BIM Utilization in TOKYO SKYTREE

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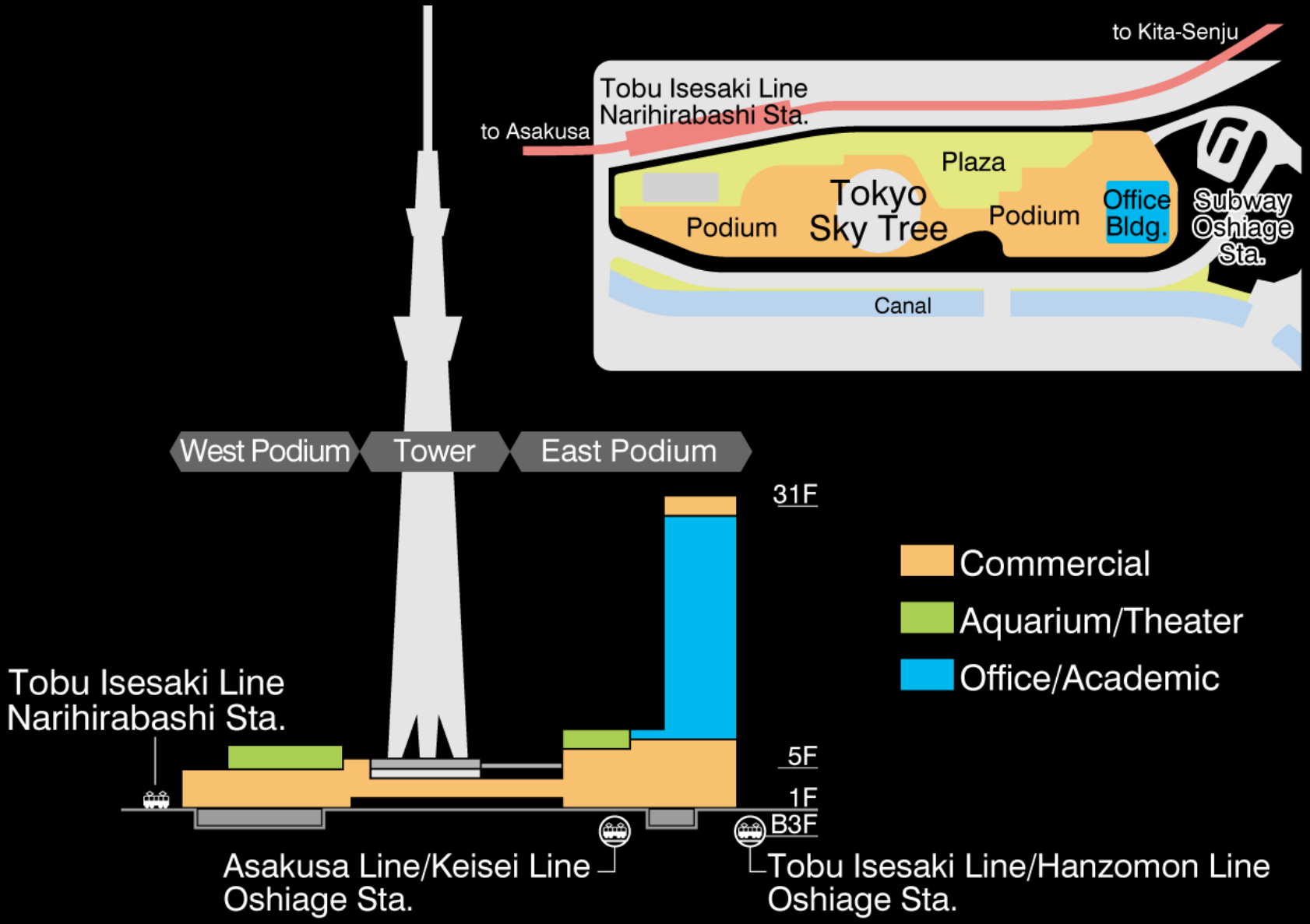
Obayashi Corporation
Building Construction Division
PD Center
General Manager

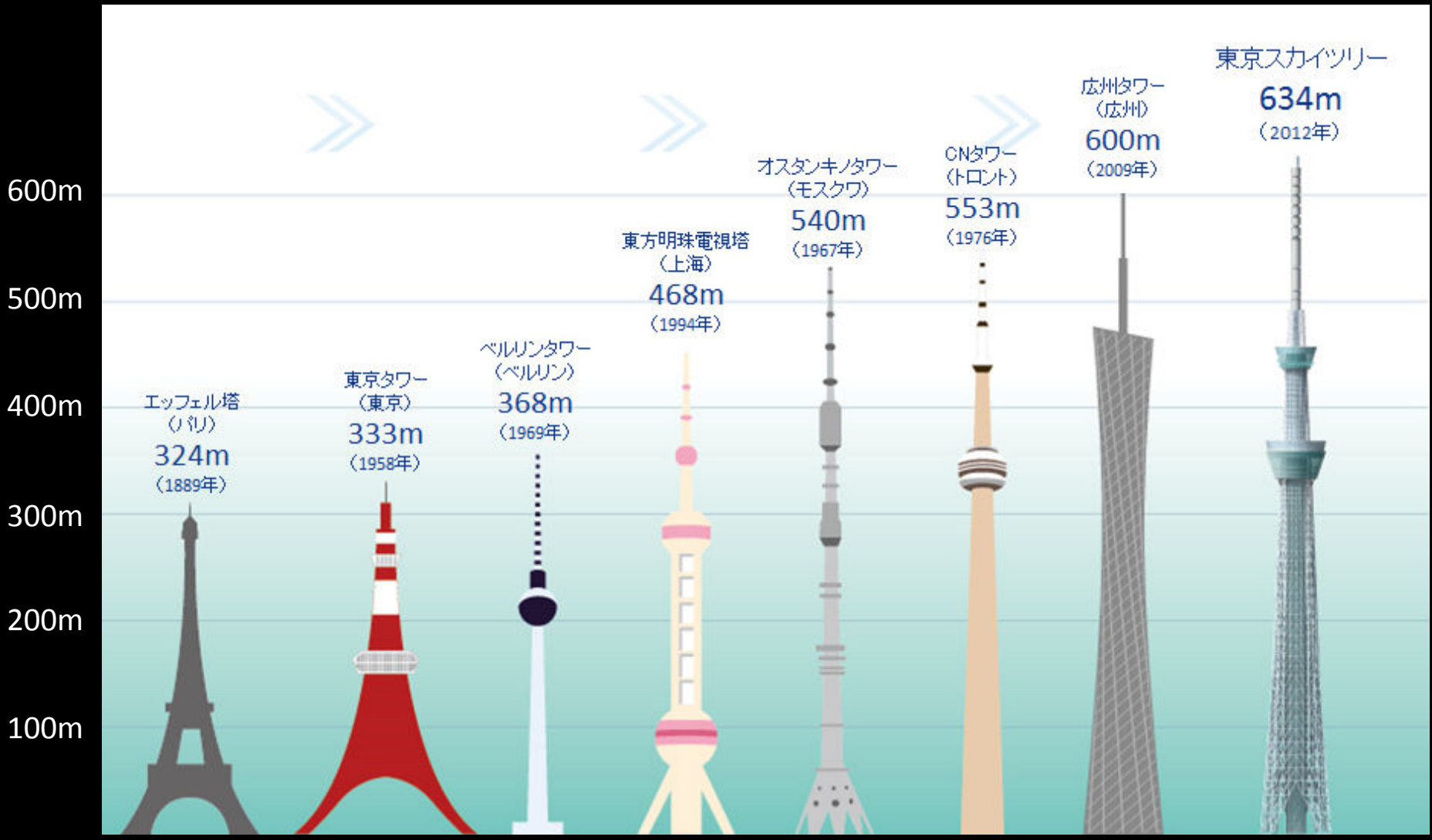
Project Outline

- Name — TOKYO SKYTREE
- Owner — Tobu Railway Co., Ltd.
  Tobu Tower Skytree Co., Ltd
- Architect — Nikken Sekkei Ltd.
- Contractor — Obayashi Corporation
- Location — Oshiage, Sumida Ward, Tokyo
- Site Area — 36,844m^2 (Tower + Podium Bldg.)
- Height — 634m
- Structure — Steel Frame,
  Steel Framed Reinforced Concrete,
  and Reinforced Concrete Structure
- Construction — June 2008 – February 2012

