

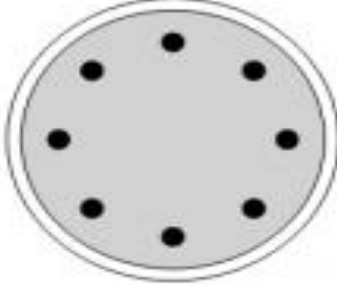
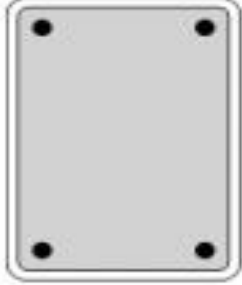
COMPOSITE STRUCTURAL FRAME FOR MULTI-STOREY BUILDINGS

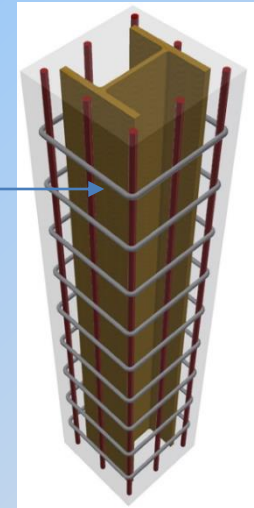
VGS SOLAR & BUILDING SYSTEMS PVT. LTD.



Composite Columns

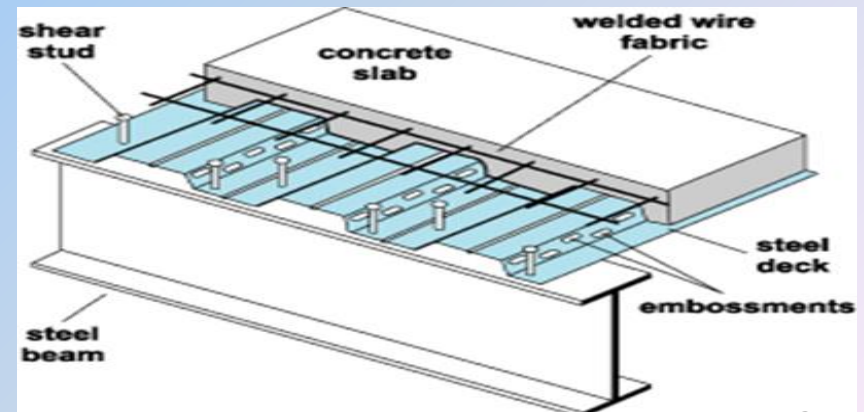
Generally, we go for encased sections to avoid fireproofing in columns and use the compressive strength of concrete

Fully encased HE section	Concrete-filled CHS	Concrete-filled SHS
		



Composite Beams

Steel beams (I beams) supporting the concrete slab. **Deck Sheet/Precast Slabs** are the floor systems that can be used for slabs.

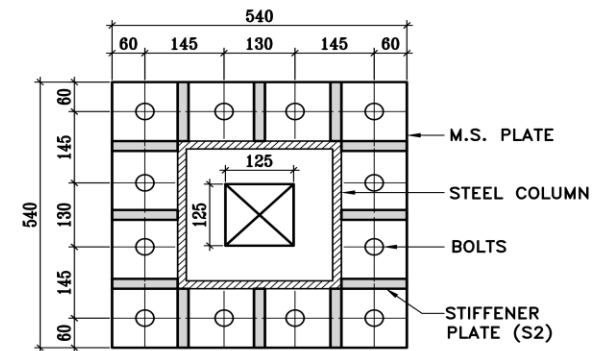


Methodology of Construction

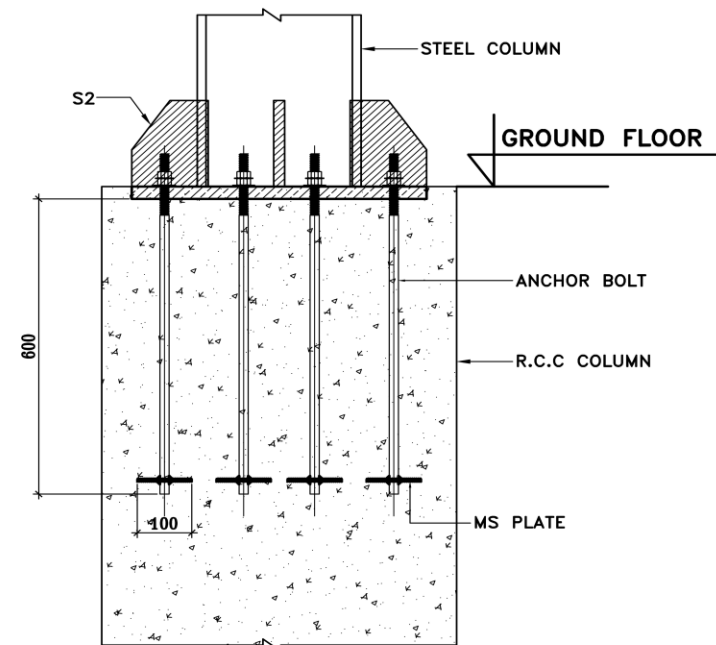
With the meteoric rise in the population along with rapid urbanization, has limited the horizontal space constraint in the metros. This further calls for maximum utilization of the space vertically with the most affordable and efficient building design. In composite construction, the bare steel sections support the initial construction loads and self weight of the structure.

