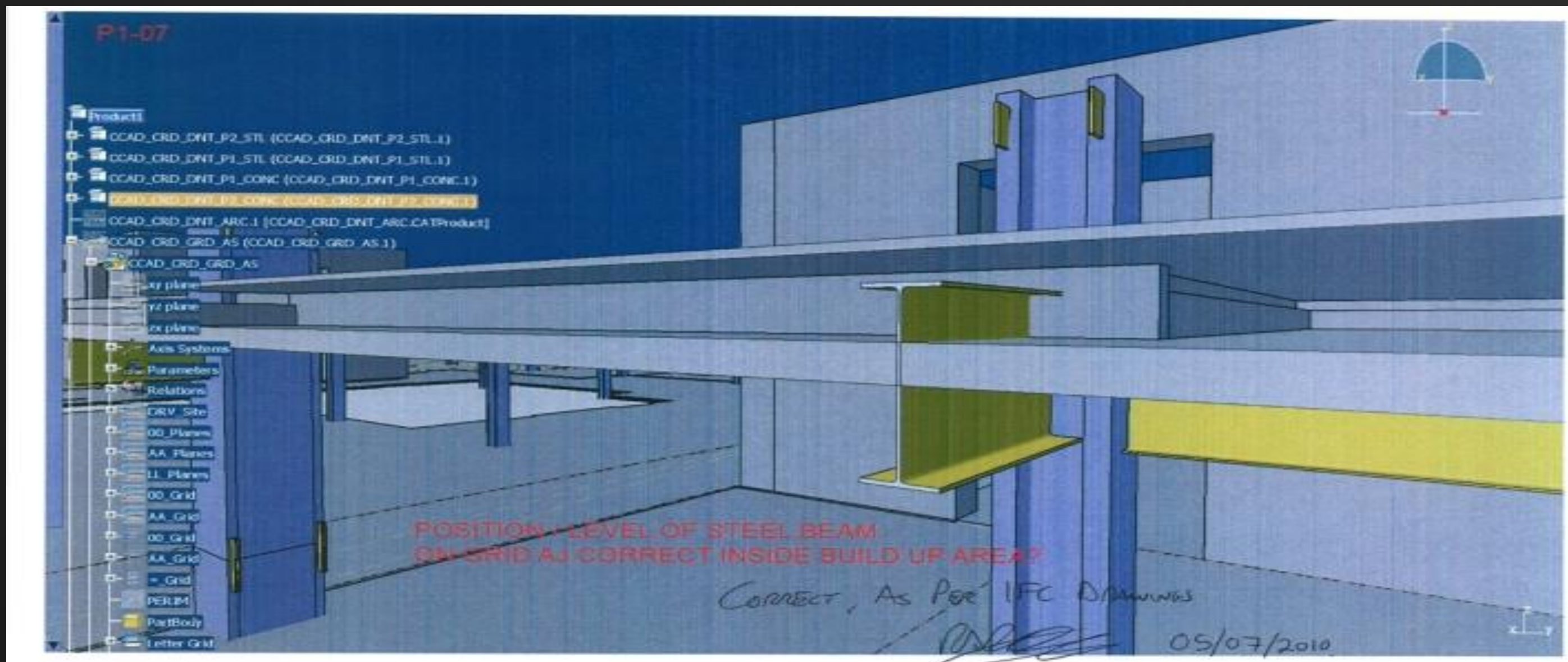


# Analysis of Deviation



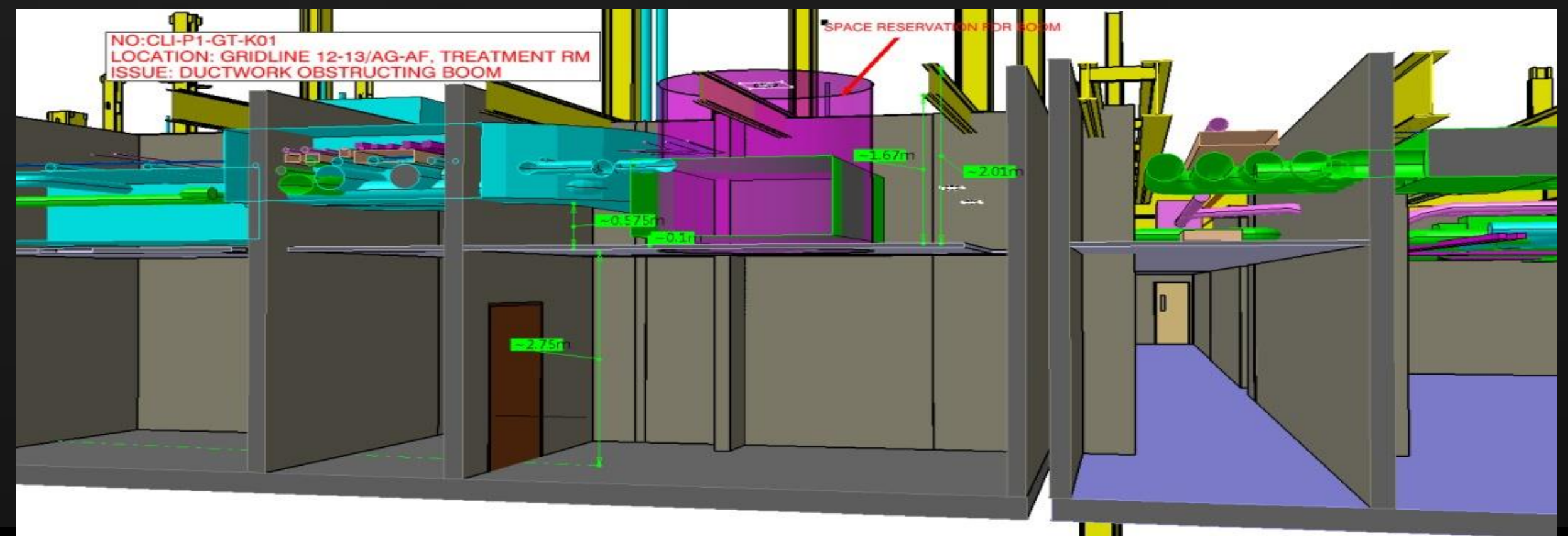