Project Outline



Project Outline

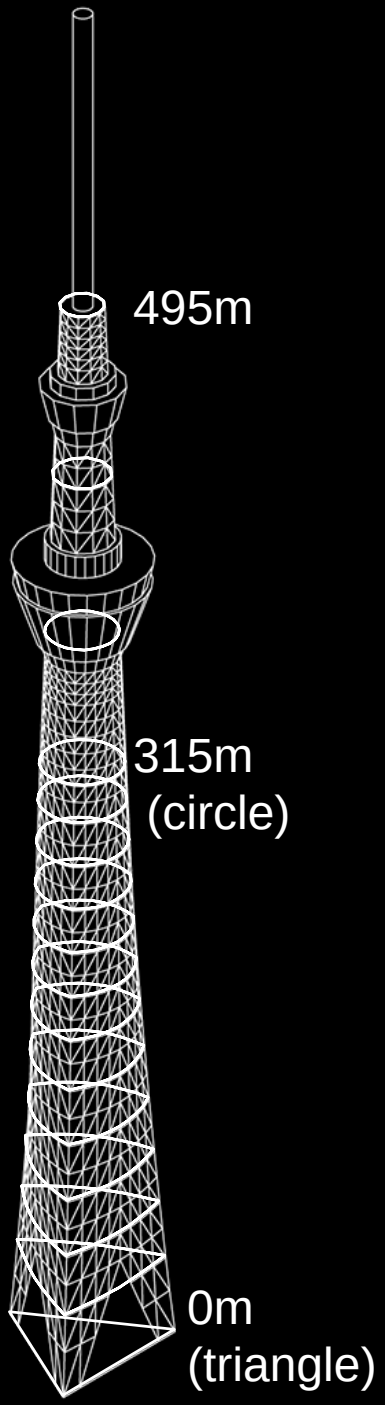


Design Concept

- Triangle Transforms into Circle
- Concave and Swelling

Concave

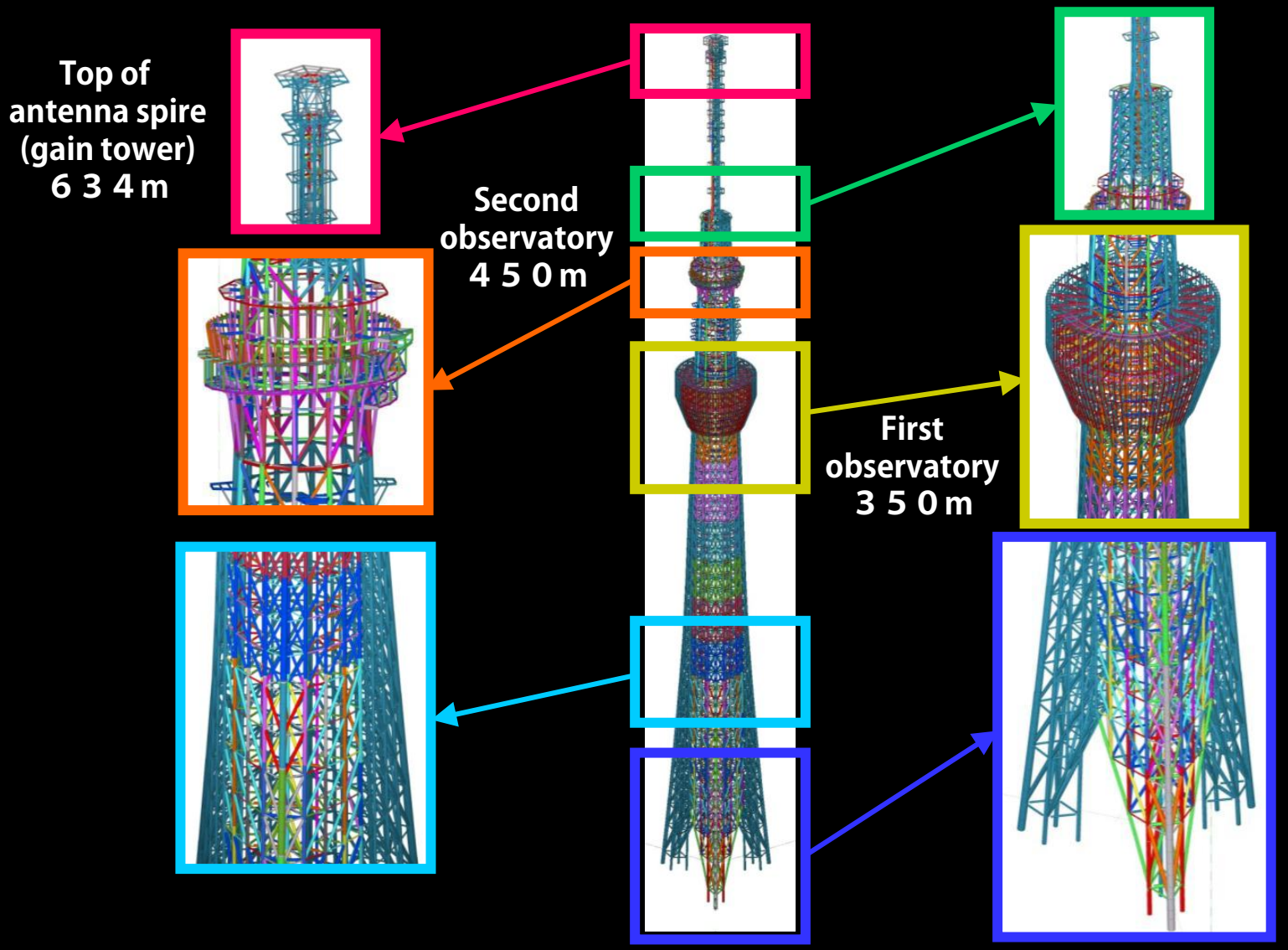
Swelling



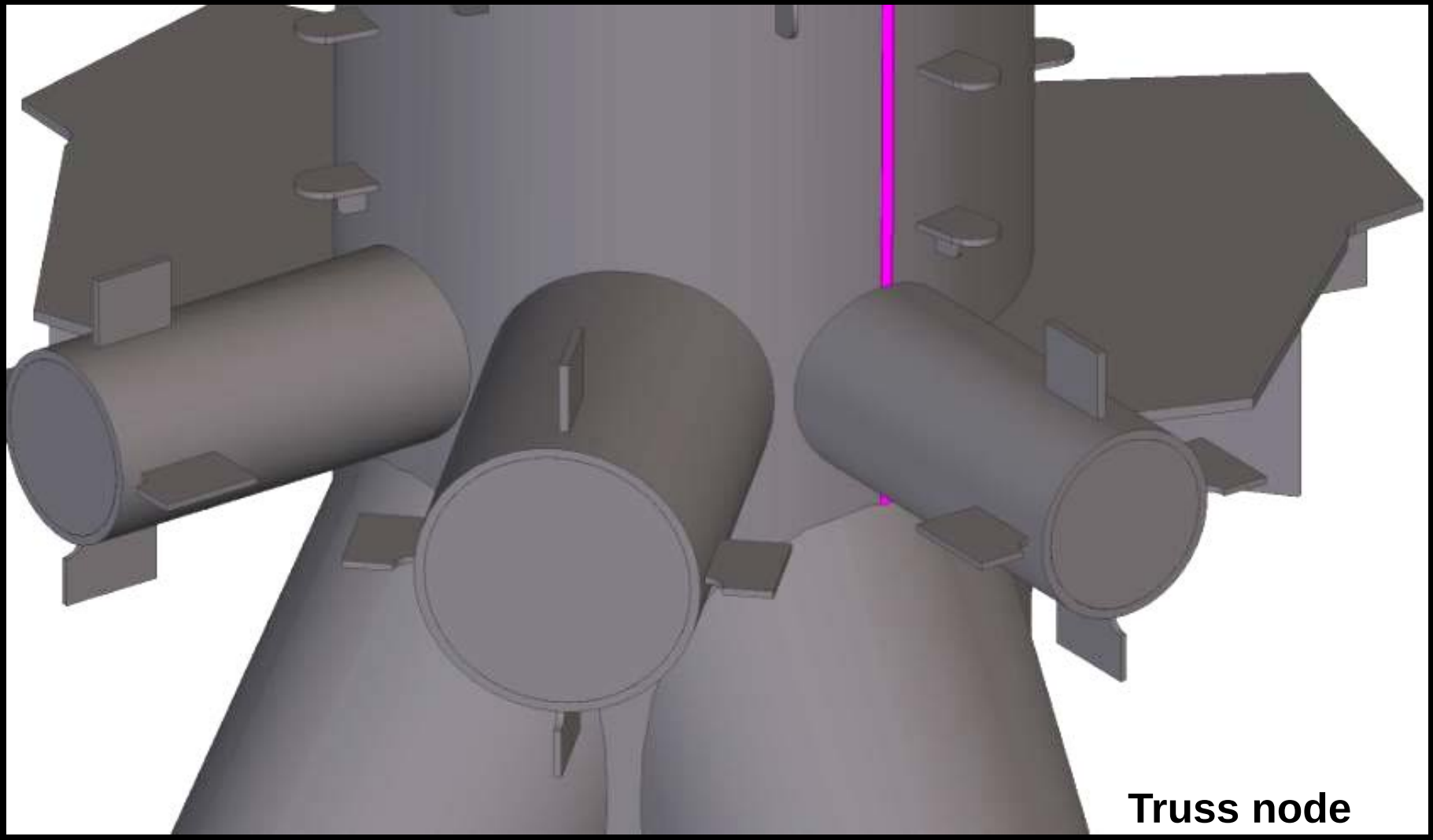
BIM in Construction

1. Review of Complex Detail
2. BIM Utilization in Fabrication
3. Construction Sequence Simulation
4. Constructability Review
5. BIM Utilization in Accuracy Control System