Sequence

1. The anchor bolts are placed in the pedestal of the column. The column is generally 8m to 12 m in length.
2. The base plate is welded at the plant to the column. The column is then erected on the site.
3. The primary beams and bracings are connected to columns thereafter by bolting at site. The secondary beams are connected further to primary beams.



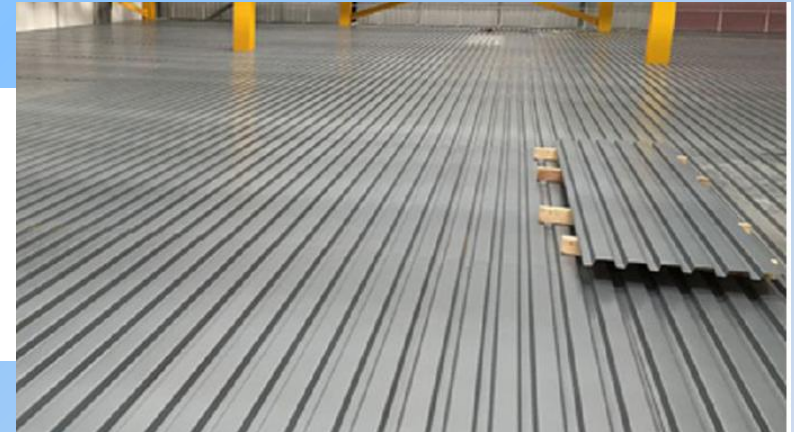
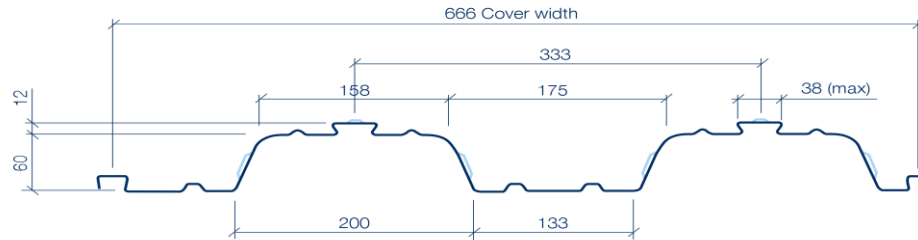
STEEL COLUMN



**TYPICAL SECTION
(FOR ANCHOR BOLT)**

Methodology of Construction

4. The deck sheet is laid on the beams and shear connectors are welded by shear gun to the beams.



5. The concrete is further laid on the deck sheet. Meanwhile, the column for second tier is joined to the column by column splice which is bolted at the site and the construction is taken up further.