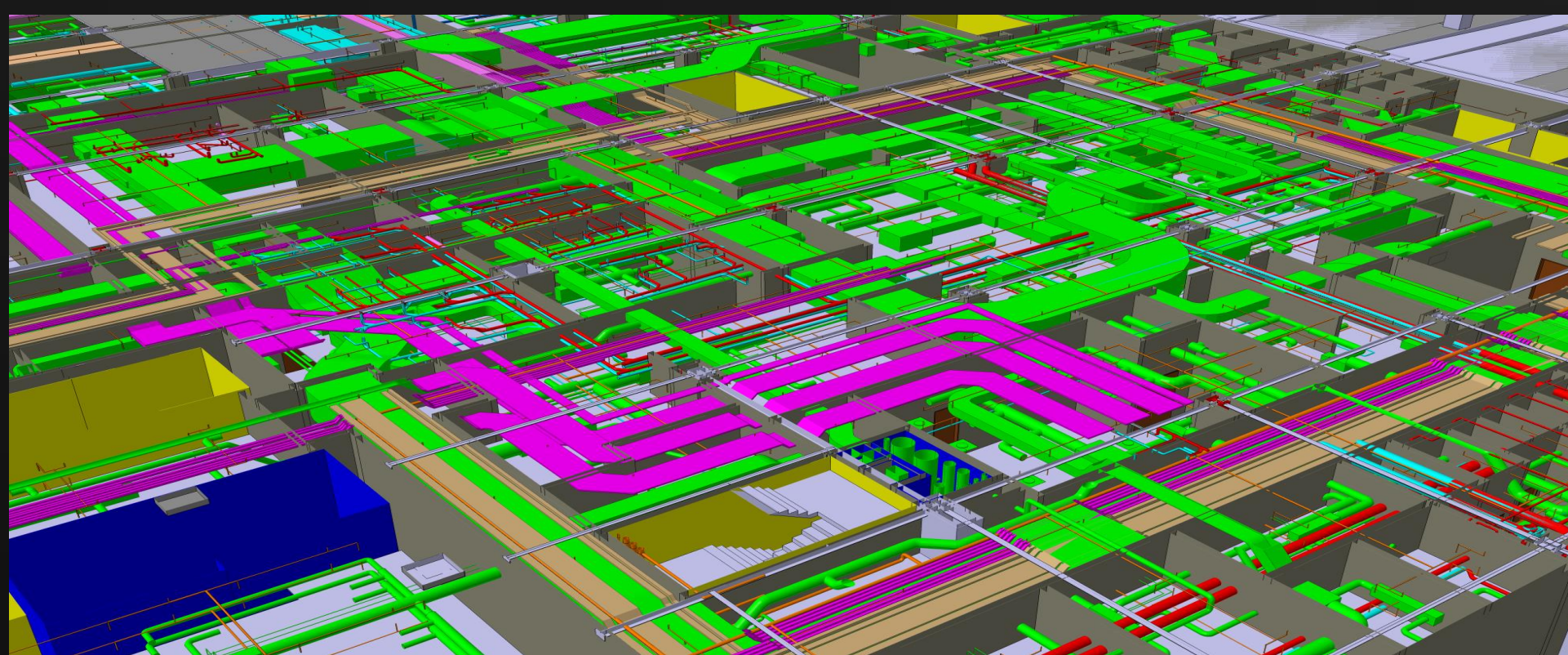
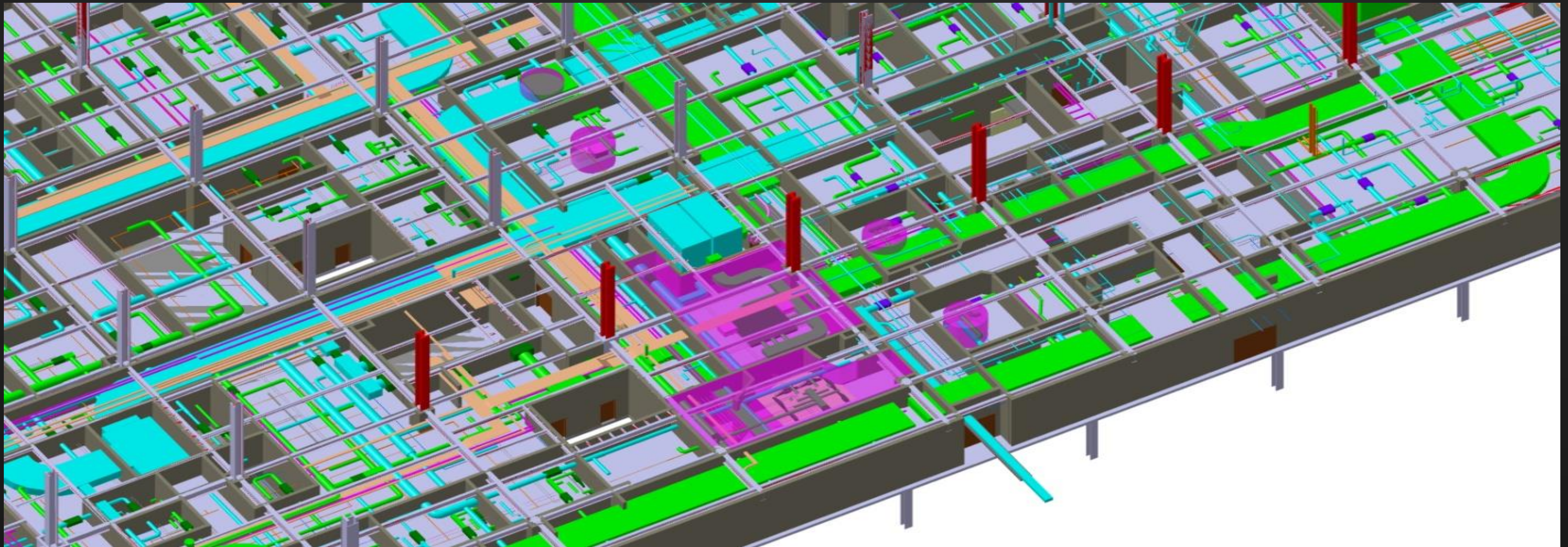