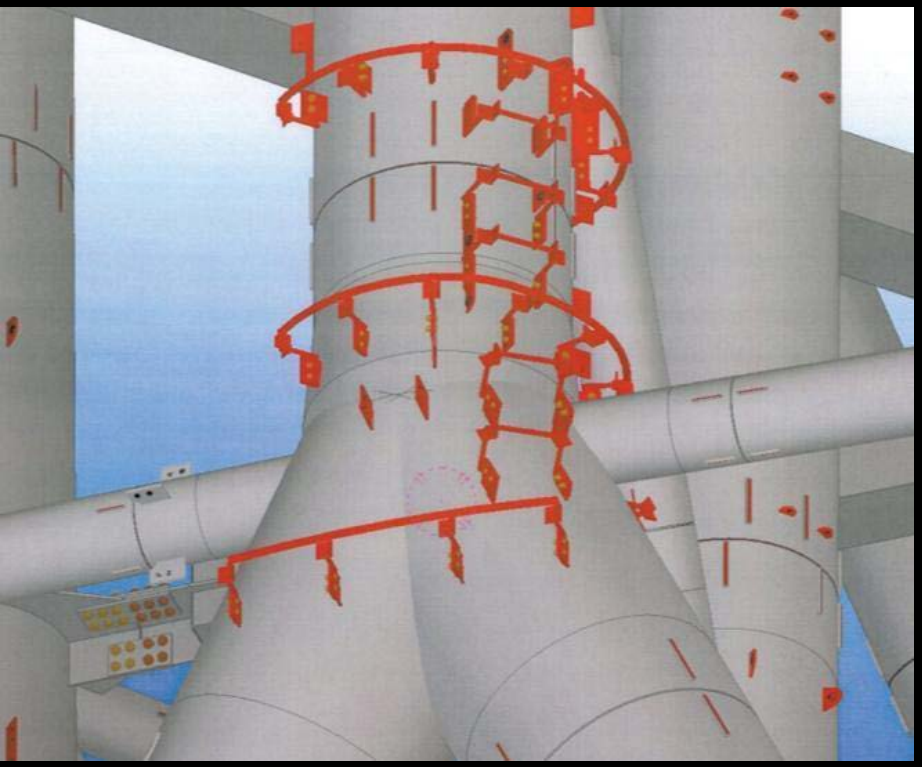
1. Review of Complex Detail



1. Review of Complex Detail

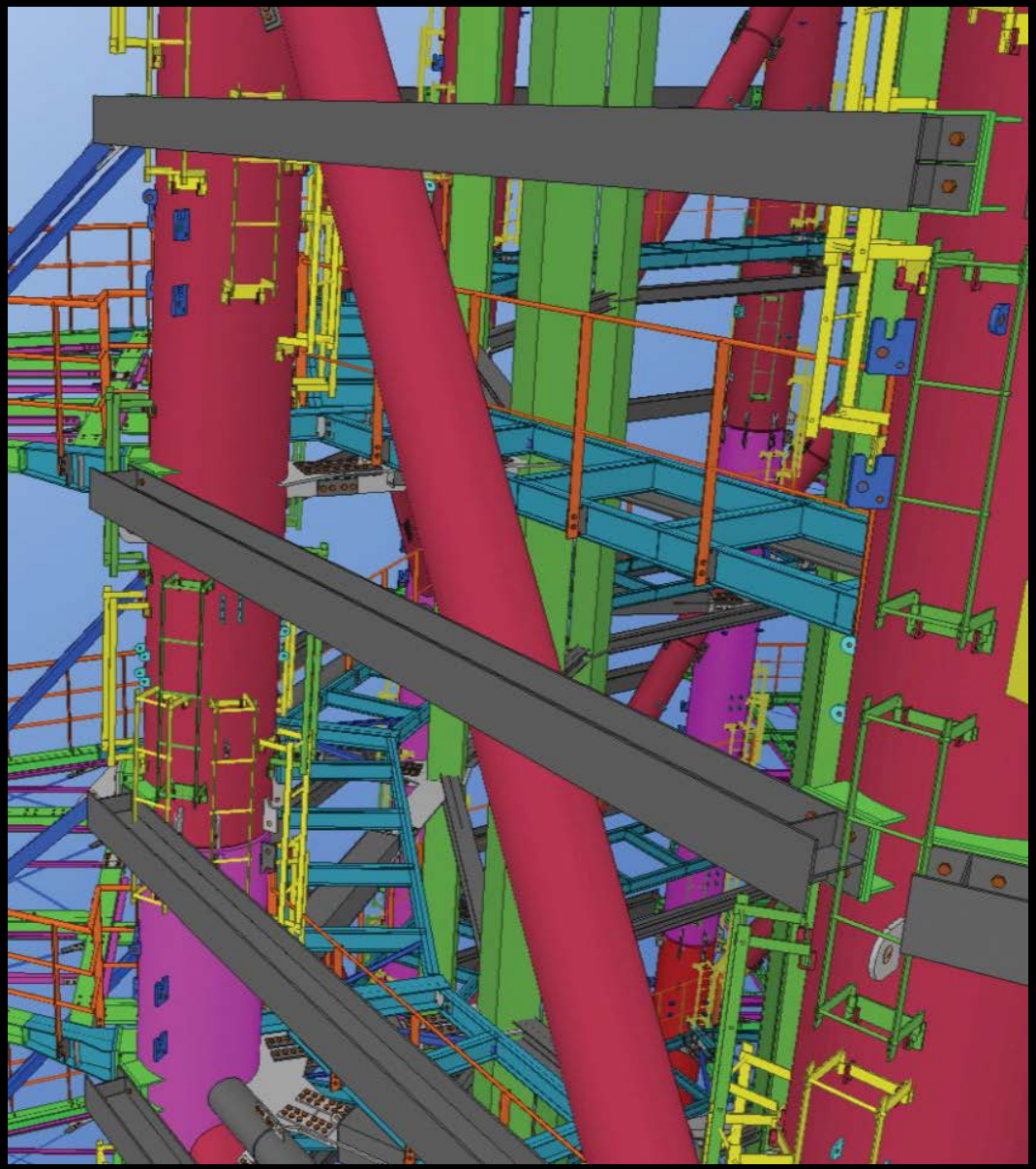


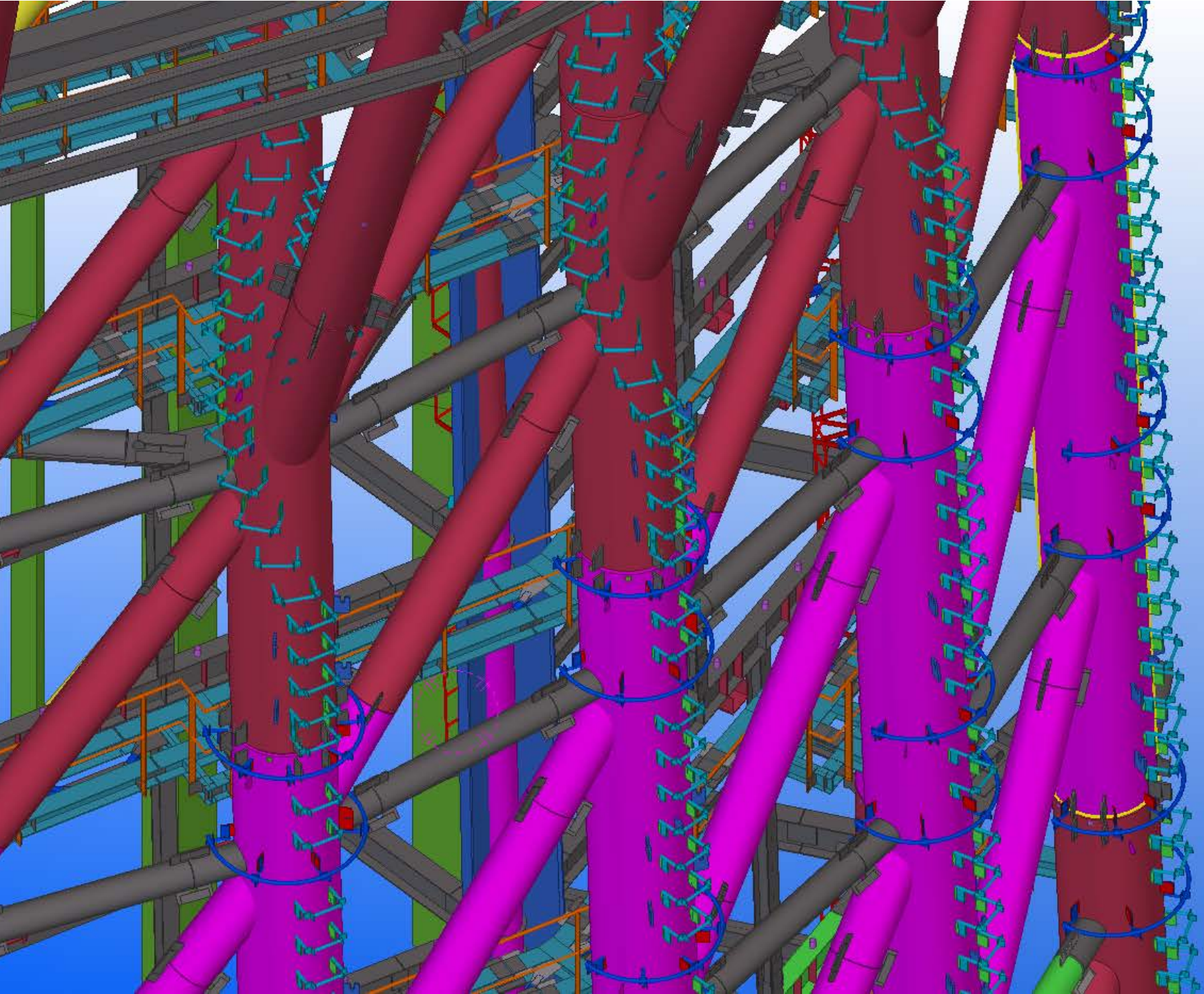
●Detail Design —Functional Verification・Visualization—
(attachments for maintenance, separate work, etc.)