SHEAR CONNECTOR STUD

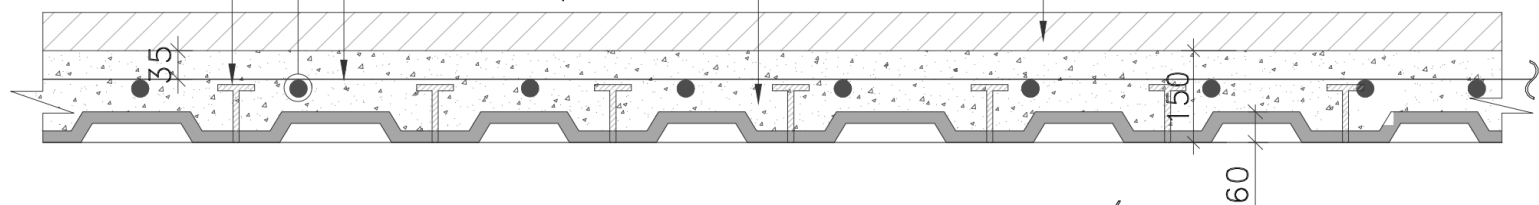
19x95MM. (TYP.)
@ 600c/c

10 ϕ @200c/c

8 ϕ @175c/c

R.C.C. SLAB

FLOORING



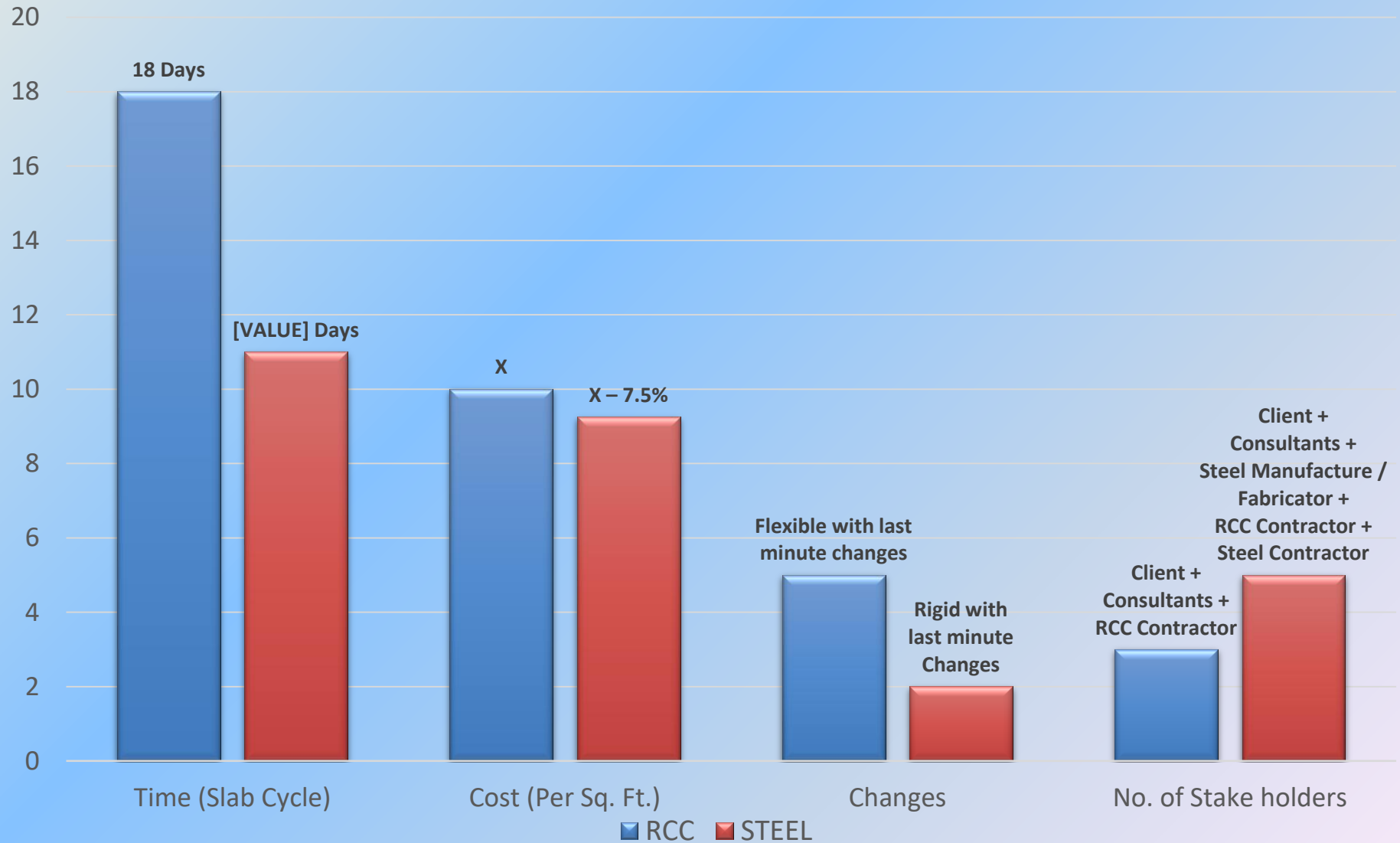
TYPICAL DECK SLAB R/F

Merit & Demerits of Structure Steel (Composite Construction)*

Sr. No.	Description	Merits	De-Merits	Risk/Threats	Opportunity	Plan to Overcome Threats
A	QUALITY	High Quality is guaranteed as yard fabricated steel has precise quality control		Site welding is prone to have poor quality	Savings in QC which would have been required for a RCC structure.	Structural engineer will minimize site welding and make majority of connection as bolted
B	TIME	The time is 50% lesser as compared with conventional		The concrete contractor has to be adept at casting the encasing of columns		Class A-/Class B+ contractor to be hired
C	COST	The cost is lesser than concrete buildings		High initial investment	Faster project completion leads to early return of investment	Owner to have sufficient funds before start of the project
D	Material Management	The fabricator will deliver the material as per site's flexibility so that minimum site storage is required	Site personnel has to coordinate with the fabricator in advance as to how much material can be delivered		Cleaner site leads to early project completion with minimum safety risks	
E	Earthquake Resistance	Even at a high magnitude earthquake the damage would be only revealed on cladding, no structural damage or collapse occurs due to light weight			Steel building of even six storey, can withstand the lateral forces of 9.0 magnitude.	
F	Eco Friendliness	Steel building emits 395 kg CO2/sqm. floor area which is 16% lesser than 495 kg CO2/sqm. for RCC structure.			Steel structure has lower embodied carbon impact than the RCC framed section.	