## 3d Coordination and Validation



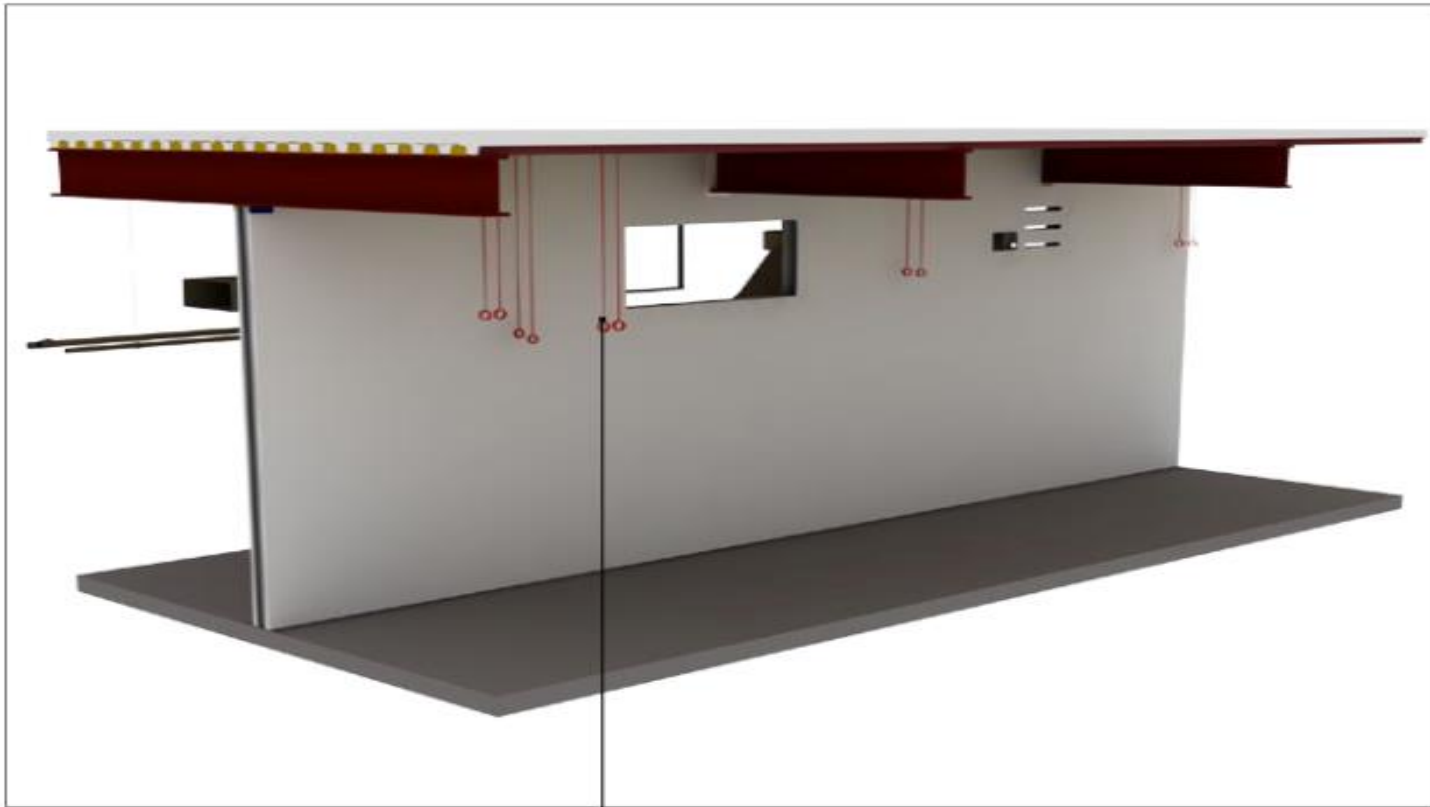


# MEP Coordination Modeling

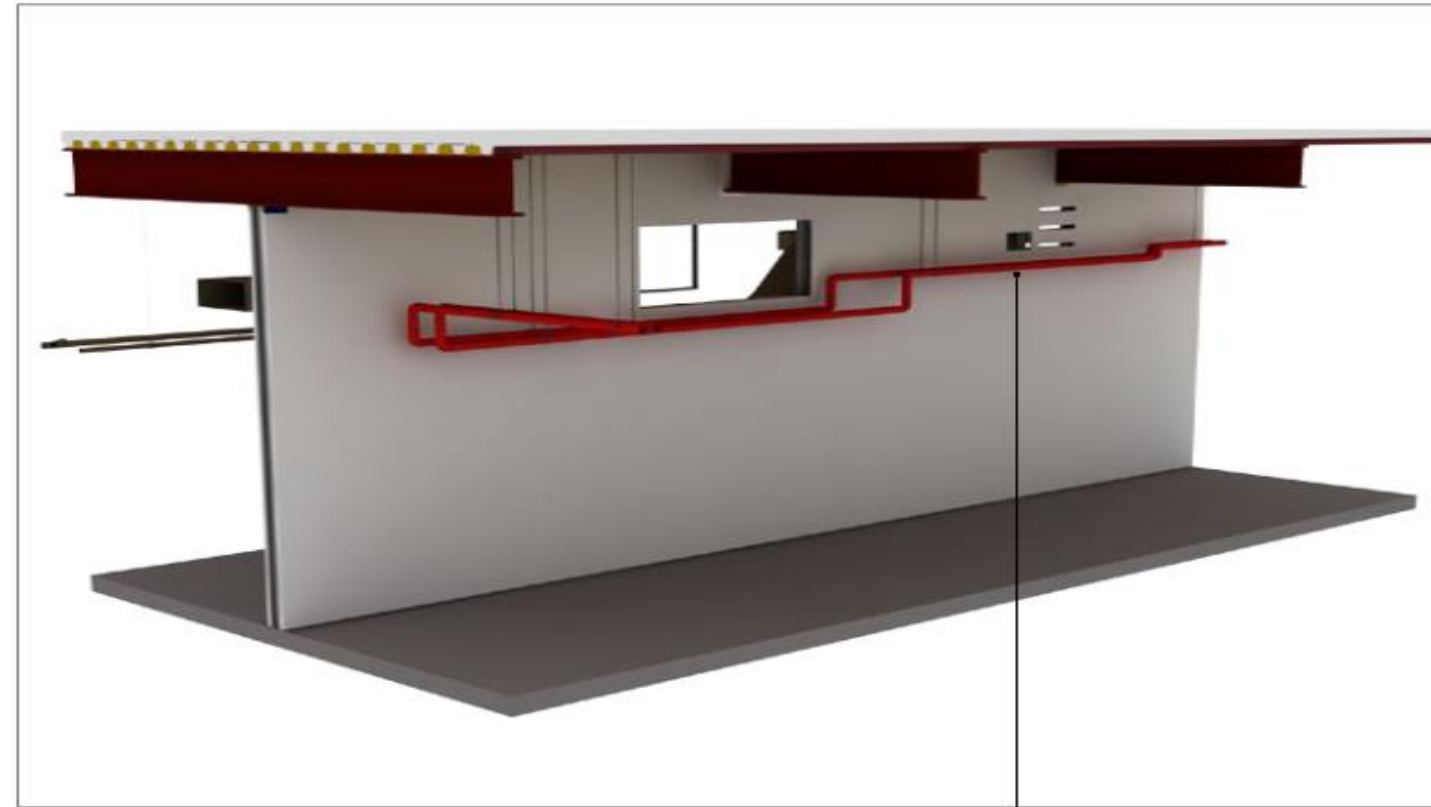




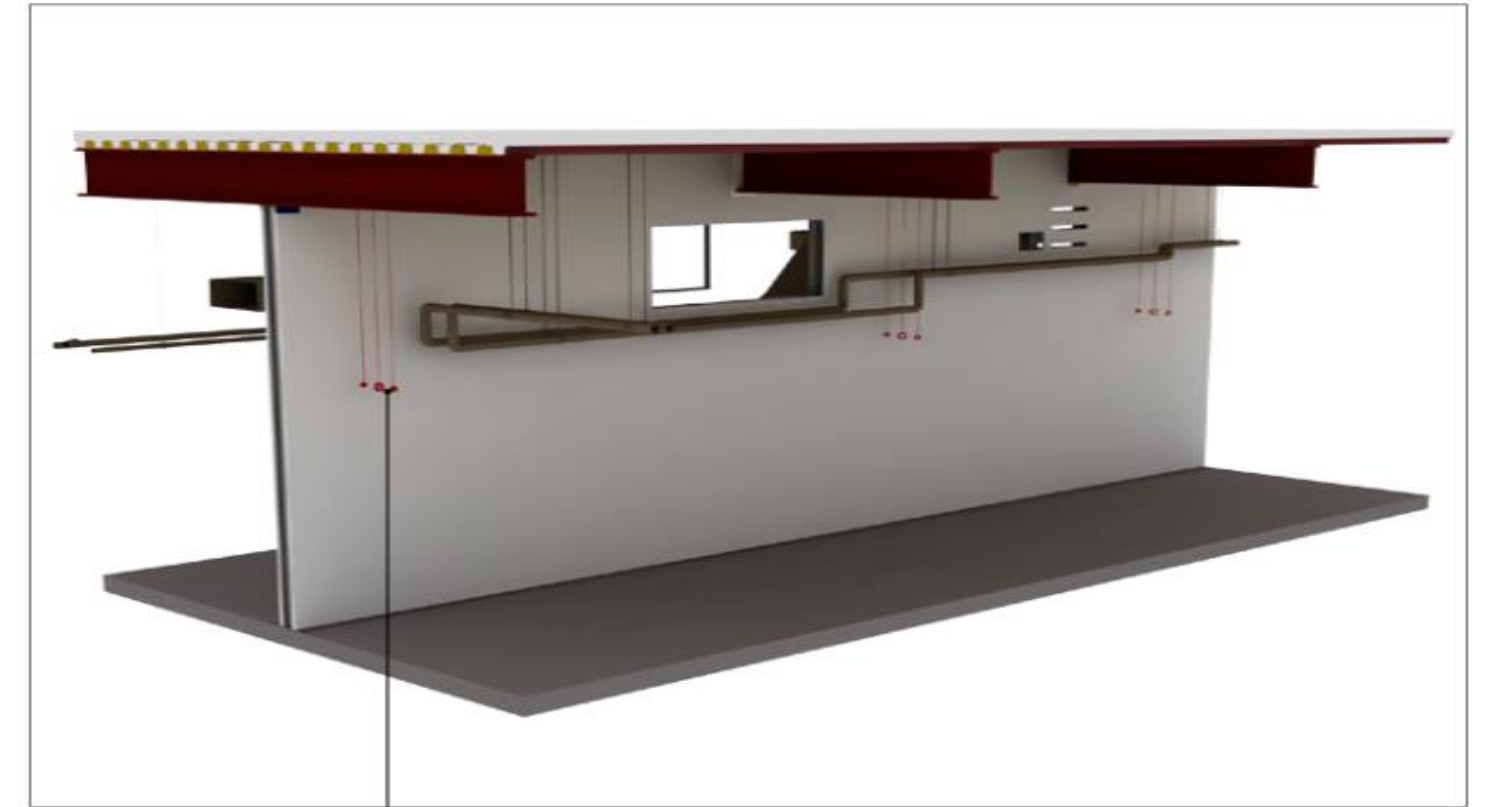