●Temporary attachments

Functional Verification,
Detail Study





2. BIM Utilization in Fabrication

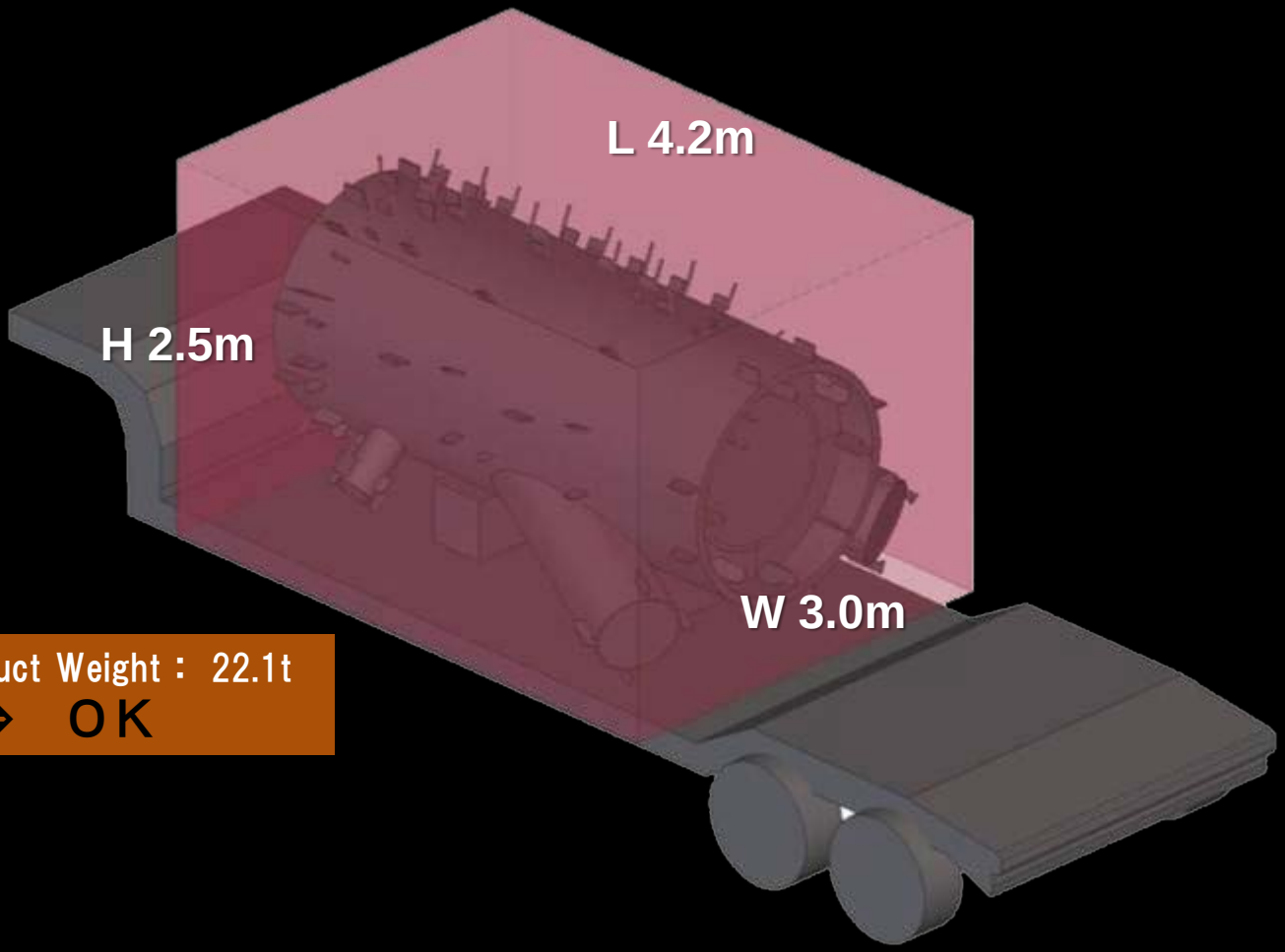
Transfer BIM into the special purpose CAD in 3D-DXF format
Generate curved sheet of layout in full-scale

Installation of the curved layout

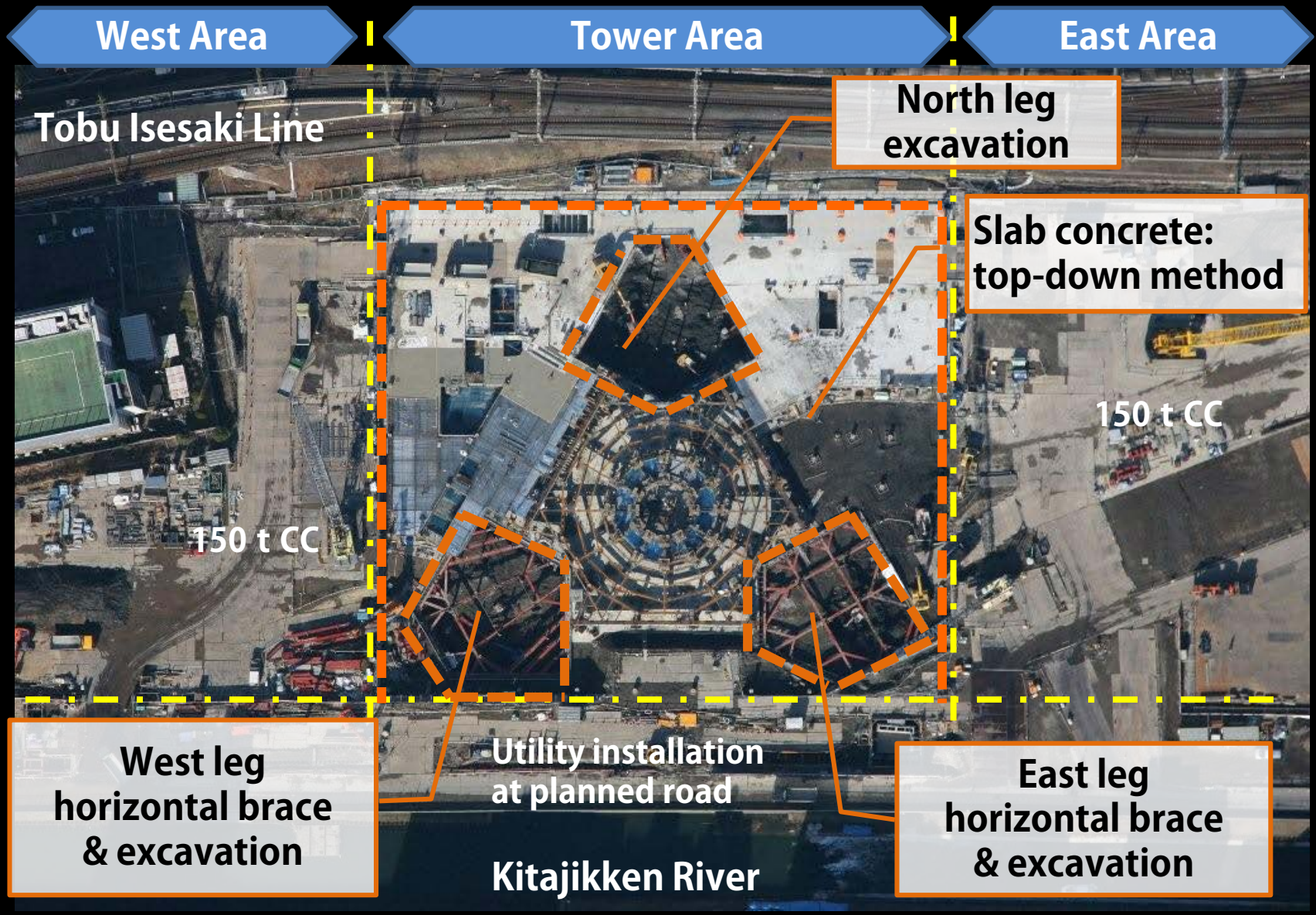
Confirm the position of 700+ studs

2. BIM Utilization in Fabrication

●Transportation simulation —gravity center, weight, and size—
(feedback to steel fabrication: position of joints and lifting lugs)

