

# BUILT TODAY USING TOMORROW TECHNOLOGY

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# BUILT TODAY USING TOMORROW TECHNOLOGY (Built Smart)

. Zakria Omron



# The Future of the Construction Industry

- The construction industry is always changing and the innovation, thinking out of the box is the key to success.
- Finding a new methodology to reduce cost and time is the main challenge of construction success.
- Reduce the material wastage by using the new fabrication technology is the only solution.
- Reduce the manpower and supervision one of important factors to the construction success.

# THINKING OUT OF THE BOX





## Six keys ways to thrive amid disruptions of the market

Players along construction industry's – architects, designers, engineers. contractors, and operations and maintenance companies – need to prepare strategically and make the right moves.

# SIX KEYS

## BUILDING A VIRTUAL WORLD

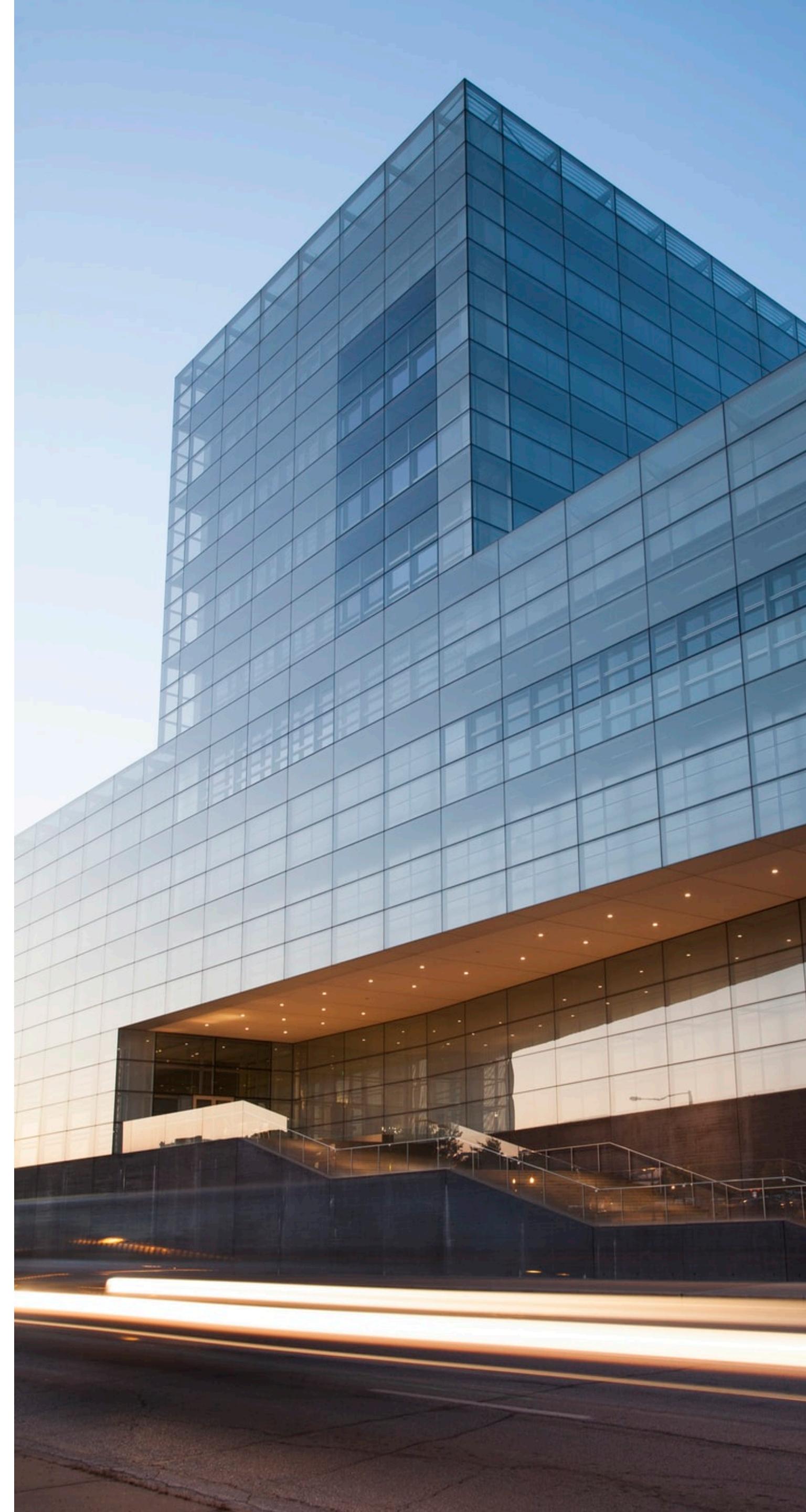
Using BIM technology  
and virtual simulation.

## FACTORIES RUN THE WORLD.

Advanced manufacturing  
processes to pre-fabricate  
modules that are later  
assembled on-site.

## A GREEN REBOOT

The construction industry  
uses sustainable  
technologies.