* Composite Construction is preferable if the no. of floors is more than 7-8 floors, so that time saving is on higher side.

RCC v/s Composite Steel Construction



Composite Structures - Green Building Advantages

- Composite construction uses lesser concrete which means less dust or lesser air pollution which is unavoidable in conventional RCC constructions.
- Lesser concrete consumption in turn leads to less usage of aggregate and sand which is a big factor in the depletion of natural stone quarries and river beds.
- The consumption of water, which has become a scarce resource these days and a major concern for environmentalists, is also significantly reduced in composite constructions.
- Composite construction is also about less material movement, resultantly lesser traffic due to high steel density which factors for curbing air pollution furthermore.
- Additionally, these technologies not only are the answers to today's persistent issues like sustainable development, environment preservation but have also proven to be aesthetically and technically superior to their conventional counterpart viz. RCC buildings and structures as composite construction utilises all the materials used to their best advantage.
- Composite construction comprises of concrete and steel. While steel provides strength and agility, concrete can be shaped as desired to achieve a stronger, highly efficient and lightweight structure which is also aesthetically brilliant.
- **High salvage value**

Earthquake Parameters

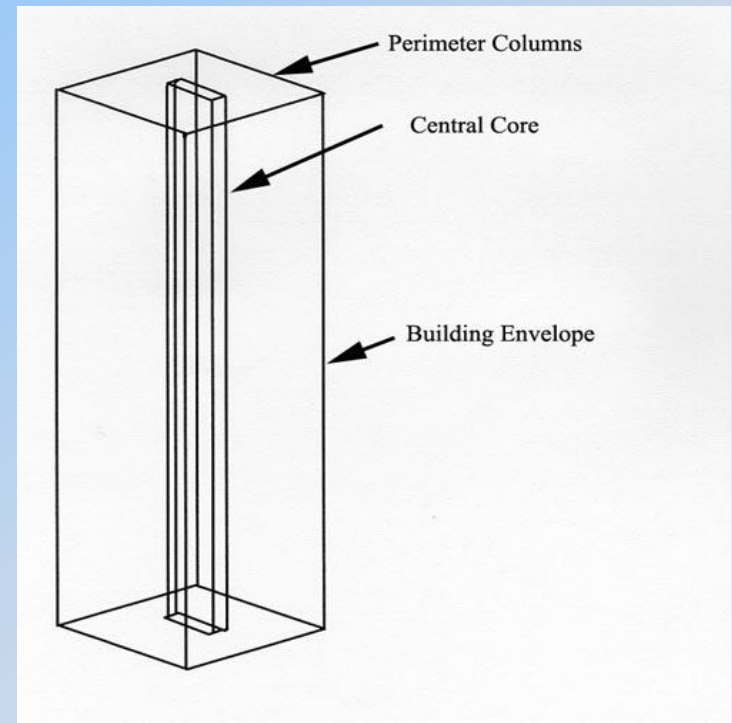
As per (US 319:2003) Seismic code of practice for structural designs

Description	Parameters
Seismic Zone	IV
Importance Factor	Varies from 1.5 to 2, depending on type of building
Structural System	Ductile Shear Wall System with RC Composite Structure
Response Reduction Factor	1.5