# MEP Sequencing



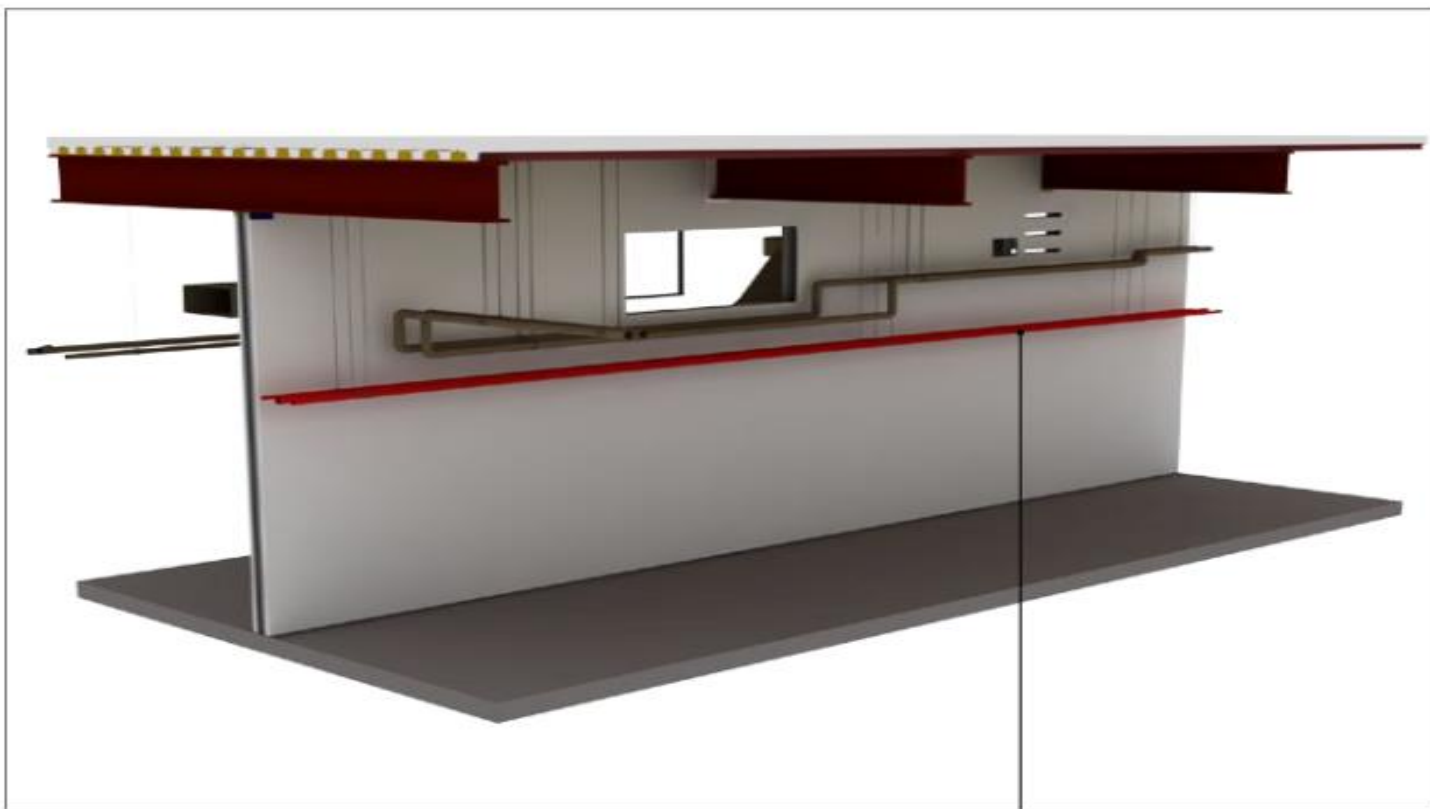
Pipe hangers



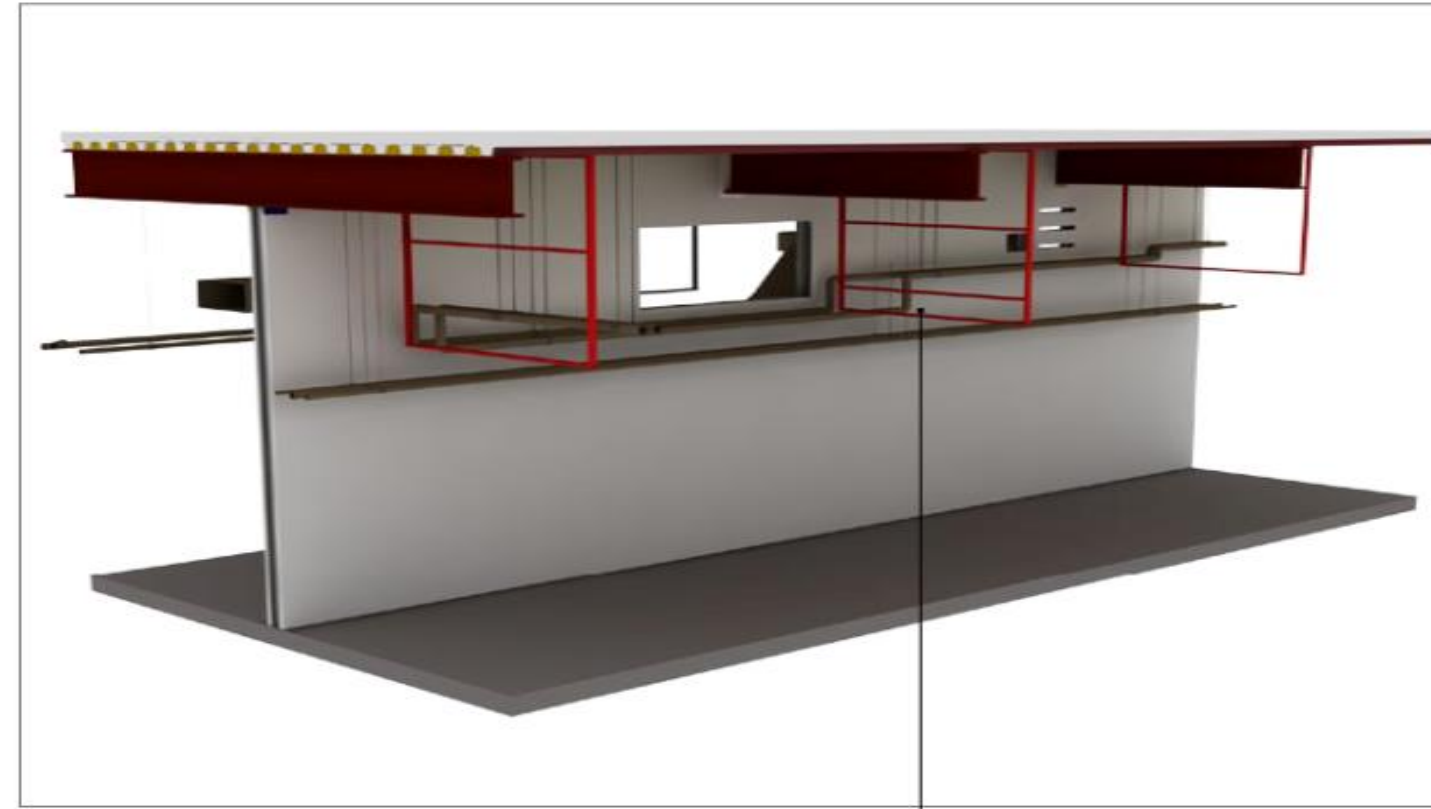
drainage/FS/plumbing/



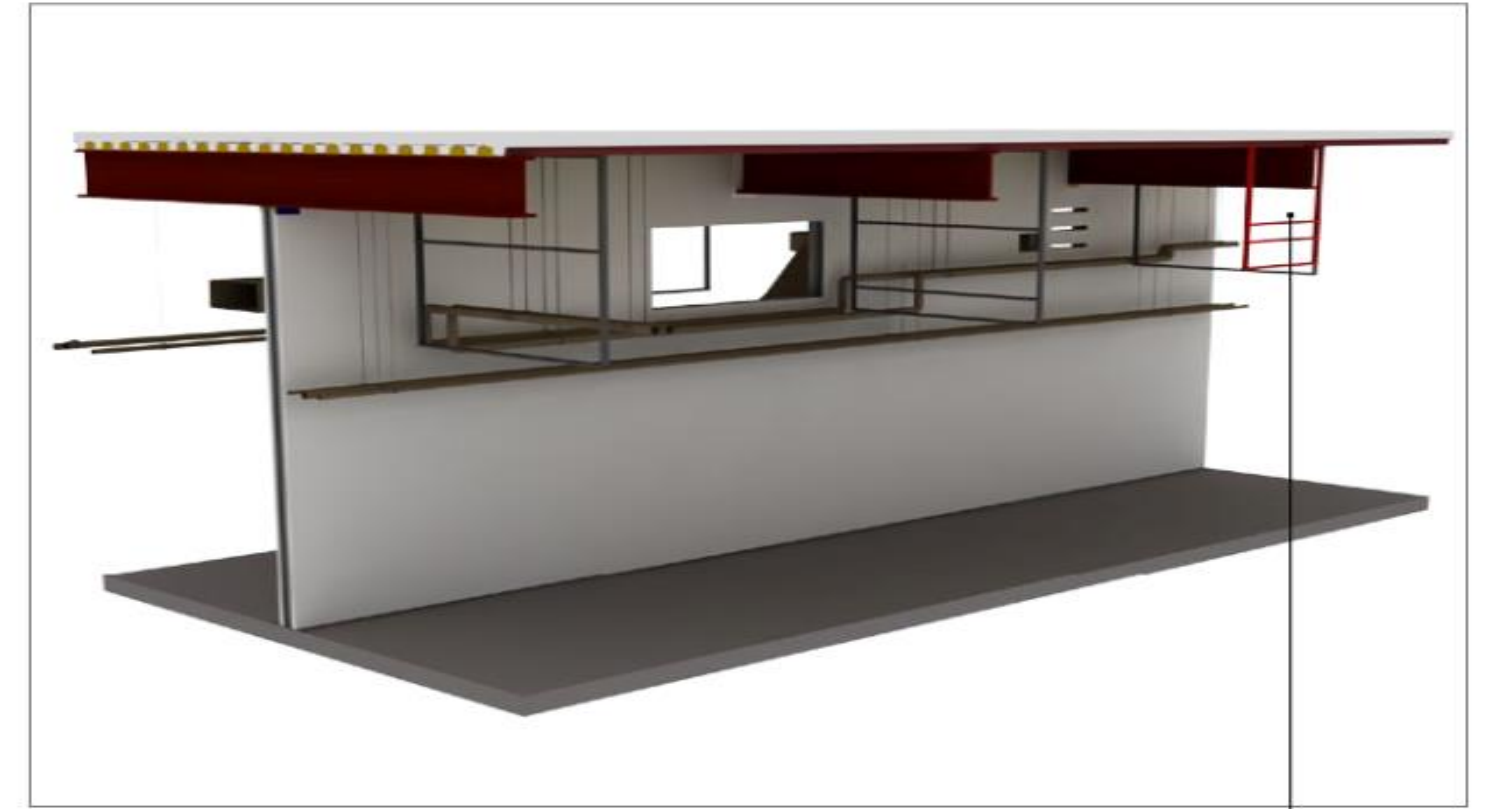
THRS/ hangers



THRS



Main duct support



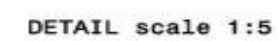
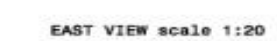
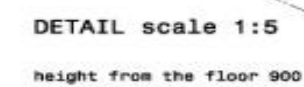
Secondary duct support