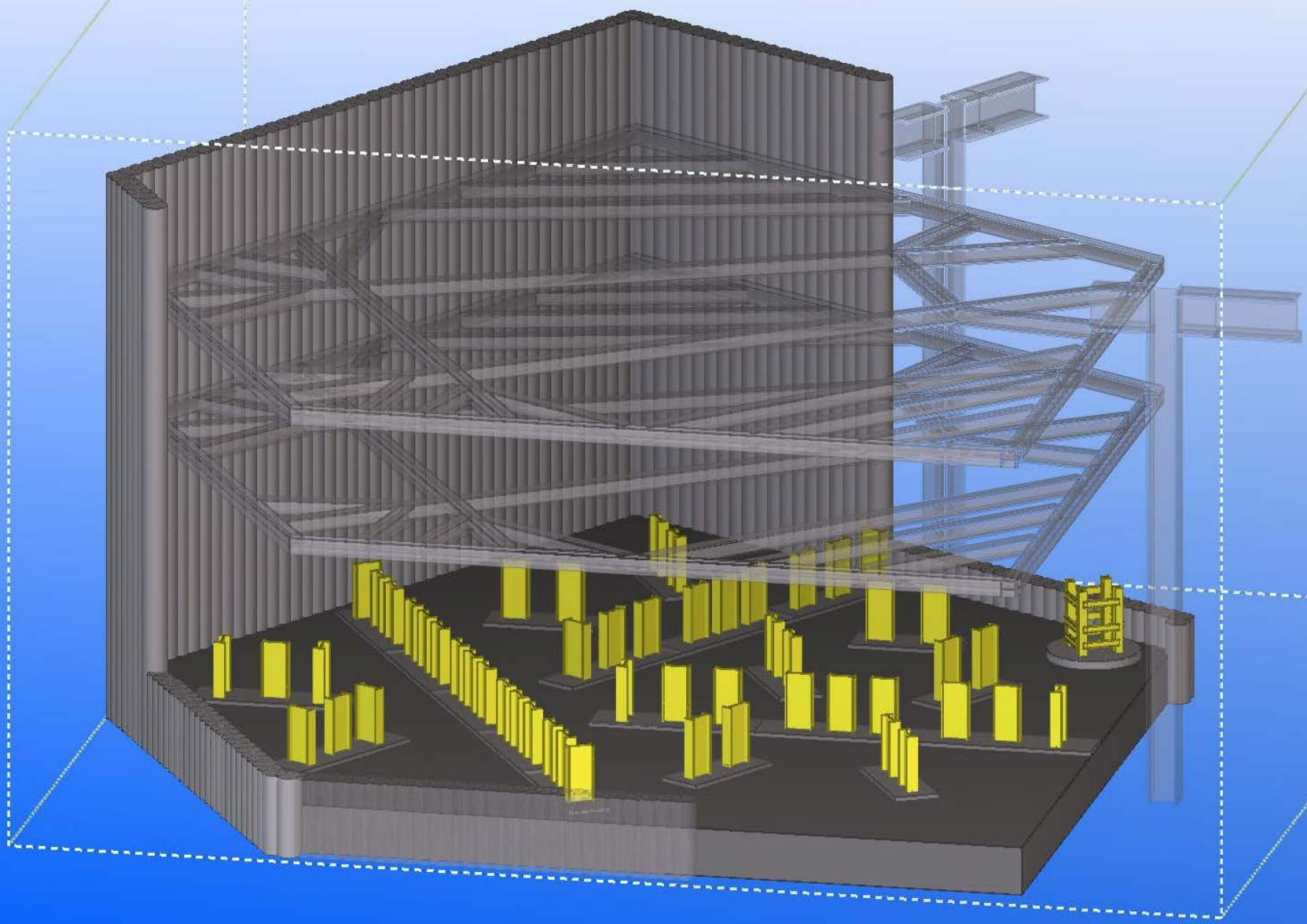


3. Construction Sequence Simulation

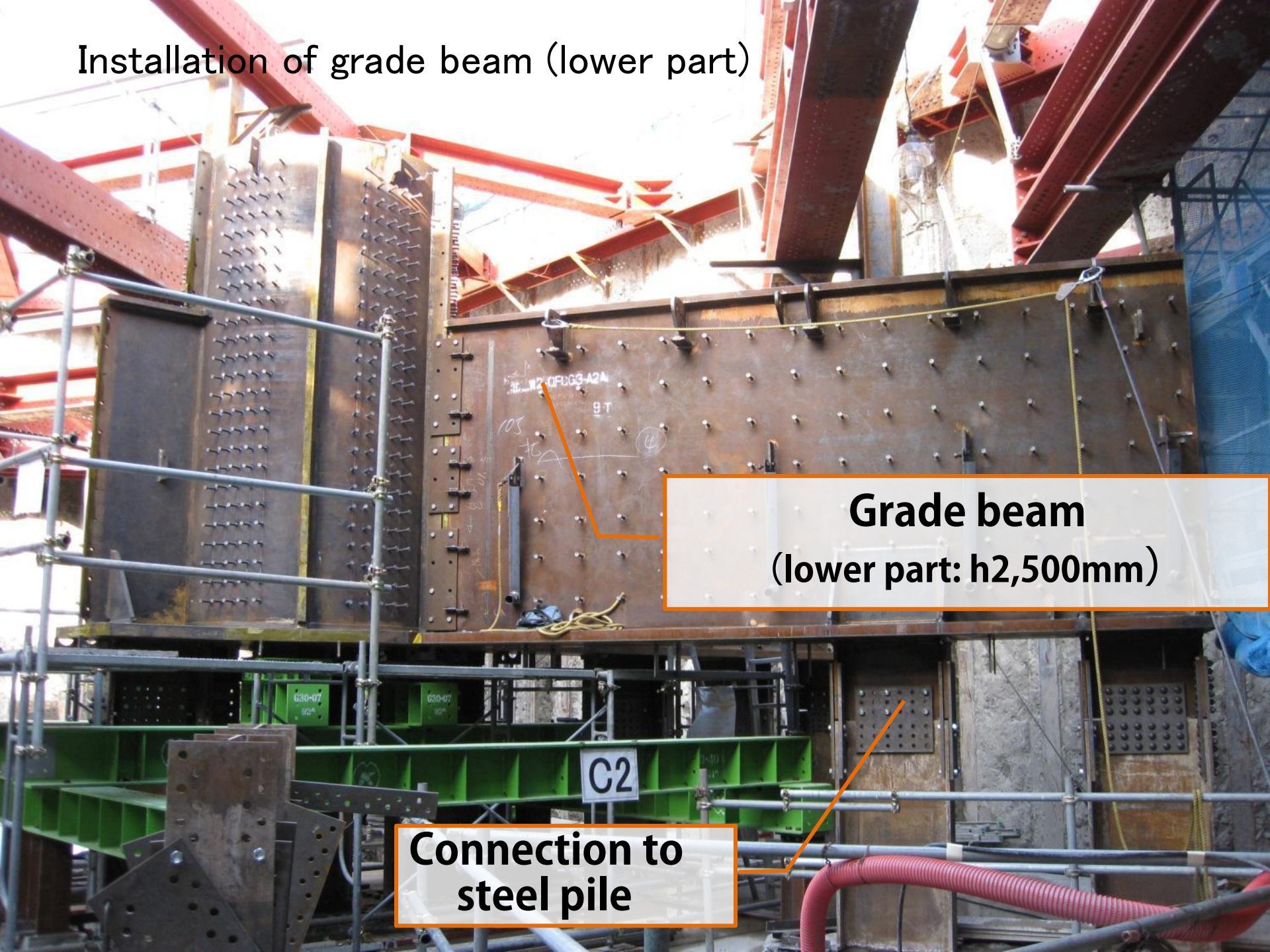



Excavation completed---before steel erection
Steel pile of wall foundation

Excavation completed---before steel erection



Installation of grade beam (lower part)