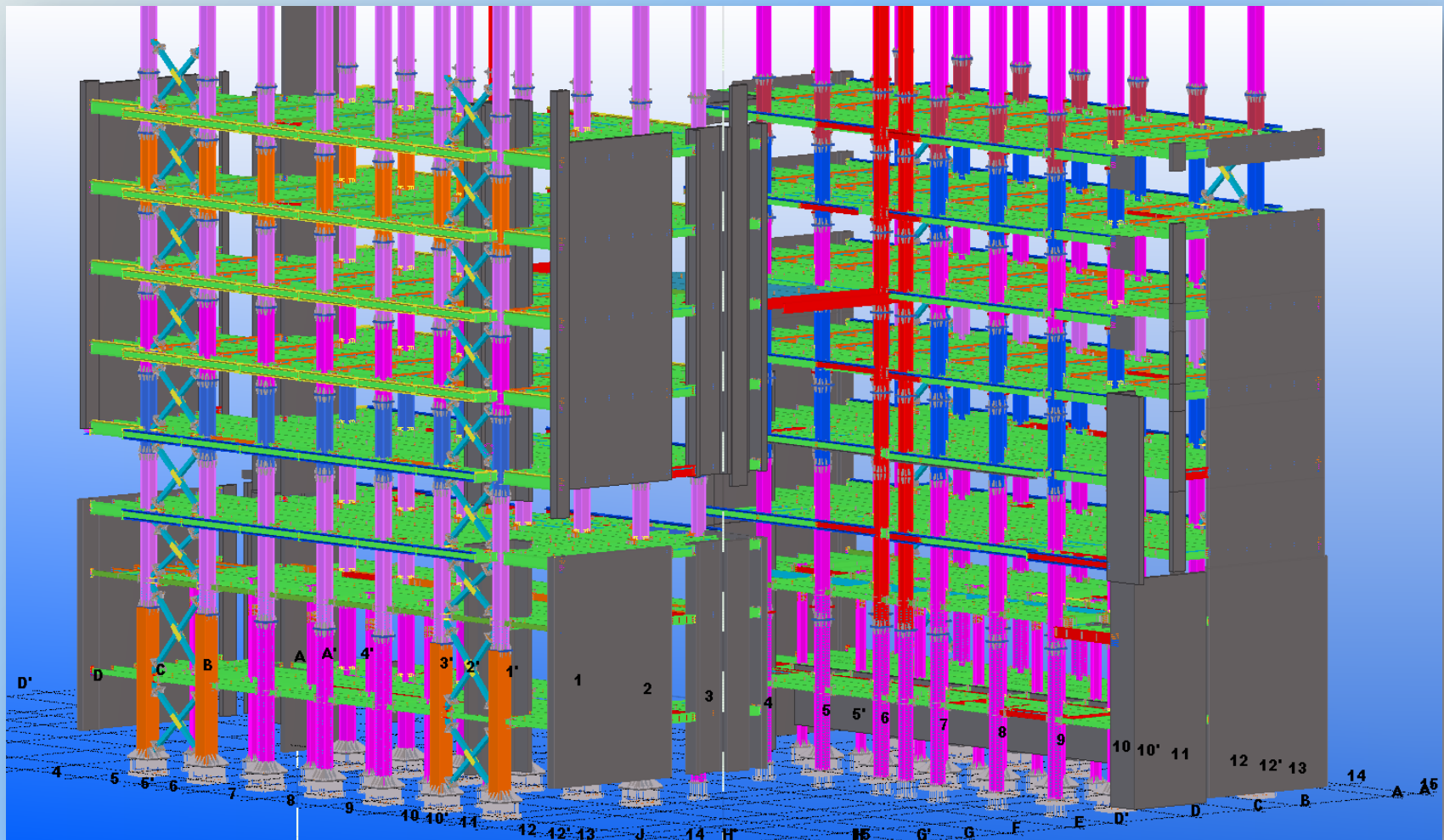
Structural System

The structural system will be composite column with steel beams and concrete slabs. The lateral load resisting system will “typically” contain:

- Shear walls
- Bracings

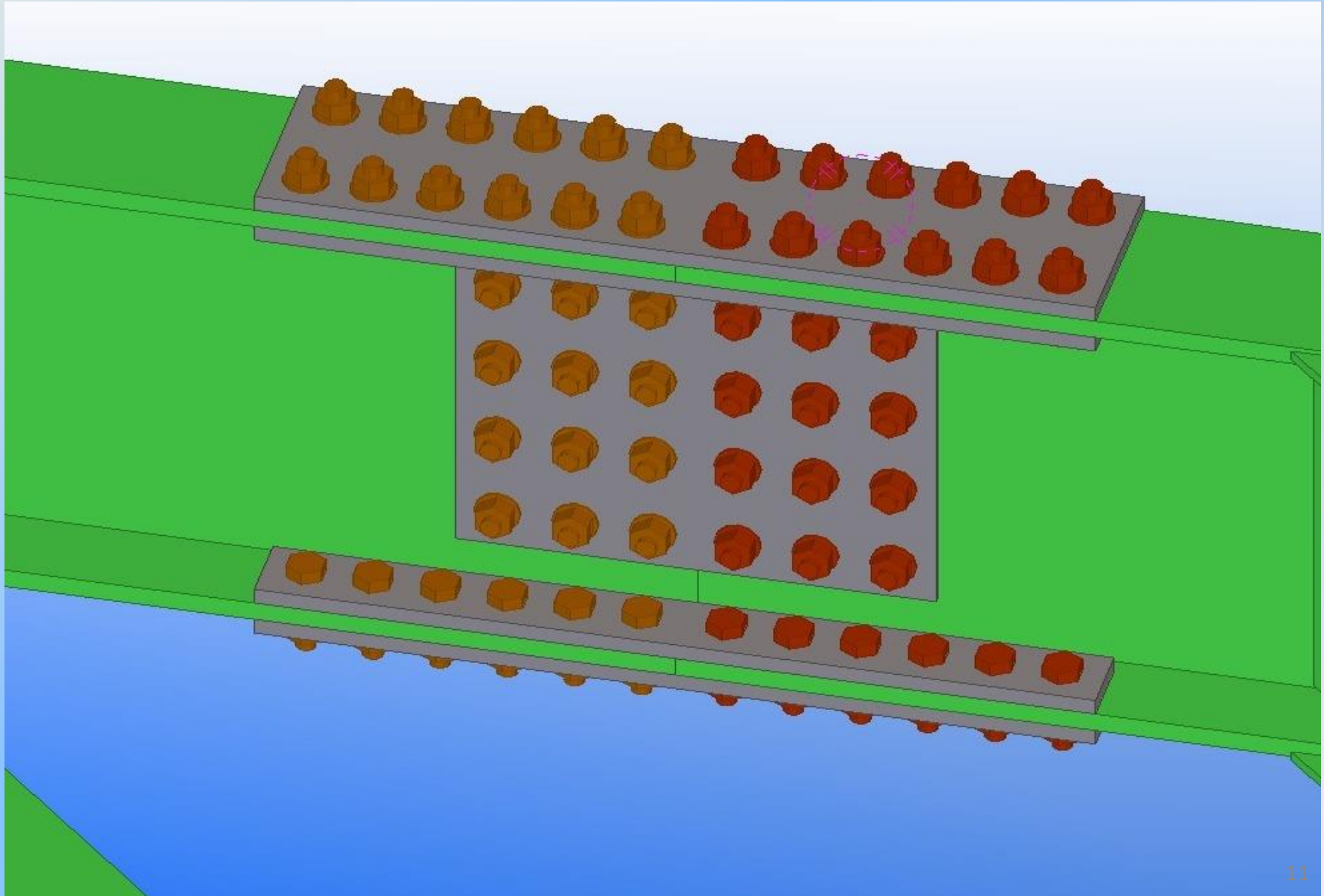


TEKLA MODEL

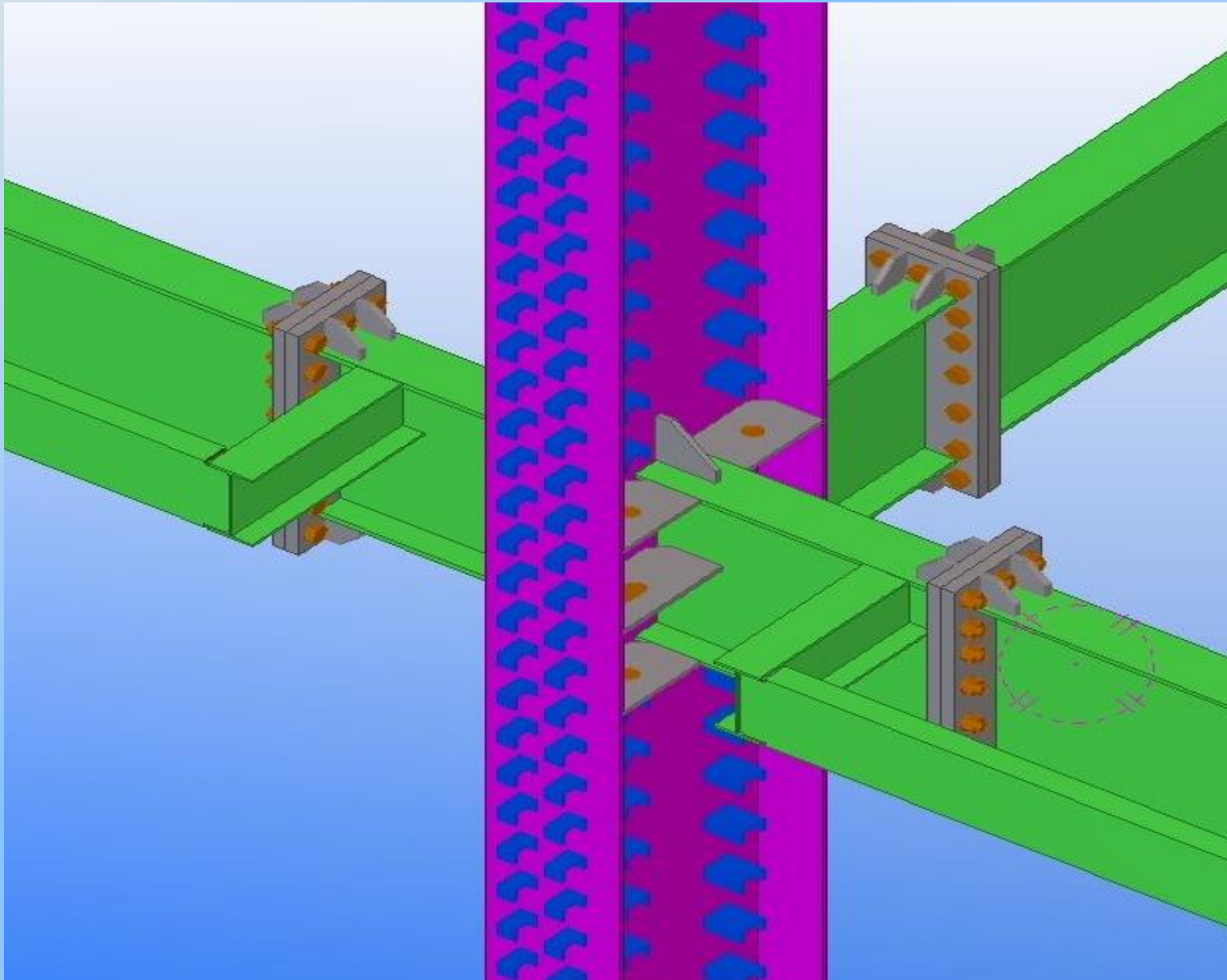