# SIX KEYS

## ATTRACT NEW TALENT AND BUILD UP REQUIRED SKILLS

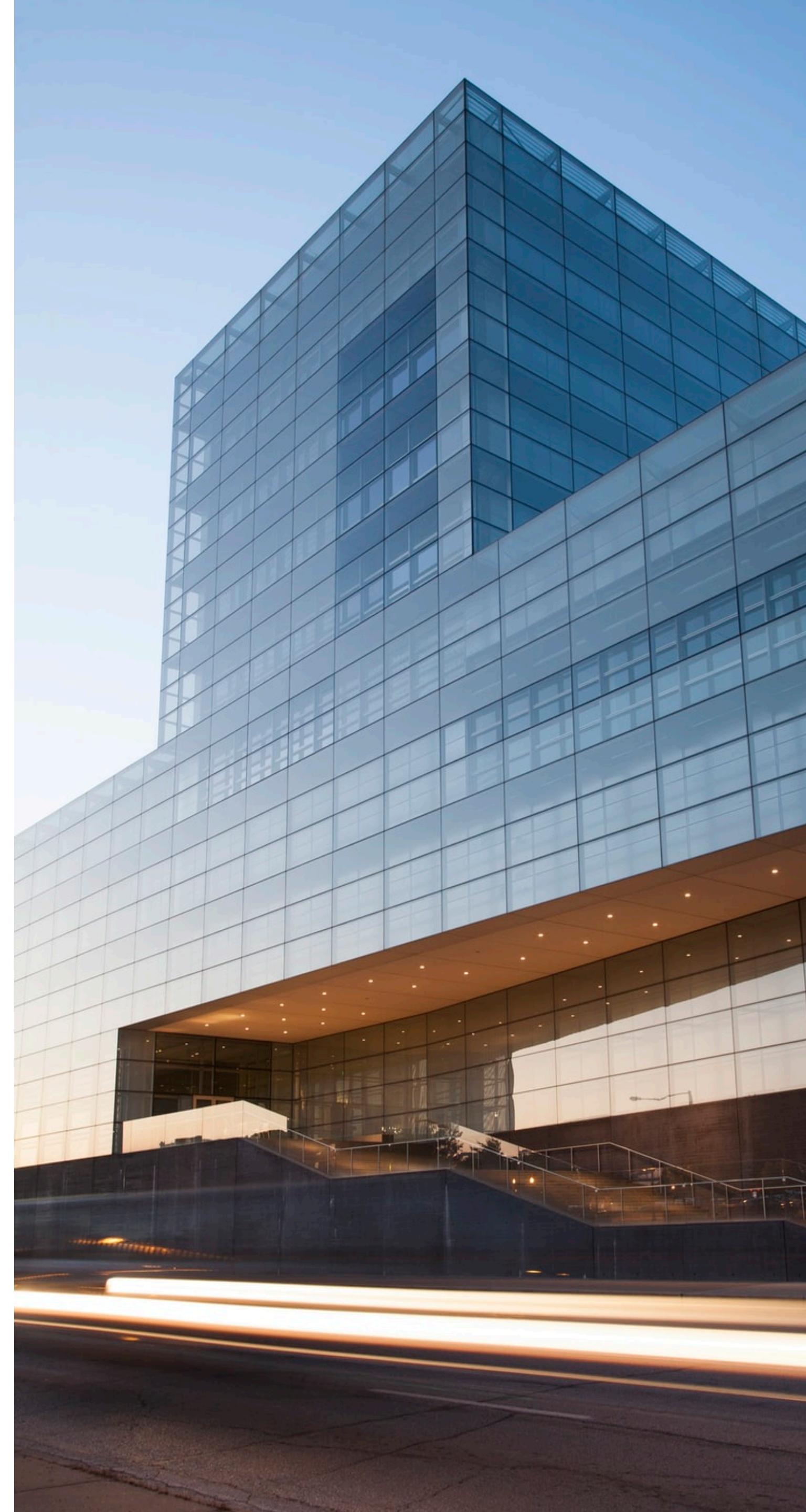
As any future scenario requires talent with substantially different skills.

## INTEGRATE AND COLLABORATE ACROSS THE CONSTRUCTION INDUSTRY'S VALUE CHAIN

As the construction industry is characterized by a disintegrated and highly fragmented value chain

## ADOPT ADVANCED TECHNOLOGIES AT SCALE

As the construction industry has been slow to adopt new technologies and still heavily relies on manual labor and mechanical technologies.



# CONSTRUCTION FUTURE

## 1- Modular Construction & prefabrication

The offsite fabrication of building components, save Money Time and improve the health and safety

## 2- Using Advanced Material (Built Green)

Using Building Material to construct energy-efficient structures and reduce the Energy waste and carbon mitigation

## 3- 3D Printing and advanced technology

Using advanced manufacturing metrology in construction Building components Saving Time cost and quality

## 4- Reality Virtualization

Using advanced software and Virtualization reality simulation tools to avoid real modification after construction



# CONSTRUCTION FUTURE

## 5- the big Data & Analysis

long term studies are needed to provide data from which the positive and negative predictive values can be calculated.

## 6- wireless technology in monitoring and control

Using wireless to monitoring/control the construction and connect the equipment's for remote sites

## 7- collaborations , integration & cloud technology

Proper coordination and communication data access and sharing with all stack holders

## 8- 3D scanner and advanced land survey technology

Accuracy and time saving

## 9- Building Information Modeling,

Proper coordination, scheduling 4D &5D



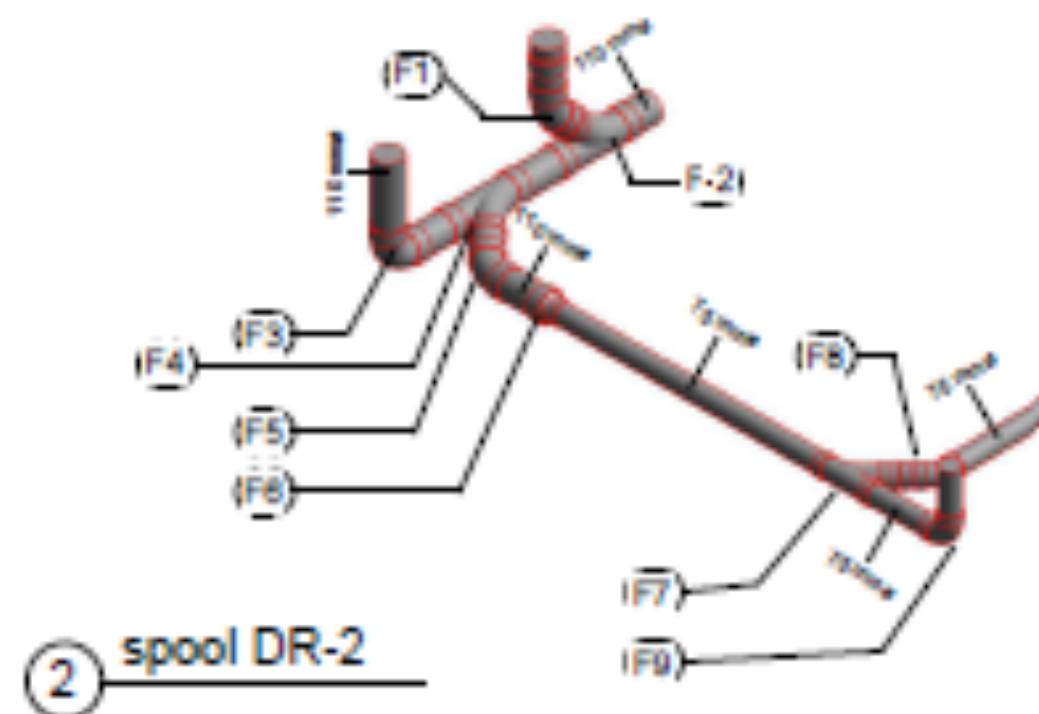


Improvement in Health & Safety Pre-Engineered Solution Right  
the First Time

# Prefabricated MEP Systems

## 1- MEP Prefabrication Components (30%)

Preparing the prefab components like:  
Pipe cut , fitting assembly , pipe spooling  
(made ready to assembled onsite)