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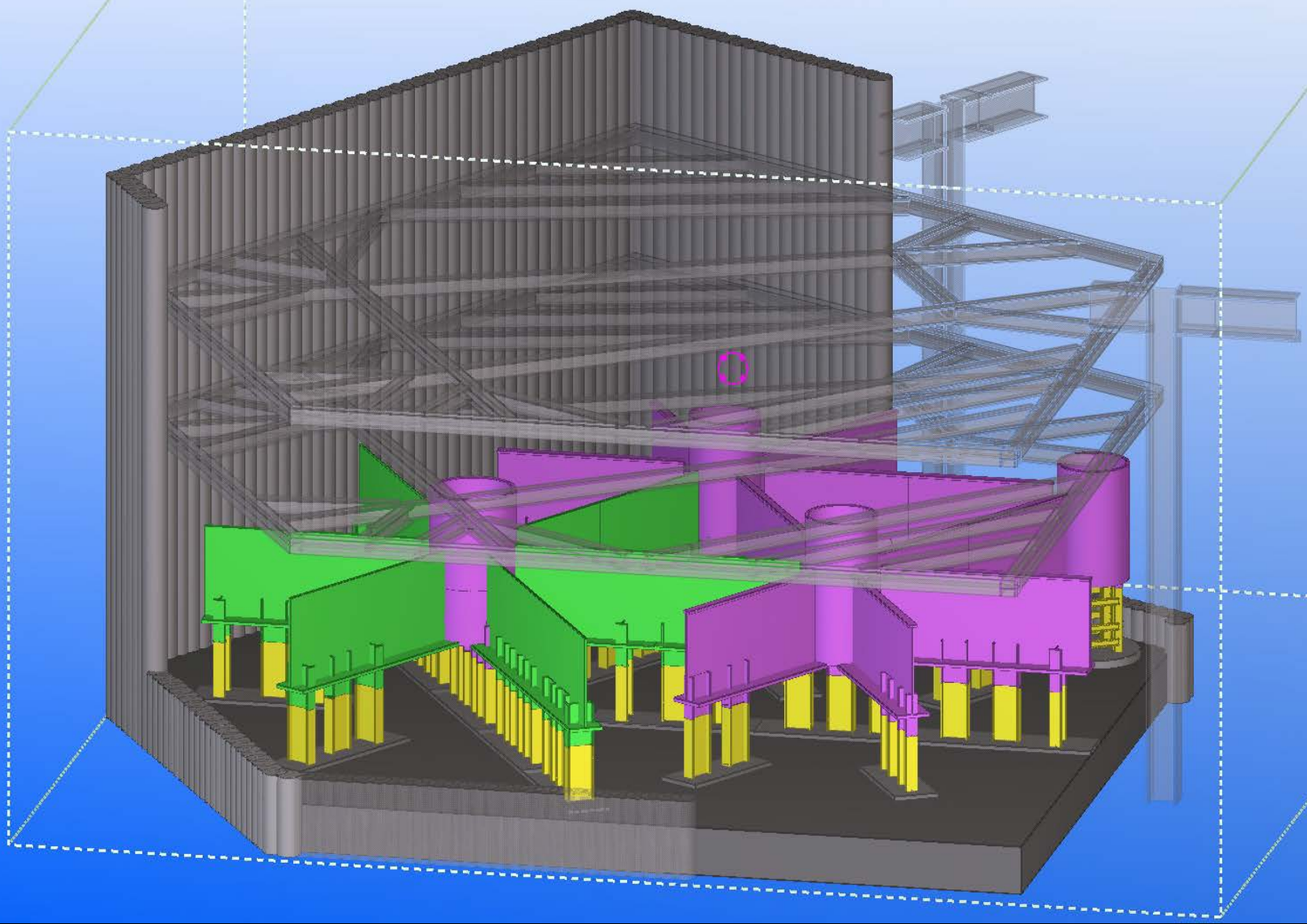
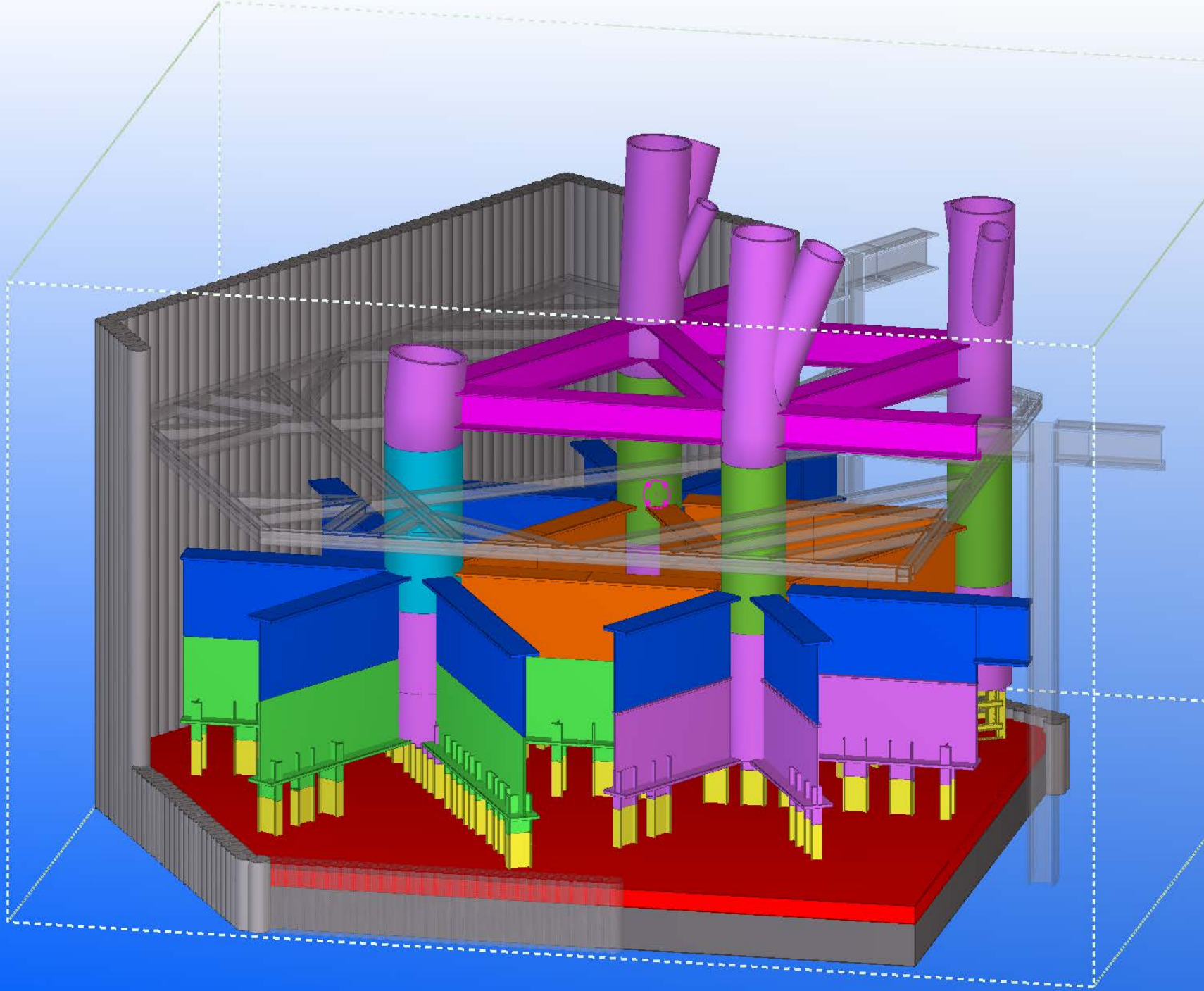
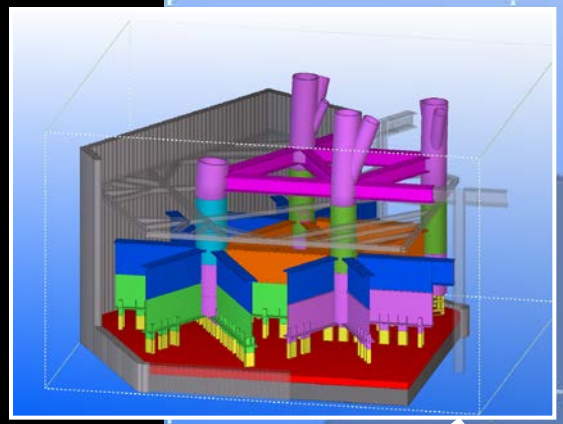
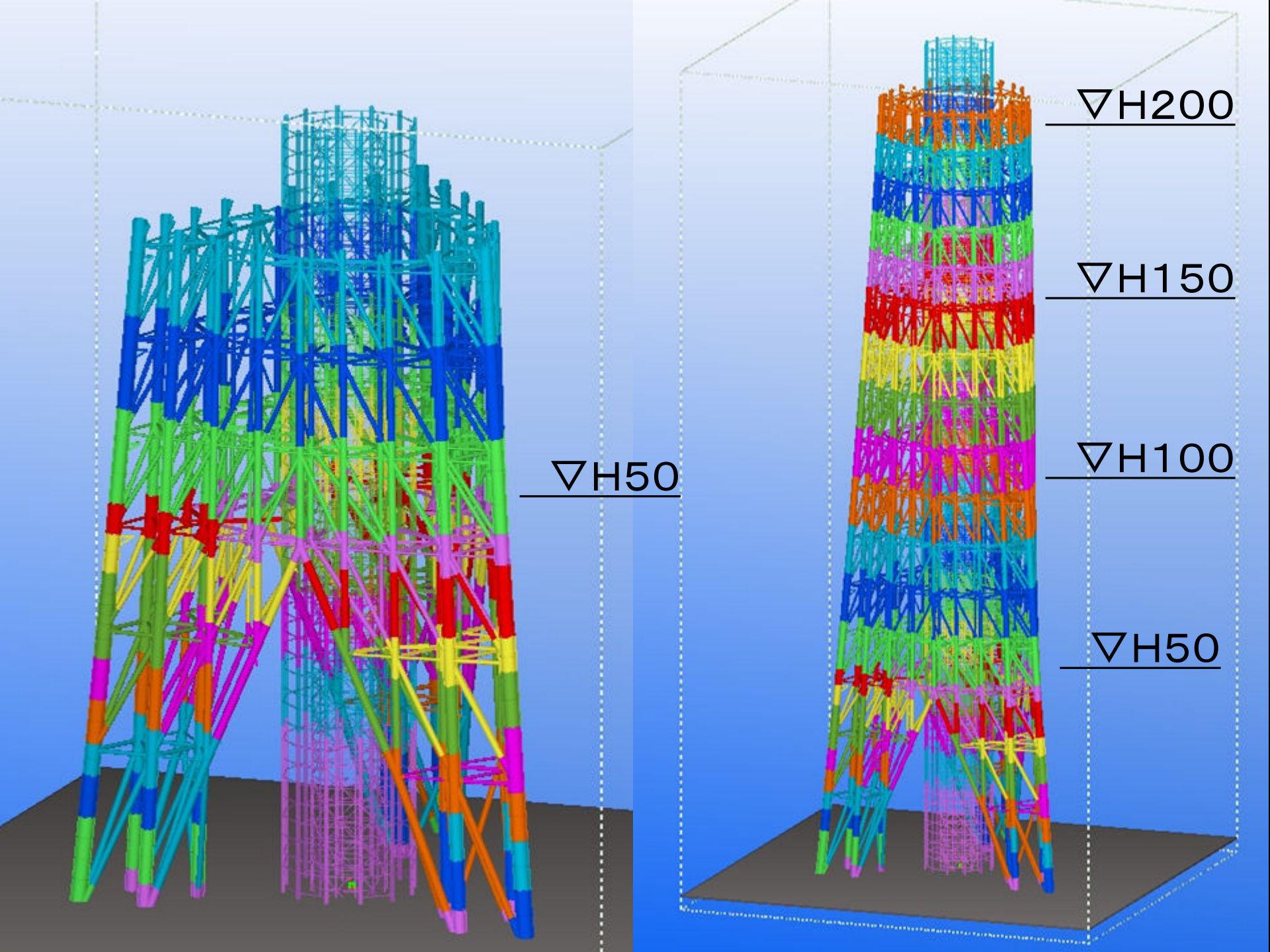