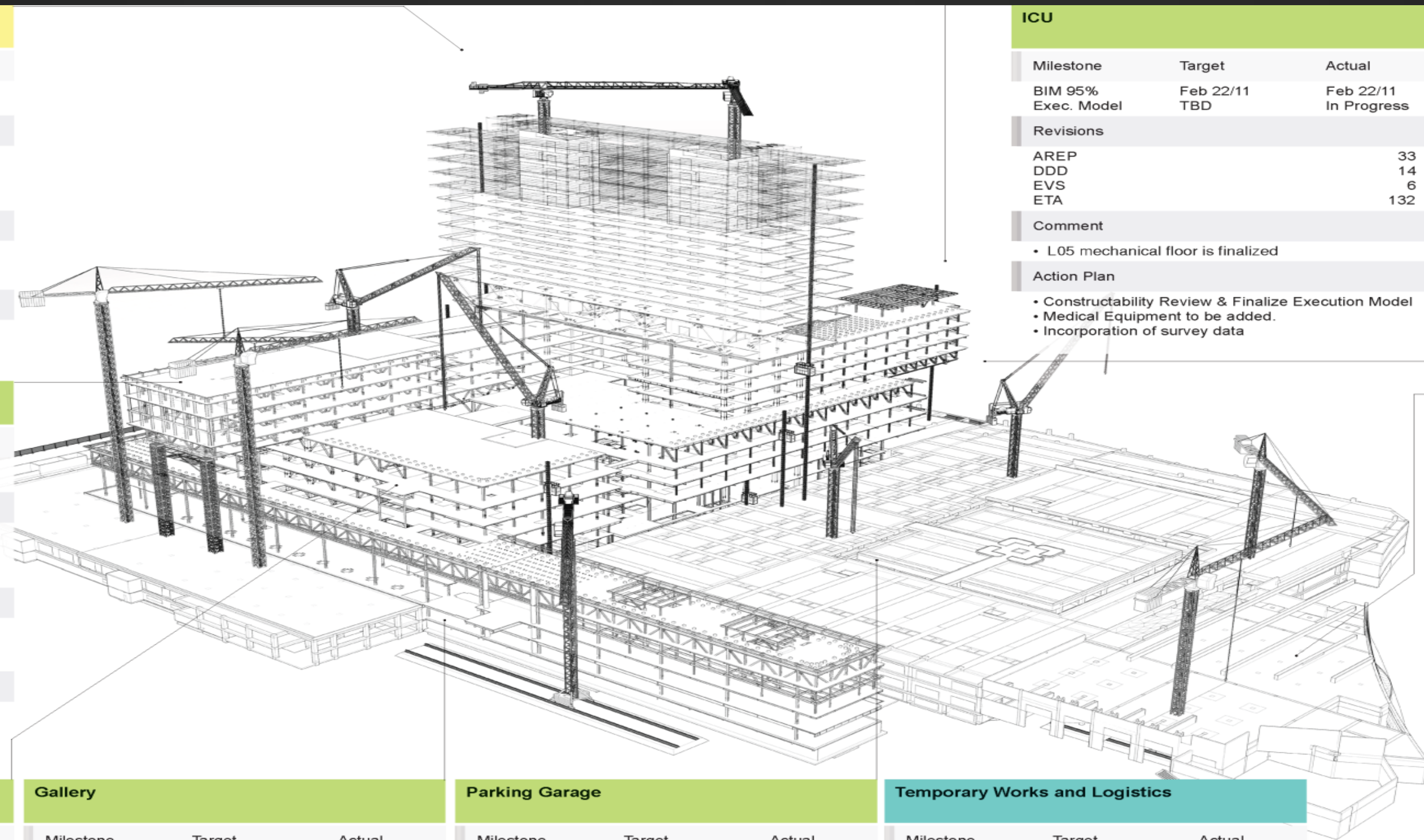


# Mockup of Space





# Construction Progress Reports

Patient Tower				ICU			DNT				
Milestone	Target	Actual		Milestone	Target	Actual	Milestone	Target	Actual		
BIM 95% Exec. Model	Feb 24/11 TBD	In Progress		BIM 95% Exec. Model	Feb 22/11 TBD	Feb 22/11 In Progress	BIM 95% Exec. Model	Dec 14/10 TBD	Dec 14/10 In Progress		
Revisions				Revisions			Revisions				
AREP		20		AREP		33	AREP		97		
DDD		15		DDD		14	DDD		34		
EVS		9		EVS		6	EVS		26		
ETA		183		ETA		132	ETA		746		
Comment				Comment			Comment				
• ETA delays. • Major clashes between patient lifts and MEP. • EVS to update patient lift models for MEP coord.				• L05 mechanical floor is finalized			• No acceptable facade models submitted to date. • Survey Data System in Place				
Action Plan				Action Plan			Action Plan				
• Completion of 95% BIM Meetings. • Focus on L19 Mech Floor w/ Facade • Survey model using new system.				• Constructability Review & Finalize Execution Model • Medical Equipment to be added. • Incorporation of survey data			• Constructability Reviews to Continue with detailed virtual mockups of difficult partition scenarios. • Survey Data Incorporation & Reporting • On-site reviews & Finalization of Execution Model				
Swing Wing				CUP							
Milestone	Target	Actual		Milestone	Target	Actual					
BIM 95% Exec. Model	Feb 3/11 TBD	Feb 22/11 In Progress		BIM 95% Exec. Model	Sept 16/10 TBD	Sept 16/10 In Progress					
Revisions				Revisions							
AREP		36		AREP		17					
DDD		10		DDD		12					
EVS		23		EVS		-					
ETA		180		ETA		6					
Comment				Comment							
• AHU Installation on L05 has been studied and potential installation plan proposed. Boxes uploaded expected by April 3				• Engineer's Instructions 8, 10, 13, 17 have forced multiple BIM revisions for all disciplines. • MEP BIM in ETS room remains outstanding along with steel work. • Facade model remains outstanding.							
Action Plan				Action Plan							
• Completion of 95% BIM Meetings. • EVS to produce medical equipment supports. • Survey data to be considered. • Finalize Execution Model				• Constructability Review • On-site issue resolution • Finalize Execution Model							
Clinic			Gallery			Parking Garage			Temporary Works and Logistics		
Milestone	Target	Actual	Milestone	Target	Actual	Milestone	Target	Actual	Milestone	Target	Actual
BIM 95% Exec. Model	Dec 14/10 TBD	Dec 14/10 In Progress	BIM 95% Exec. Model	Feb 3/11 TBD	Feb 3/11 In Progress	BIM 95% Exec. Model	Feb 3/11 TBD	Feb 3/11 In Progress	BIM 95% Exec. Model	-	-
Revisions			Revisions			Revisions			Comment		
AREP		60	AREP		69	AREP		18	• Cranes precisely instantiated, impact analyzed		
DDD		27	DDD		17	DDD		13	• Hoists instantiated & Studied for impact on future construction works		
EVS		54	EVS		32	EVS		-	• Logistics Pathways have begun to be modeled and traffic analyzed.		
ETA		202	ETA		47	ETA		168	Action Plan		
Comment			Comment			Comment			• March - April look-ahead. • Logistics pathways-traffic planning. • Temporary MEP Services		
• MEP interface between Clinic & Gallery. • Outstanding RFI regarding for L01 interface. • Acceptable facade model still outstanding. • Yuanda modelers still not on site.			• New truss design (EI36, received on Feb 10) under study by task force. • Auditorium seating design intent confirmed. Analysis in progress.			• Level issues in P1 and GND to be brought to the consultant.					
Action Plan			Action Plan			Action Plan					
• Constructability reviews being conducted to finalize execution model for site teams • Survey data to be incorporated. • On-site reviews.			• Impact of mezzanine re-design to be analysed. • Integrate facade models in BIM. • Finalize Execution Model			• Continued analysis of EI impact. • Finalize Execution Model & incorporate survey data					