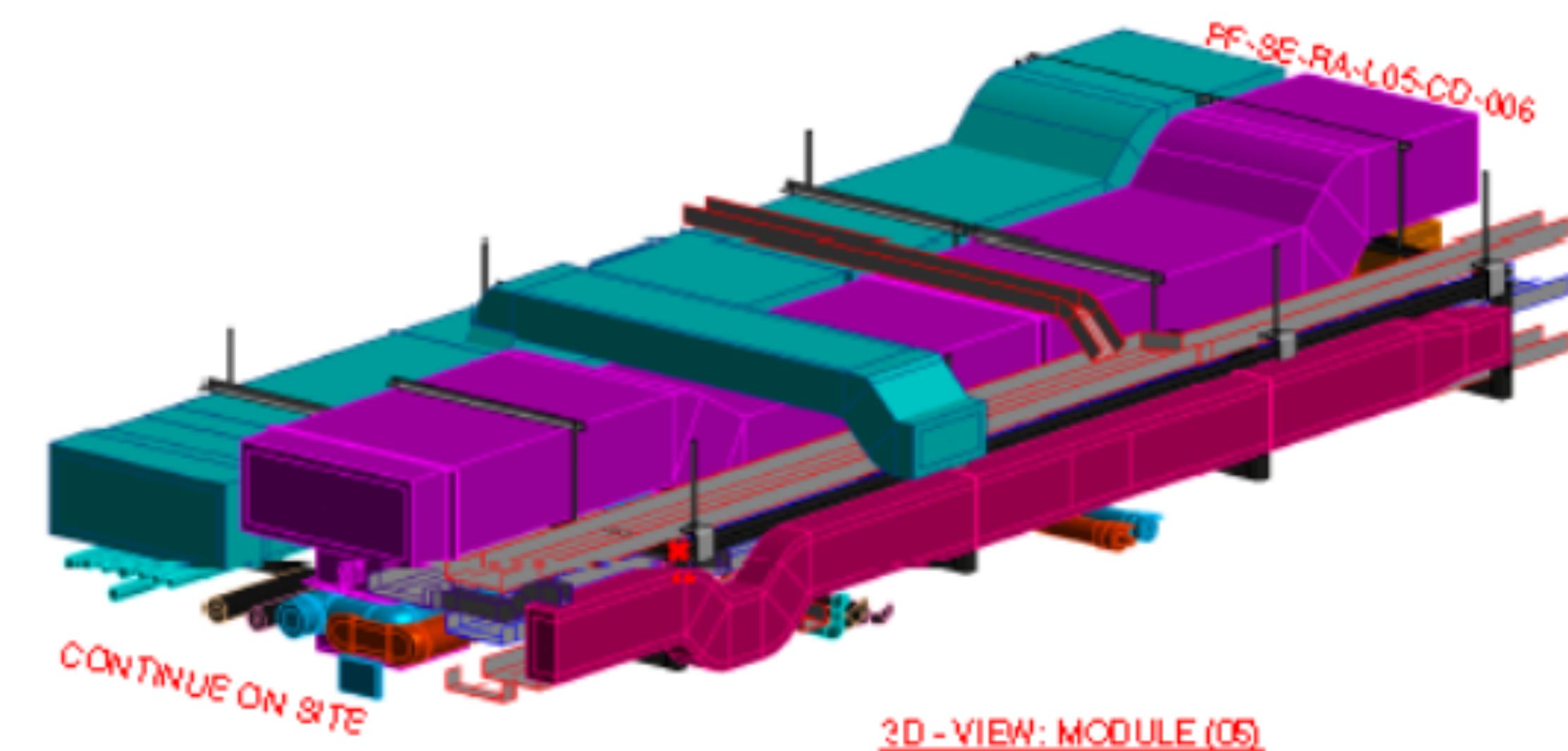


Pipe Fitting Schedule			
Mark	Family and Type	Size	Count
F9	ME_M_ESE00_Bend - PVC: Standard	75 mmx-75 mm	1
F7	Tee Reducing Sanitary - PVC - DNW: Standard	75 mmx-75 mmx-75 mm	1
	Reducer - PVC - DNW: Standard	75 mmx-75 mm	1
	Reducer - PVC - DNW: Standard	110 mmx-100 mm	1
F1	ME_M_ESE00_Bend - PVC: Standard	110 mmx-110 mm	1
F2	Tee Reducing Sanitary - PVC - DNW: Standard	110 mmx-110 mmx-110 mm	1
F3	ME_M_ESE00_Bend - PVC: Standard	110 mmx-110 mm	1
F4	Tee Reducing Sanitary - PVC - DNW: Standard	110 mmx-110 mmx-110 mm	1
F6	ME_M_ESE00_Bend - PVC: Standard	75 mmx-75 mm	1
F8	Reducer - PVC - DNW: Standard	110 mmx-75 mm	1
F5	ME_M_ESE00_Bend - PVC: Standard	110 mmx-110 mm	1

Pipe Schedule			
Family and Type	Size	Length	Count
Pipe Type: PVC	75 mm	454	1
Pipe Type: PVC	75 mm	1275	1
Pipe Type: PVC	75 mm	197	1
Pipe Type: PVC	75 mm	15	1
Pipe Type: PVC	75 mm	295	1
Pipe Type: PVC	110 mm	292	1
Pipe Type: PVC	110 mm	80	1
Pipe Type: PVC	110 mm	13	1
Pipe Type: PVC	110 mm	123	1
Pipe Type: PVC	110 mm	110	1
Pipe Type: PVC	110 mm	139	1
Pipe Type: PVC	110 mm	81	1
Pipe Type: PVC	110 mm	166	1

## 2- MEP Prefabrication modular Frame (45%)

MEP services to be assembled inside steel frame.  
All MEP Services in one Frame modular