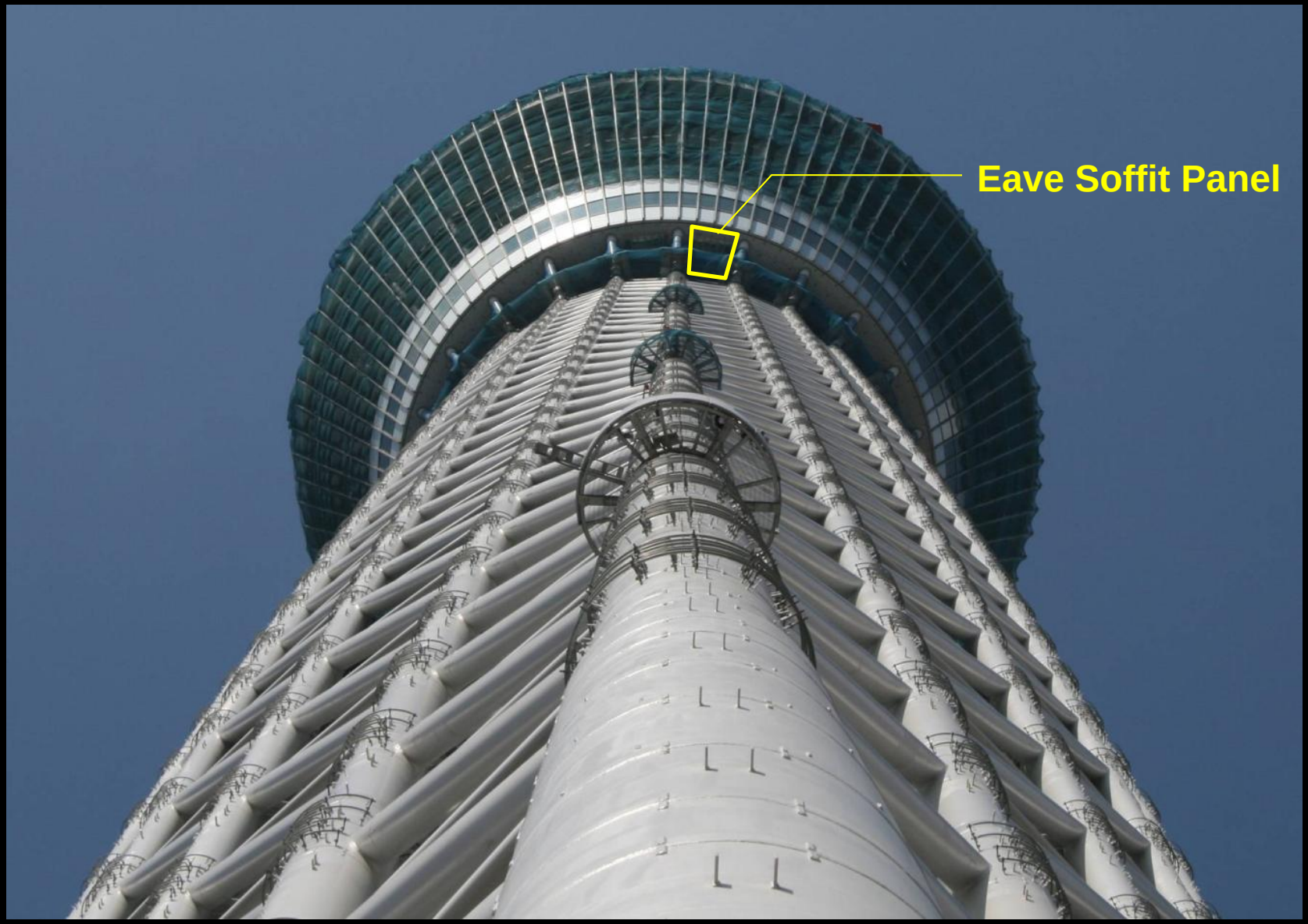




▽H20


▽H50
▽H200
▽H150
▽H100
▽H50

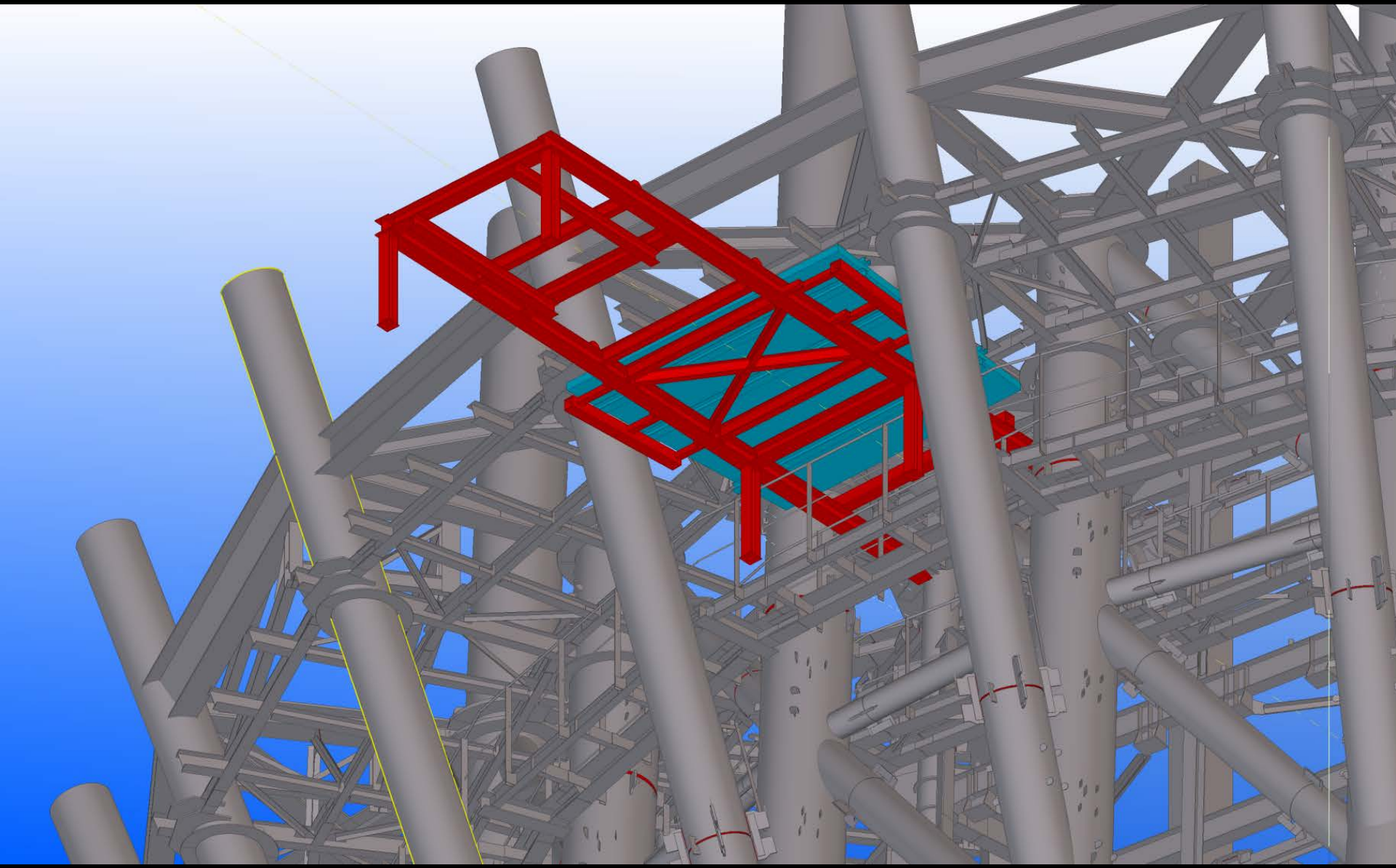
4. Constructability Review -eave soffit panel-