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## February BIM Progress

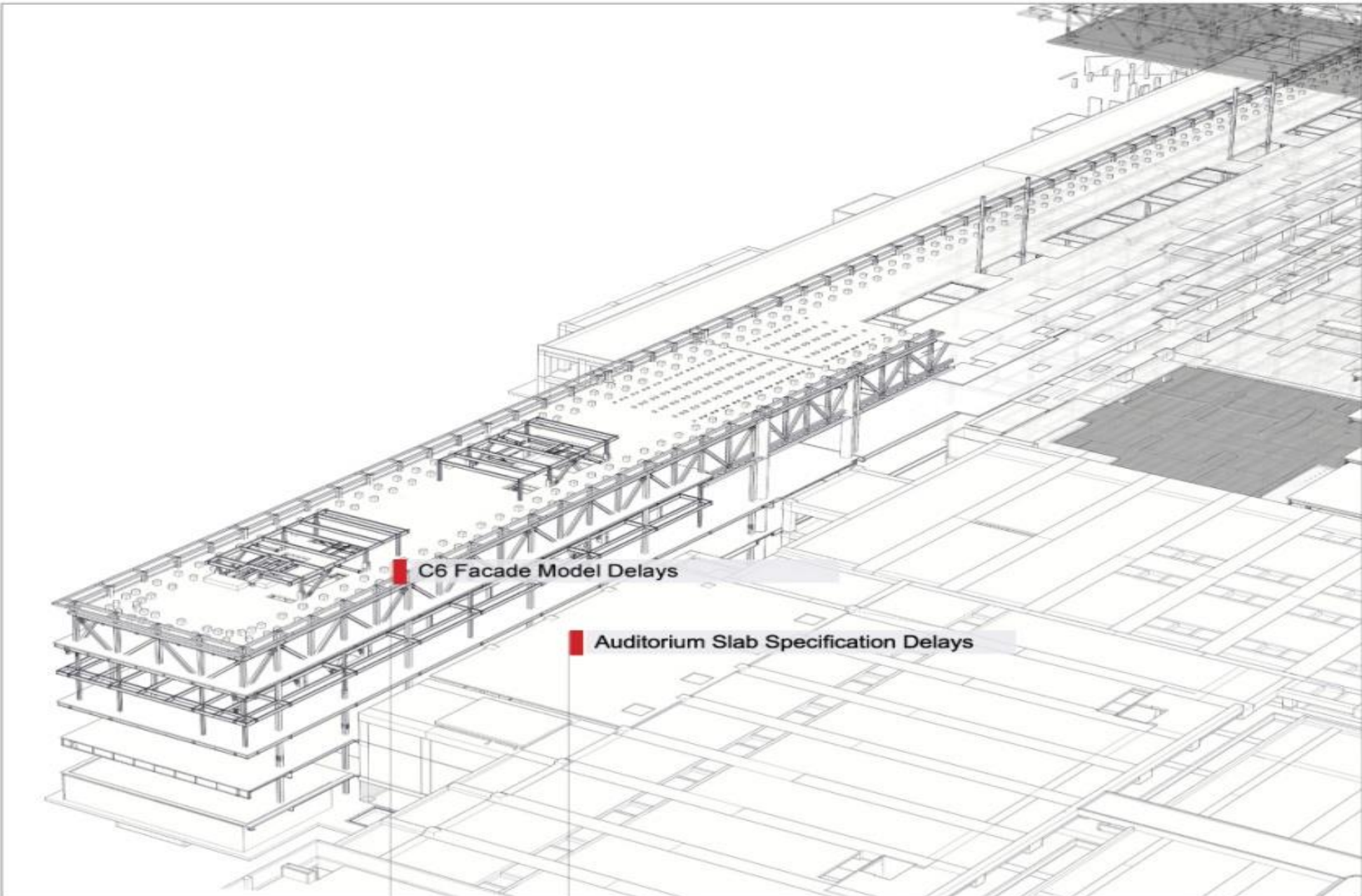
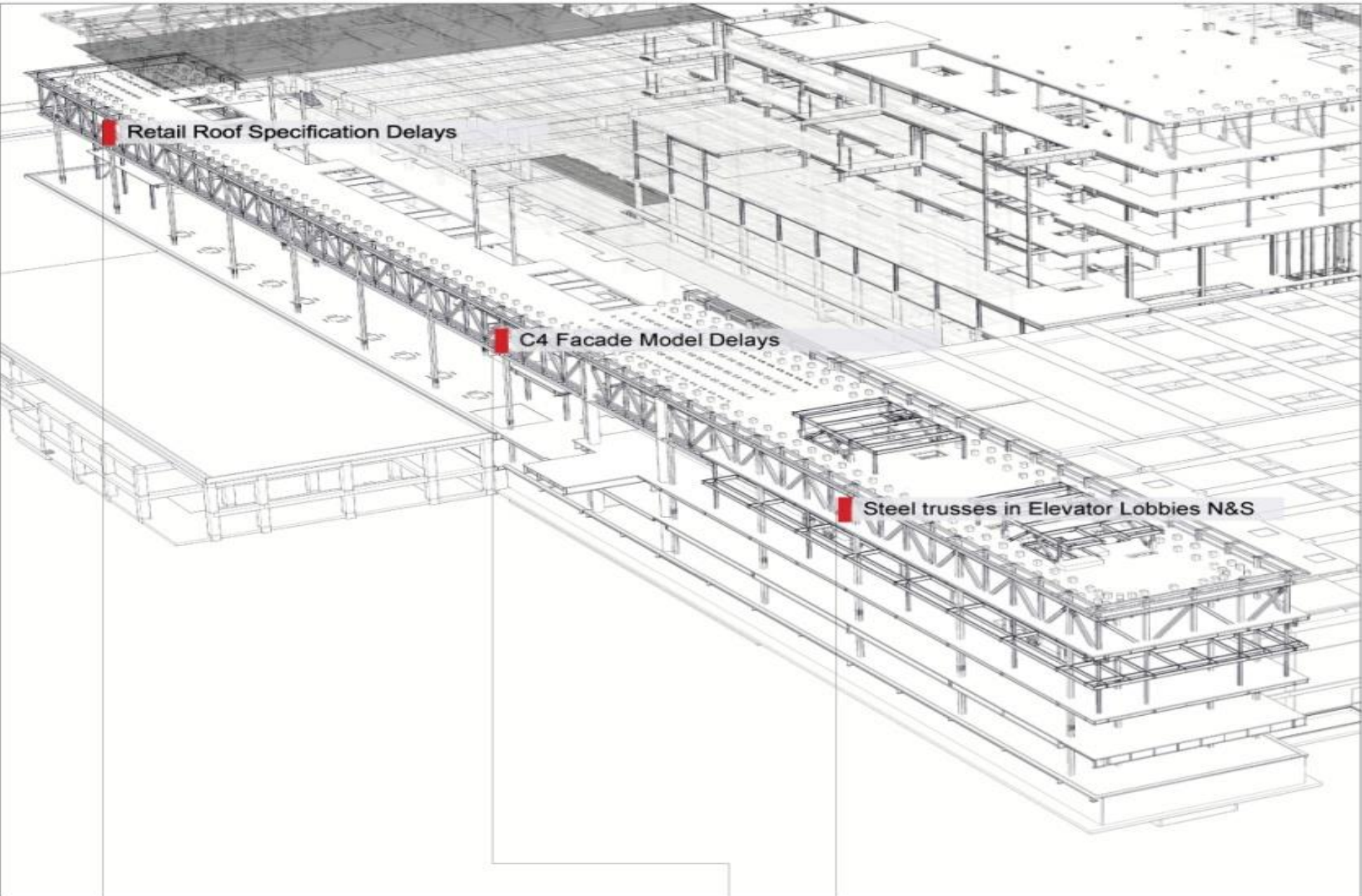
On schedule

Behind schedule



# Building-Specific Reports

## April Gallery Overview



MEP MODELS		
FLOOR	ZONE	MODEL STATUS
UG	A	ISSUE FREE
UG	E	ISSUE FREE
UG	J	ETA TO RE-SUBMIT
UG	N	ETA TO RE-SUBMIT
UG	S	ISSUE FREE
P3	A	ETA TO RE-SUBMIT
P3	E	ETA TO RE-SUBMIT
P3	J	ETA TO RE-SUBMIT
P3	N	ETA TO RE-SUBMIT
P3	S	ETA TO RE-SUBMIT
P2	A	UNDER REVIEW
P2	E	UNDER REVIEW
P2	J	UNDER REVIEW
P2	N	UNDER REVIEW
P2	S	UNDER REVIEW
P1	A	UNDER REVIEW
P1	E	UNDER REVIEW
P1	J	UNDER REVIEW
P1	N	ETA TO RE-SUBMIT
P1	S	ETA TO RE-SUBMIT
GND	A	SEE CLINIC
GND	E	SEE CLINIC
GND	J	SEE CLINIC
GND	N	ETA TO RE-SUBMIT
GND	S	ETA TO RE-SUBMIT
L01	N	ETA TO RE-SUBMIT
L01	S	ETA TO RE-SUBMIT
L02	N	UNDER REVIEW
L02	S	ETA TO SUBMIT