# Prefabricated MEP Systems

## 3- MEP Services integrated with Arch. And Strc. Members (60%)

MEP services assembled are assembled with Architectural like full ceiling and steel members in one frame



## 4- MEP Sked (pump Rooms)

MEP services assembled are assembled with Architectural like full ceiling and steel members in one frame



# Traditional Methods VS Prefabrication

 <u>Vs</u> 	
WHAT ARE THE ISSUES?	WHAT ARE THE BENEFITS?
Clash of services and trades	<b>Improved</b> logistical coordination
Design freeze	Manufactured under factory controlled conditions to an agreed design
High risk of project slippage	Aligns to <b>tighter</b> project timescales
Inconsistent Quality of materials and installation	<b>Reduce</b> onsite material waste
Increase number of labour on site (multi trades)	<b>Reduction</b> of on-site personnel
Increase risk of incidents	<b>Improvements</b> in health and safety and predictability
Large material footprint for storage and WIP	<b>Reduced</b> environmental footprint during installation
Requires increased supervision.	Significant cost <b>reduction</b> of on-site labour reducing supervision costs
Surprise costs due to unforeseen issue	<b>Reduced</b> waste and improved installation efficiency
Unreliable Cost estimates and time control	More <b>accurate</b> cost and delivery estimates
Waste Management Control	<b>Reduced</b> waste and improved installation efficiency

# The benefits of Offsite Engineering for Health & safety benefits

- ✓ Less Work on site v's factory time .
- ✓ Better controlled environment
- ✓ Reduce the site Noise.. Pollution.. Movement.. Hazards)
- ✓ Reduced waste generation and waste management
- ✓ Less security risks like Theft .. Fire.. R
- ✓ Better controlled Environmental Impact (Built Green)
- ✓ Using High efficient Machines and Reduced manual handling
- ✓ Work at factory to avoid Working at Height
- ✓ Risk Mitigation



“Take care of your own safety, welfare and wellbeing and that of your colleagues”  
“Make yourself aware of the inherent risks in everything you do and ensure they are adequately mitigated”  
“Never take shortcuts”  
“Stop the job if you deem it unsafe”

Input From Project Team(Client)

Project Documents Review

Prepare Fully coordinated Drawings (Zero Clash)

Issue Drawings for Approval

Customers Approval

Prepare Manufacturing Drawings

Issue Job Pack

Proceed with Manufacture



3D - VIEW: FRAME (07)

PF-SE-RA-L05-CD-006

PF-SE-RA-L05-CD-008

**Specialty Equipment Schedule**

ITEMNO	System Type	Size	Length
01	Supply Air Duct	85x0250	350
02	Supply Air Duct	70x0250	350
03	Supply Air Duct	70x0250	1200
04	Supply Air Duct	70x0200	907
05	Supply Air Duct	70x0200	24
06	Supply Air Duct	70x0200	200
07	Supply Air Duct	40x0150	50
08	Supply Air Duct	25x0150	171
10	Conditioned Fresh Air Duct	40x0200	1200
11	Conditioned Fresh Air Duct	40x0200	1200
12	Conditioned Fresh Air Duct	40x0200	1200
13	Conditioned Fresh Air Duct	40x0200	902
14	Supply Air Duct	25x0150	101
15	Supply Air Duct	25x0150	300
16	Supply Air Duct	25x0150	67

**Mechanical Equipment Schedule**

TYPE MARK	LENGTH	COUNT	TOTAL LENGTH
PF000000m	160	4	640
PF000000m	195	4	780
PF000000m	227	8	2517
PF000000m	292	1	292
PF000000m	298	2	1179
PF000000m	414	4	1656
PF000000m	1289	4	5156
PF000000m	1625	4	6500
PF000000m	1625	2	3200

**Cable Tray Schedule**

ITEMNO	Description	Size	Length
01	Normal Power cable Tray	100x50	1280
02	Normal Power cable Tray	100x50	2000
03	Normal Power cable Tray	100x50	46
04	OSK8 Cable Tray	200x50	1492
05	OSK8 Cable Tray	200x50	2000
06	Normal Power cable Tray	100x50	1485
07	Normal Power cable Tray	100x50	2000
08	Normal Power cable Tray	100x50	100
09	Telephone Cable Tray	200x50	1280
10	Telephone Cable Tray	200x50	2000
11	Telephone Cable Tray	200x50	37

**Cable Tray Fitting Schedule**

ITEMNO	Description	Size	Count
01	Cable Tray Vertical Inside Bend 45°	10x050-100x50	2
02	Cable Tray Vertical Inside Bend 45°	20x050-200x50	1
03	Cable Tray Vertical Outside Bend 45°	10x050-100x50	2
04	Cable Tray Vertical Outside Bend 45°	20x050-200x50	1

**Duct Schedule**

ITEMNO	System Type	Description	Size	Length
01	Supply Air Duct	Rectangular Flange	400x0250x0250	2
02	Supply Air Duct	Rectangular Sheet Board	400x0150x00150	1
03	Supply Air Duct	Rectangular Flange	250x0250x0250	2
04	Supply Air Duct	Rectangular Flange	250x050x050x50	1
05	Supply Air Duct	Rectangular Flange	250x050x050x50	1
06	Supply Air Duct	Rectangular Sheet Board	250x050x050x50	1
07	Supply Air Duct	Rectangular Flange	700x050x00250	1
08	Supply Air Duct	Rectangular Sheet Board	700x050x00250	1
09	Supply Air Duct	Rectangular Transition 90°	700x050x00250	1
10	Supply Air Duct	Rectangular Transition 90°	700x067-700x0250	1
11	Supply Air Duct	Rectangular Elbow 90°	150x050x050x50	2

**Duct Fitting Schedule**

ITEMNO	System Type	Description	Size	Count
01	Conditioned Fresh Air Duct	Rectangular Flange	400x0250x0250	2
02	Supply Air Duct	Rectangular Sheet Board	400x0150x00150	1
03	Supply Air Duct	Rectangular Flange	250x0250x0250	2
04	Supply Air Duct	Rectangular Flange	250x050x050x50	1
05	Supply Air Duct	Rectangular Sheet Board	250x050x050x50	1
06	Supply Air Duct	Rectangular Flange	700x050x00250	1
07	Supply Air Duct	Rectangular Sheet Board	700x050x00250	1
08	Supply Air Duct	Rectangular Transition 90°	700x050x00250	1
09	Supply Air Duct	Rectangular Transition 90°	700x067-700x0250	1
10	Supply Air Duct	Rectangular Elbow 90°	150x050x050x50	2