4. Constructability Review -eave soffit panel-

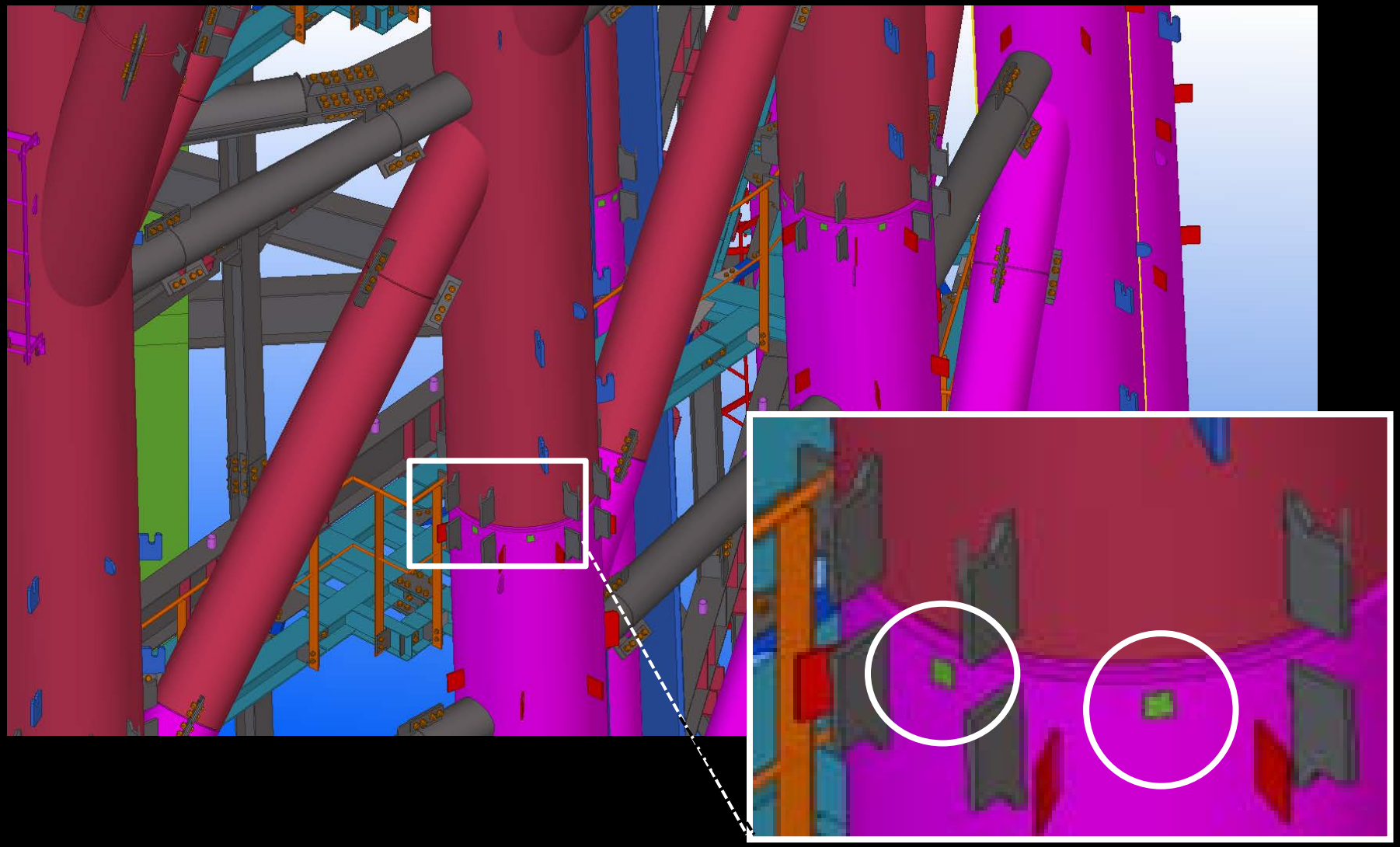
SkyJuster：hoisting load control device

4. Constructability Review -eave soffit panel-



5. BIM Utilization in Accuracy Control System

●Interacting with Steel Erection Accuracy Control System



3D Surveying System

●Interacting with Steel Erection Accuracy Control System

部材マーク	柱頭芯座標		
	X	Y	Z
1-35C1-1	0.00	16854.41	294500.00
1-35C3-A1	-8386.00	14550.87	294500.00
1-35C3-B1	8386.00	14550.87	294500.00
1-35C5-1	14556.72	8404.32	293500.00
2-35C1-1	-14596.33	-8427.20	294500.00
2-35C3-A1	-8408.40	-14537.93	294500.00
2-35C3-B1	-16794.42	-12.92	294500.00
2-35C5-1	-14556.70	8404.34	293500.00
3-35C1-1	14596.33	-8427.20	294500.00
3-35C3-A1	16794.41	-12.92	294500.00
3-35C3-B1	8408.41	-14537.92	294500.00
3-35C5-1	0.00	-16808.64	293500.00

Target points in 3D coordinate

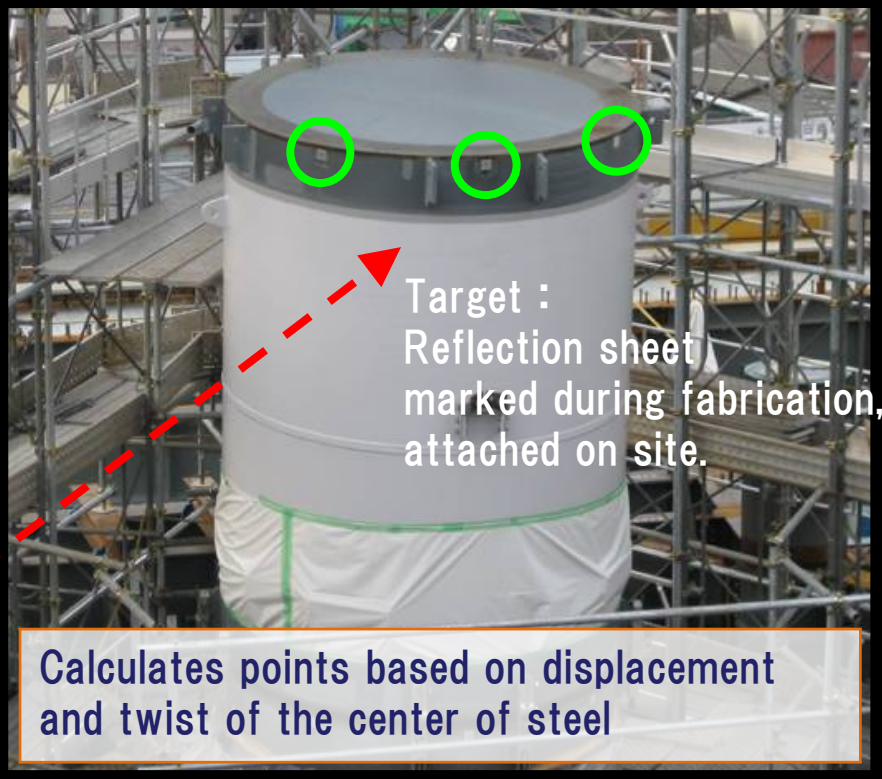
Automatic Registration

Control Device：Laptop PC
(Wi-fi embedded)

3D Surveying System

3D Surveying System

Control Device : Laptop PC (with Wi-fi)



Calculates points based on displacement and twist of the center of steel

		X	Y	Z	θ
誤差	2点	← 4	↑ 4	↓ 4	
	3点	0	0	0	
	4点	← 2	↑ 3	↓ 1	
●	芯値	3.3	-2.8	3.2	0.1
■	前節	1.0	-3.3	4.4	0.1
柱の倒れ		2.3	0.5		

Displays results and directions


OBAYASHI