### MAIN OUTSTANDING ISSUES

**Retail Roof Specification Delays**  
Responsible Organization:  
Action by Date:

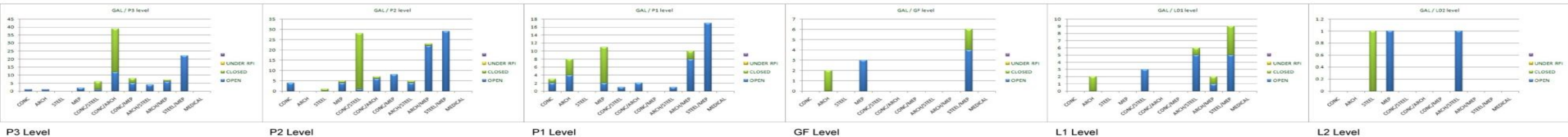
**C4 Facade Model Delays**  
Responsible Organization:  
Action by Date:

**Steel trusses in Elevator Lobbies N & S**  
Responsible Organization:  
Action by Date:

**C6 Facade Model Delays**  
Responsible Organization:  
Action by Date:

**Auditorium Slab Specification Delays**  
Responsible Organization:  
Action by Date:

### ALL CONFLICTS PER DISCIPLINE AND STATUS





# Building-Specific Reports

## Temporary Works and Logistics

Milestone	Target	Actual
BIM 95%	-	-
Exec. Model	-	-

### Comment

- Cranes precisely instantiated, impact analyzed
- Hoists instantiated & Studied for impact on future construction works
- Logistics Pathways have begun to be modeled and traffic analyzed.

### Action Plan

- March - April look-ahead.
- Logistics pathways-traffic planning.
- Temporary MEP Services

## Swing Wing

Milestone	Target	Actual
BIM 95%	Feb 3/11	Feb 22/11
Exec. Model	TBD	In Progress

### Revisions

AREP	36
DDD	10
EVS	23
ETA	180

### Comment

- AHU Installation on L05 has been studied and potential installation plan proposed. Boxes uploaded expected by April 3

### Action Plan

- Completion of 95% BIM Meetings.
- EVS to produce medical equipment supports.
- Survey data to be considered.
- Finalize Execution Model

## Gallery

Milestone	Target	Actual
BIM 95%	Feb 3/11	Feb 3/11
Exec. Model	TBD	In Progress

### Revisions

AREP	69
DDD	17
EVS	32
ETA	47

### Comment

- New truss design (EI36, received on Feb 10) under study by task force.
- Auditorium seating design intent confirmed. Analysis in progress.

### Action Plan

- Impact of mezzanine re-design to be analysed.
- Integrate facade models in BIM.
- Finalize Execution Model

## ICU

Milestone	Target	Actual
BIM 95%	Feb 22/11	Feb 22/11
Exec. Model	TBD	In Progress

### Revisions

AREP	33
DDD	14
EVS	6
ETA	132

### Comment

- L05 mechanical floor is finalized

### Action Plan

- Constructability Review & Finalize Execution Model
- Medical Equipment to be added.
- Incorporation of survey data

## CUP

Milestone	Target	Actual
BIM 95%	Sept 16/10	Sept 16/10
Exec. Model	TBD	In Progress

### Revisions

AREP	17
DDD	12
EVS	-
ETA	6

### Comment

- Engineer's Instructions 8, 10, 13, 17 have forced multiple BIM revisions for all disciplines.
- MEP BIM in ETS room remains outstanding along with steel work.
- Facade model remains outstanding.

### Action Plan

- Constructability Review
- On-site issue resolution
- Finalize Execution Model

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## Gallery BIM Progress

On schedule

Behind schedule



# Building-Specific Reports

## Temporary Works and Logistics

Milestone	Target	Actual
BIM 95% Exec. Model	-	-
Comment		
<ul style="list-style-type: none"><li>• Cranes precisely instantiated, impact analyzed</li><li>• Hoists instantiated &amp; Studied for impact on future construction works</li><li>• Logistics Pathways have begun to be modeled and traffic analyzed.</li></ul>		
Action Plan		
<ul style="list-style-type: none"><li>• March - April look-ahead.</li><li>• Logistics pathways-traffic planning.</li><li>• Temporary MEP Services</li></ul>		

## CUP

Milestone	Target	Actual
BIM 95% Exec. Model	Sept 16/10 TBD	Sept 16/10 In Progress
Revisions		
AREP		17
DDD		12
EVS		-
ETA		6
Comment		
<ul style="list-style-type: none"><li>• Engineer's Instructions 8, 10, 13, 17 have forced multiple BIM revisions for all disciplines.</li><li>• MEP BIM in ETS room remains outstanding along with steel work.</li><li>• Facade model remains outstanding.</li></ul>		
Action Plan		
<ul style="list-style-type: none"><li>• Constructability Review</li><li>• On-site issue resolution</li><li>• Finalize Execution Model</li></ul>		

## DNT

Milestone	Target	Actual
BIM 95% Exec. Model	Dec 14/10 TBD	Dec 14/10 In Progress
Revisions		
AREP		97
DDD		34
EVS		26
ETA		746
Comment		
<ul style="list-style-type: none"><li>• No acceptable facade models submitted to date.</li><li>• Survey Data System in Place</li></ul>		
Action Plan		
<ul style="list-style-type: none"><li>• Constructability Reviews to Continue with detailed virtual mockups of difficult partition scenarios.</li><li>• Survey Data Incorporation &amp; Reporting</li><li>• On-site reviews &amp; Finalization of Execution Model</li></ul>		

## Gallery

Milestone	Target	Actual
BIM 95% Exec. Model	Feb 3/11 TBD	Feb 3/11 In Progress
Revisions		
AREP		69
DDD		17
EVS		32
ETA		47
Comment		
<ul style="list-style-type: none"><li>• New truss design (EI36, received on Feb 10) under study by task force.</li><li>• Auditorium seating design intent confirmed. Analysis in progress.</li></ul>		
Action Plan		
<ul style="list-style-type: none"><li>• Impact of mezzanine re-design to be analysed.</li><li>• Integrate facade models in BIM.</li><li>• Finalize Execution Model</li></ul>		

## ICU


Milestone	Target	Actual
BIM 95% Exec. Model	Feb 22/11 TBD	Feb 22/11 In Progress
Revisions		
AREP		33
DDD		14
EVS		6
ETA		132
Comment		
<ul style="list-style-type: none"><li>• L05 mechanical floor is finalized</li></ul>		
Action Plan		
<ul style="list-style-type: none"><li>• Constructability Review &amp; Finalize Execution Model</li><li>• Medical Equipment to be added.</li><li>• Incorporation of survey data</li></ul>		

## Parking Garage

Milestone	Target	Actual
BIM 95% Exec. Model	Feb 3/11 TBD	Feb 3/11 In Progress
Revisions		
AREP		18
DDD		13
EVS		-
ETA		168
Comment		
<ul style="list-style-type: none"><li>• Level issues in P1 and GND to be brought to the consultant.</li></ul>		
Action Plan		
<ul style="list-style-type: none"><li>• Continued analysis of EI impact.</li><li>• Finalize Execution Model &amp; incorporate survey data</li></ul>		

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## BIM Progress

On schedule   
Behind schedule 



# Scheduling Diagrams