**Hot Water Return Duct Schedule**

ITEMNO	System Type	Description	Size	Count	Ins Thk
01	Hot Water Return	Elbow - Threaded	40x40x40	1	19 mm
02	Hot Water Return	Elbow - Threaded	40x40x40	1	19 mm
03	Hot Water Return	Elbow - Threaded	40x40x40	1	19 mm
04	Hot Water Return	Elbow - Threaded	40x40x40	1	19 mm
05	Hot Water Return	Elbow - Threaded	25x25x25	2	19 mm
06	Hot Water Return	Elbow - Threaded	25x25x25	1	19 mm
07	Hot Water Return	Elbow - Threaded	25x25x25	1	19 mm

**Chilled Water System Pipe Fitting Schedule**

ITEMNO	System Type	Description	Size	Count	Ins Thk
01	Chilled Water Return	Reducer - Threaded	40x40x40	1	19 mm
02	Chilled Water Supply	Reducer - Threaded	40x40x40	1	19 mm
03	Chilled Water Return	Union Tee	40x40x40	1	19 mm
04	Chilled Water Return	Elbow - Threaded	25x25x25	2	19 mm
05	Chilled Water Supply	Elbow - Threaded	25x25x25	1	19 mm
06	Chilled Water Supply	Elbow - Threaded	25x25x25	1	19 mm

**Chilled Water System Pipe Accessory Schedule**

ITEMNO	System Type	Description	Size	Count
01	Supply Air Duct	VCD	40x00x00	1
02	Supply Air Duct	VCD	25x00x00	1

**Duct Accessory Schedule**

ITEMNO	System Type	Description	Size	Count
01	Supply Air Duct	VCD	40x00x00	1
02	Supply Air Duct	VCD	25x00x00	1

**Chilled Water System Pipe Accessory Schedule**

ITEMNO	System Type	Description	Size	Count
01	Chilled Water Return	Ball Valve Threaded	25x00	1
02	Chilled Water Return	Ball Valve Threaded	25x00	1

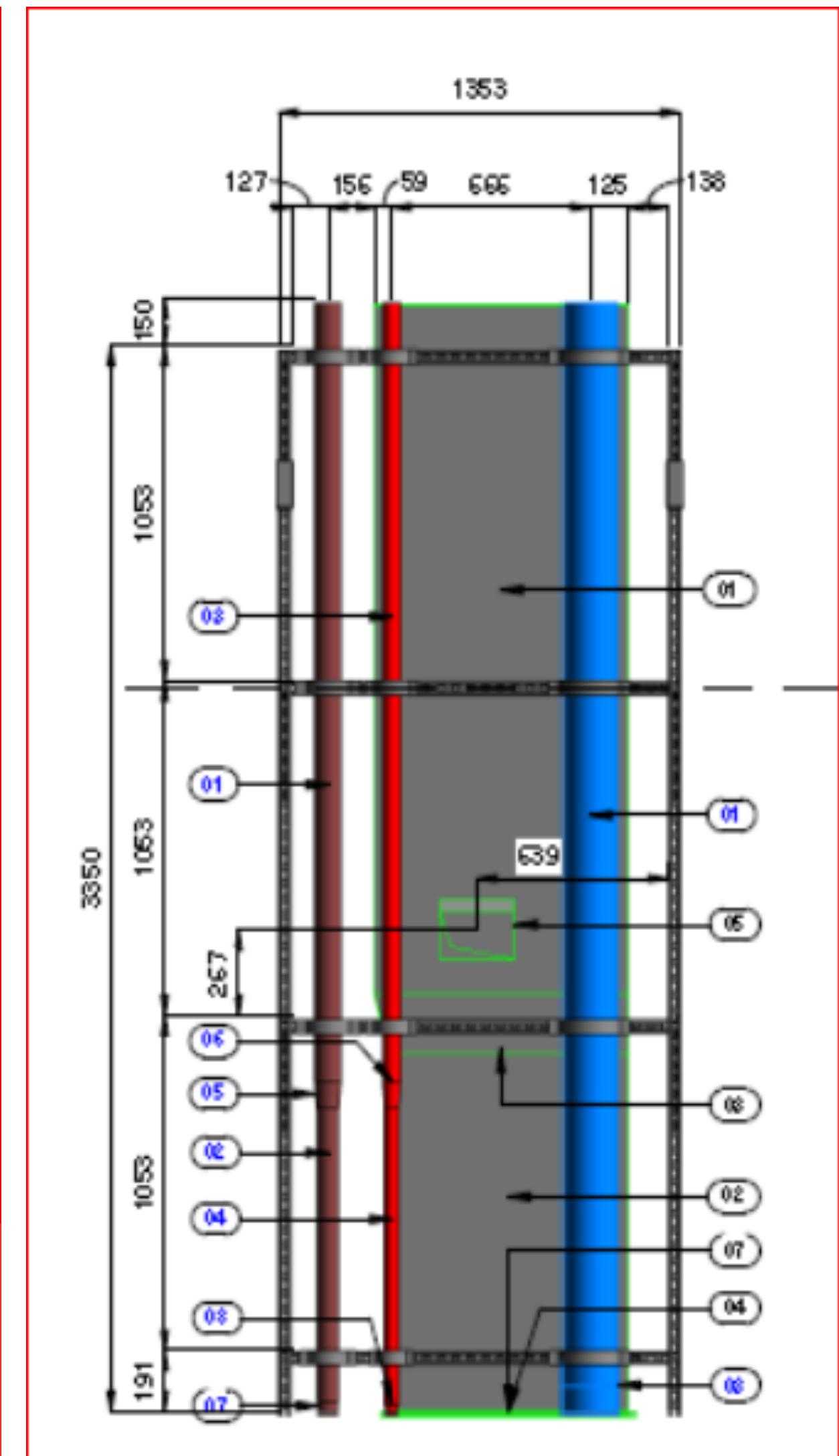
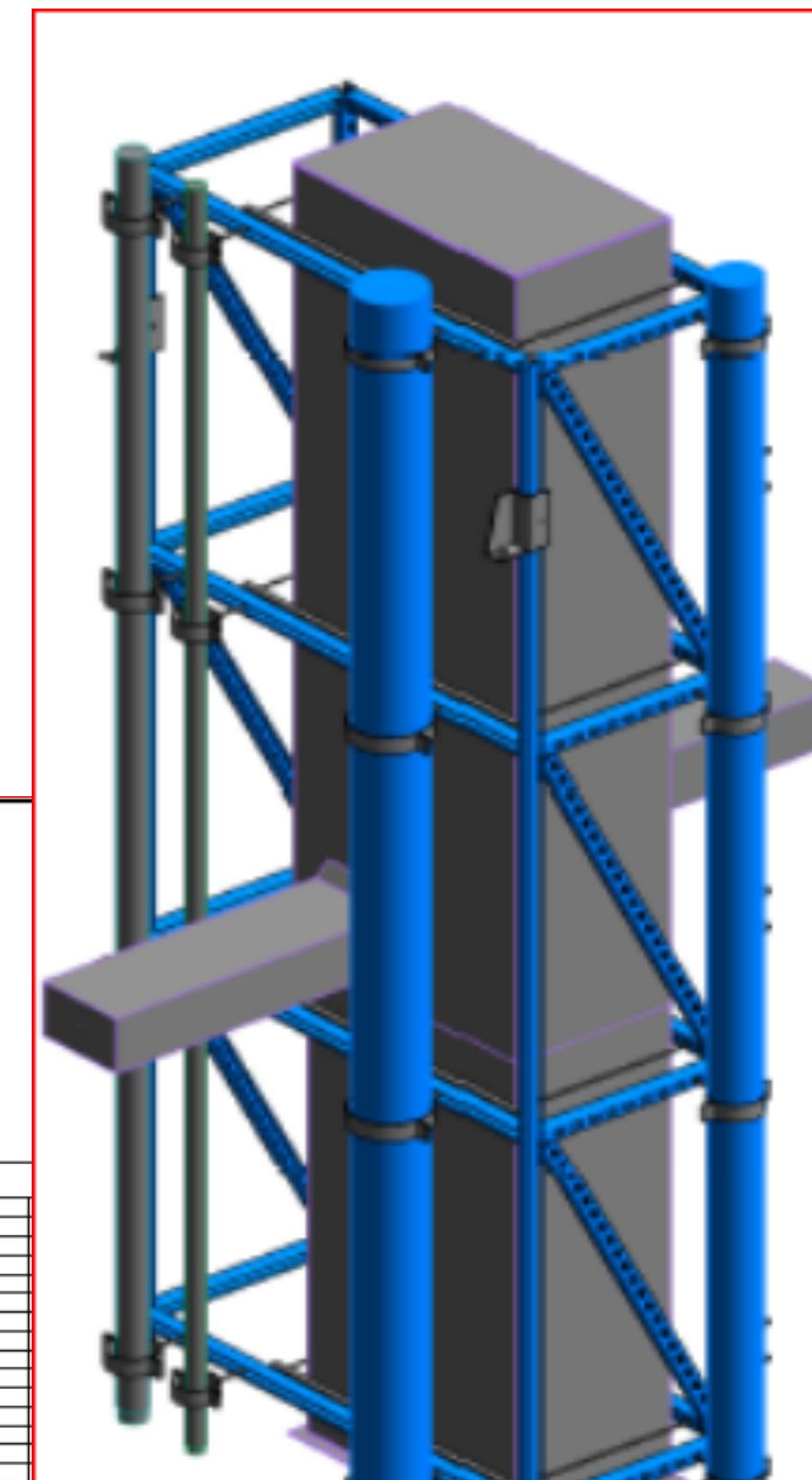
**Chilled Water Return Duct Schedule**

ITEMNO	System Type	Description	Size	Count	Ins Thk
01	Chilled Water Return	Elbow - Threaded	40x40x40	1	19 mm
02	Chilled Water Return	Elbow - Threaded	40x40x40	1	19 mm
03	Chilled Water Return	Elbow - Threaded	40x40x40	1	19 mm
04	Chilled Water Supply	Reducer - Threaded	40x40x40	1	19 mm
05	Chilled Water Supply	Reducer - Threaded	40x40x40	1	19 mm
06	Chilled Water Supply	Elbow - Threaded	25x25x25	1	19 mm
07	Chilled Water Supply	Elbow - Threaded	25x25x25	1	19 mm
08	Chilled Water Return	Ball Valve Threaded	25x00	1	19 mm

**Chilled Water Return Duct Schedule**

ITEMNO	System Type	Description	Size	Count	Ins Thk
01	Chilled Water Return	Elbow - Threaded	40x40x40	1	19 mm
02	Chilled Water Return	Elbow - Threaded	40x40x40	1	19 mm
03	Chilled Water Return	Elbow - Threaded	40x40x40	1	19 mm
04	Chilled Water Supply	Reducer - Threaded	40x40x40	1	19 mm
05	Chilled Water Supply	Reducer - Threaded	40x40x40	1	19 mm
06	Chilled Water Supply	Elbow - Threaded	25x25x25	1	19 mm
07	Chilled Water Supply	Elbow - Threaded	25x25x25	1	19 mm
08	Chilled Water Return	Ball Valve Threaded	25x00	1	19 mm

# Design Workflow Prefabrication



# INSTALLATION EQUIPMENT

- 1 – USING FORKLIFT TO MOVE MODULES/SPOOLS TO THE ERACTION AREA
- 2 – MODULE LIFTING EQUIPMENT TO BE USED LEFT AND HOLD TO THE REQUIRED INSTALLATION LEVEL.
- 2 – UNITES WILL BE USED TO INSTALL THE MODULE



# MODULE INSTALLATION



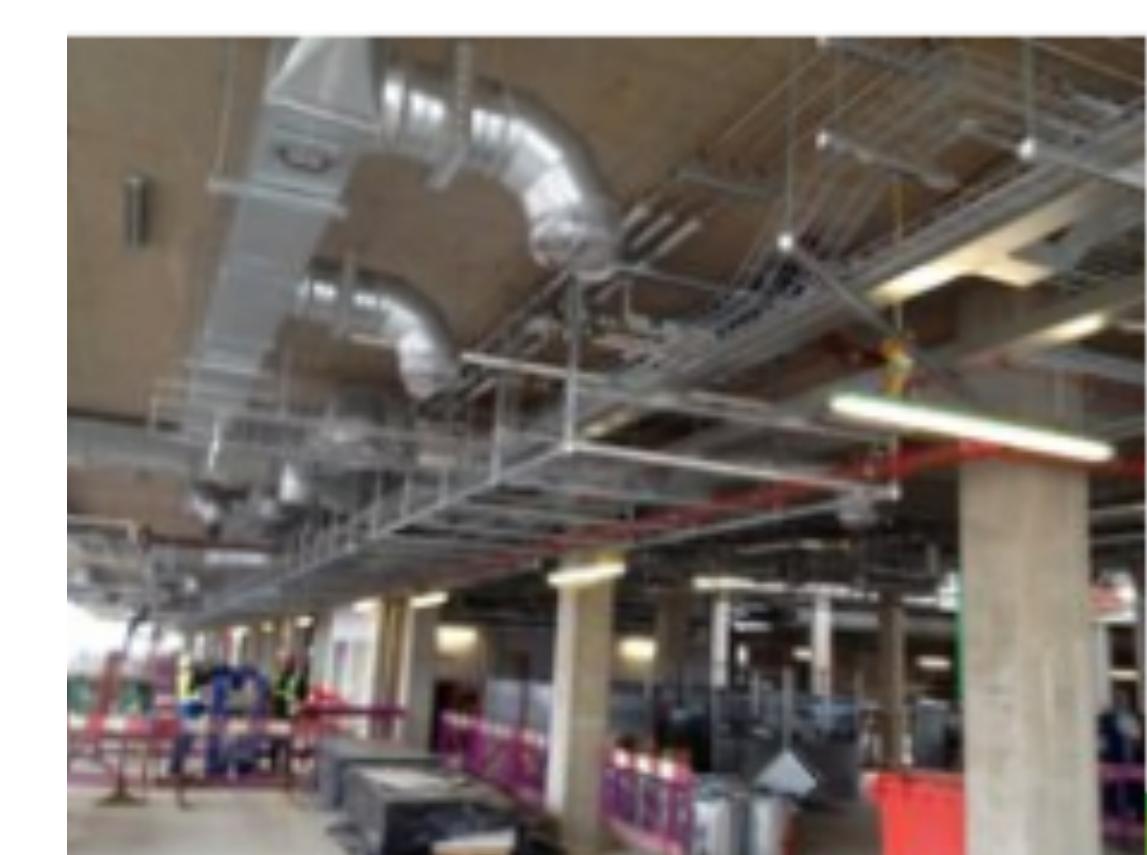
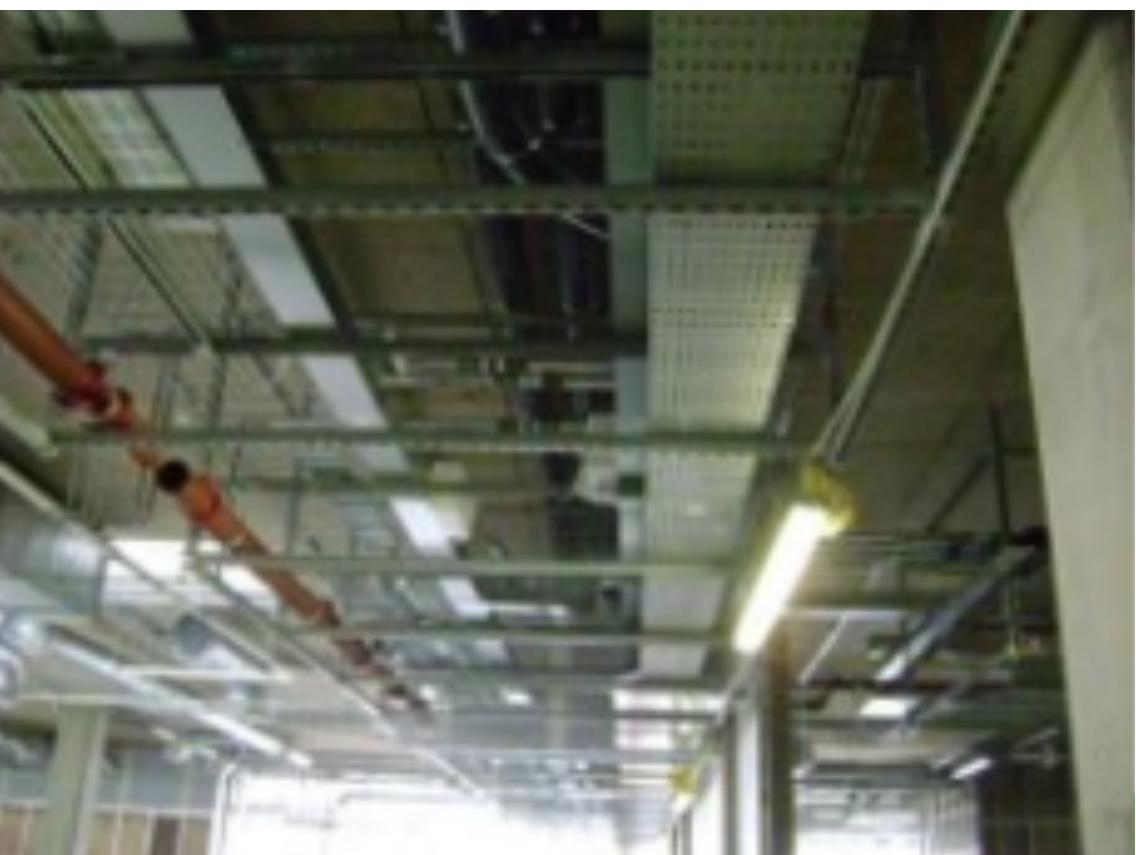
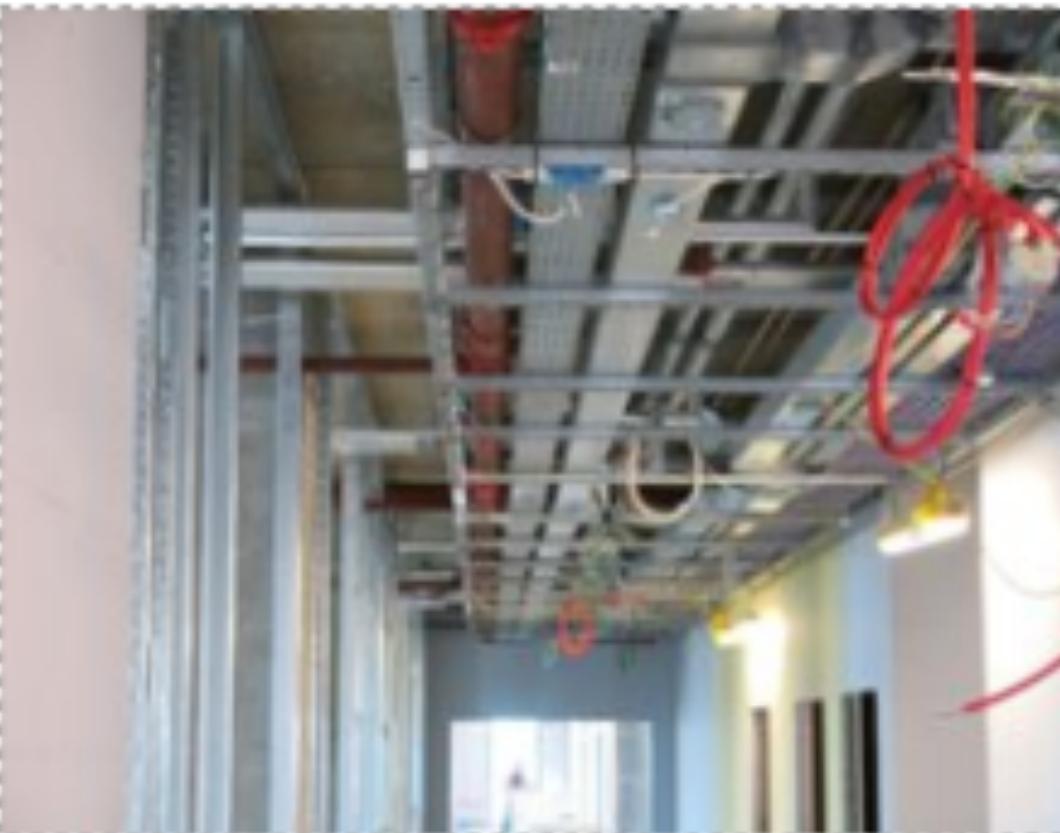
# MODULE INSTALLATION



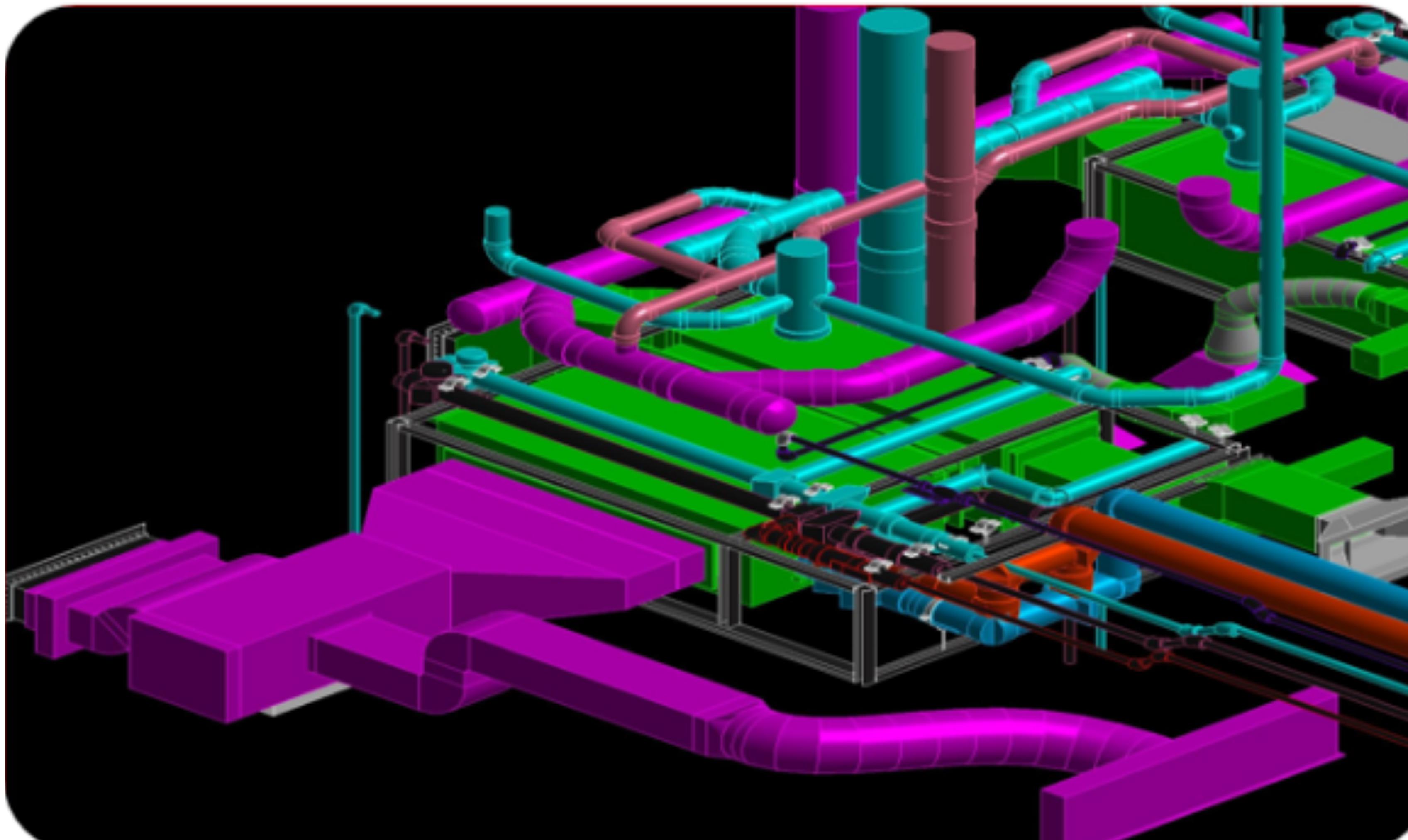
# MODULE INSTALLATION



# MODULE INSTALLATION



# Typical Guest Room Toilet MEP Services



## Easy Handing to Avoid Civil work delay



# SITE INSTALLATION