1. All elements cut to size with all fabrication drawings
2. Coordination with concrete elements

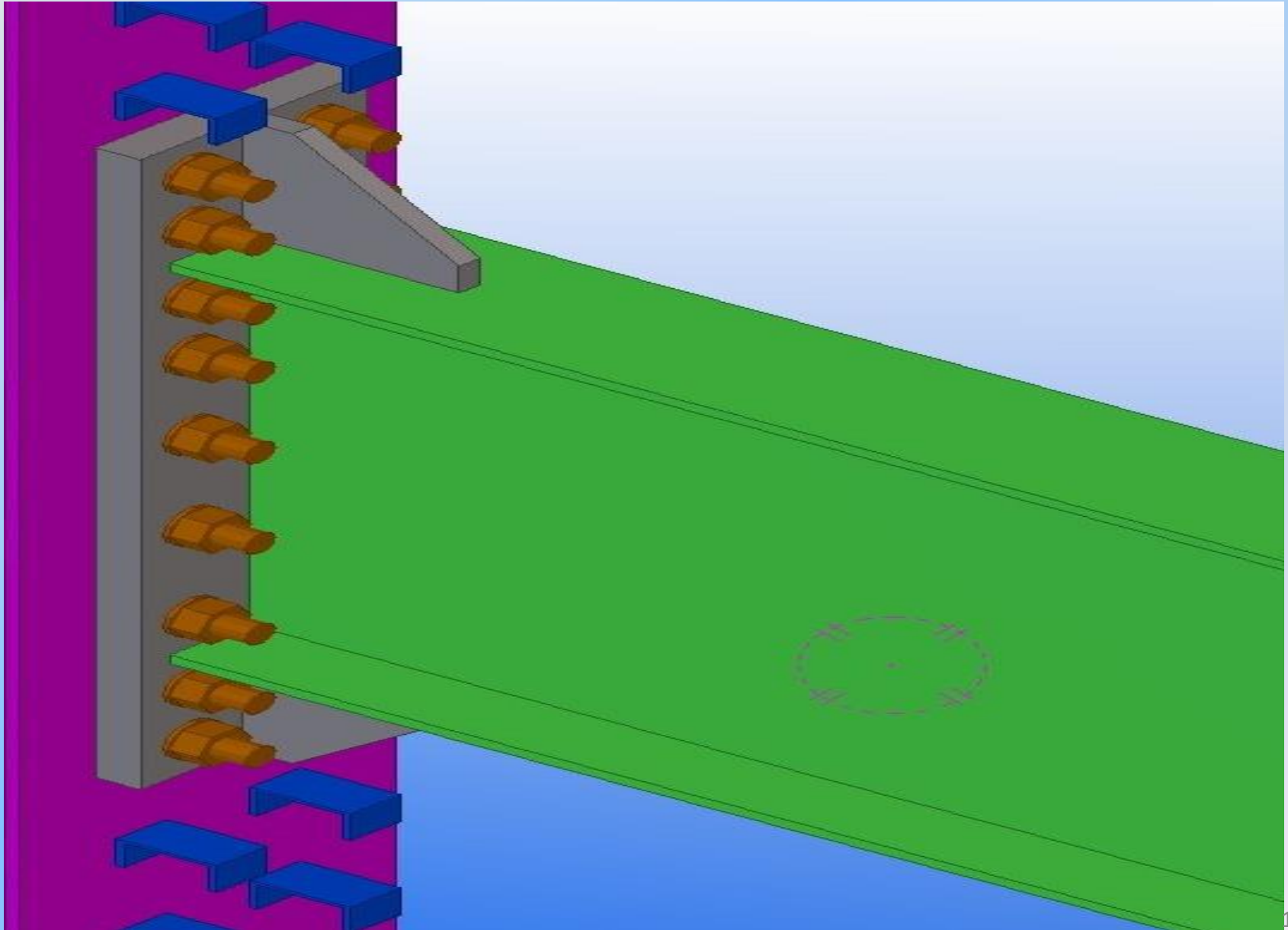
PARALLEL BEAM SPLICE CONNECTION



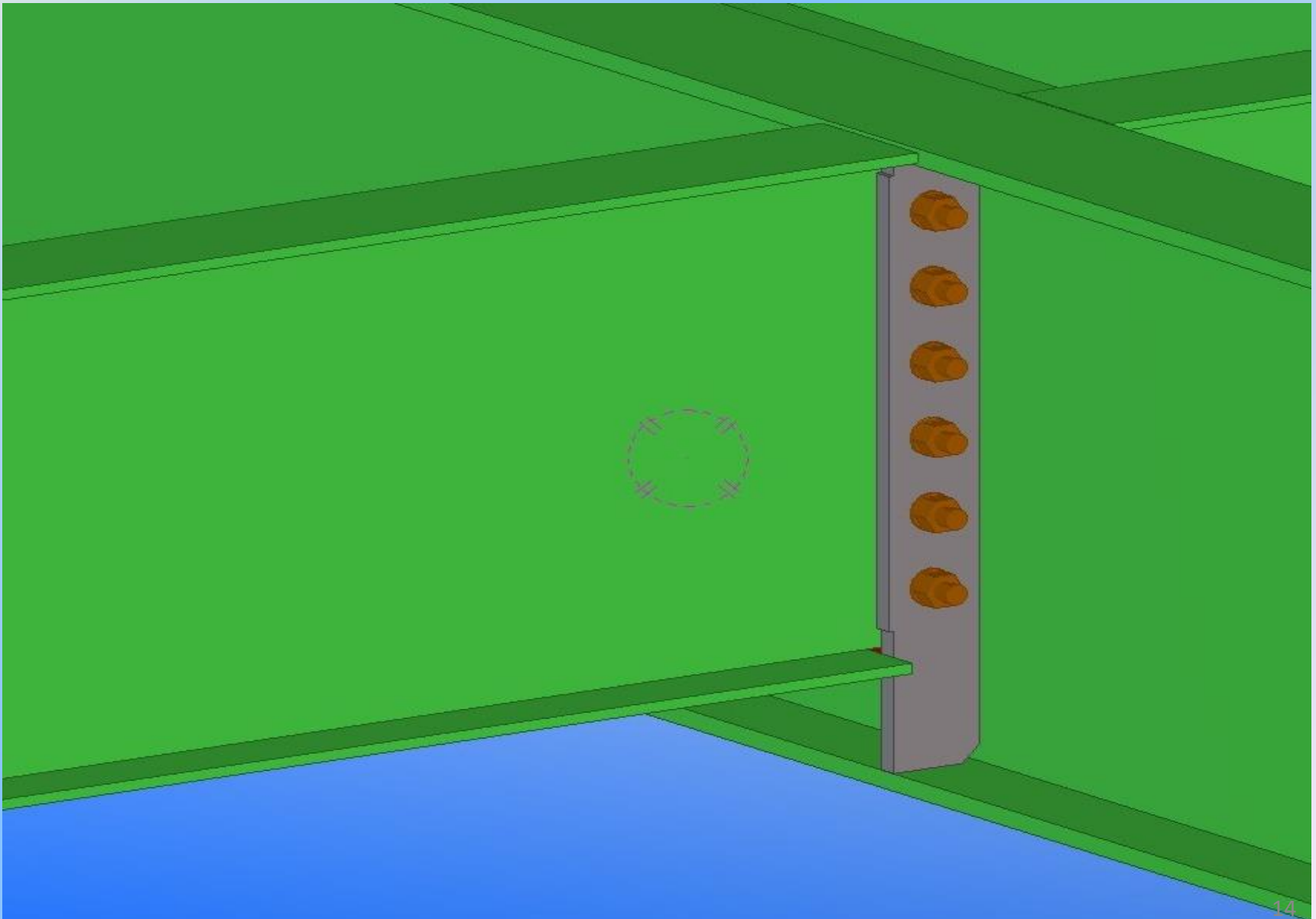
COLUMN BEAM JUNCTION



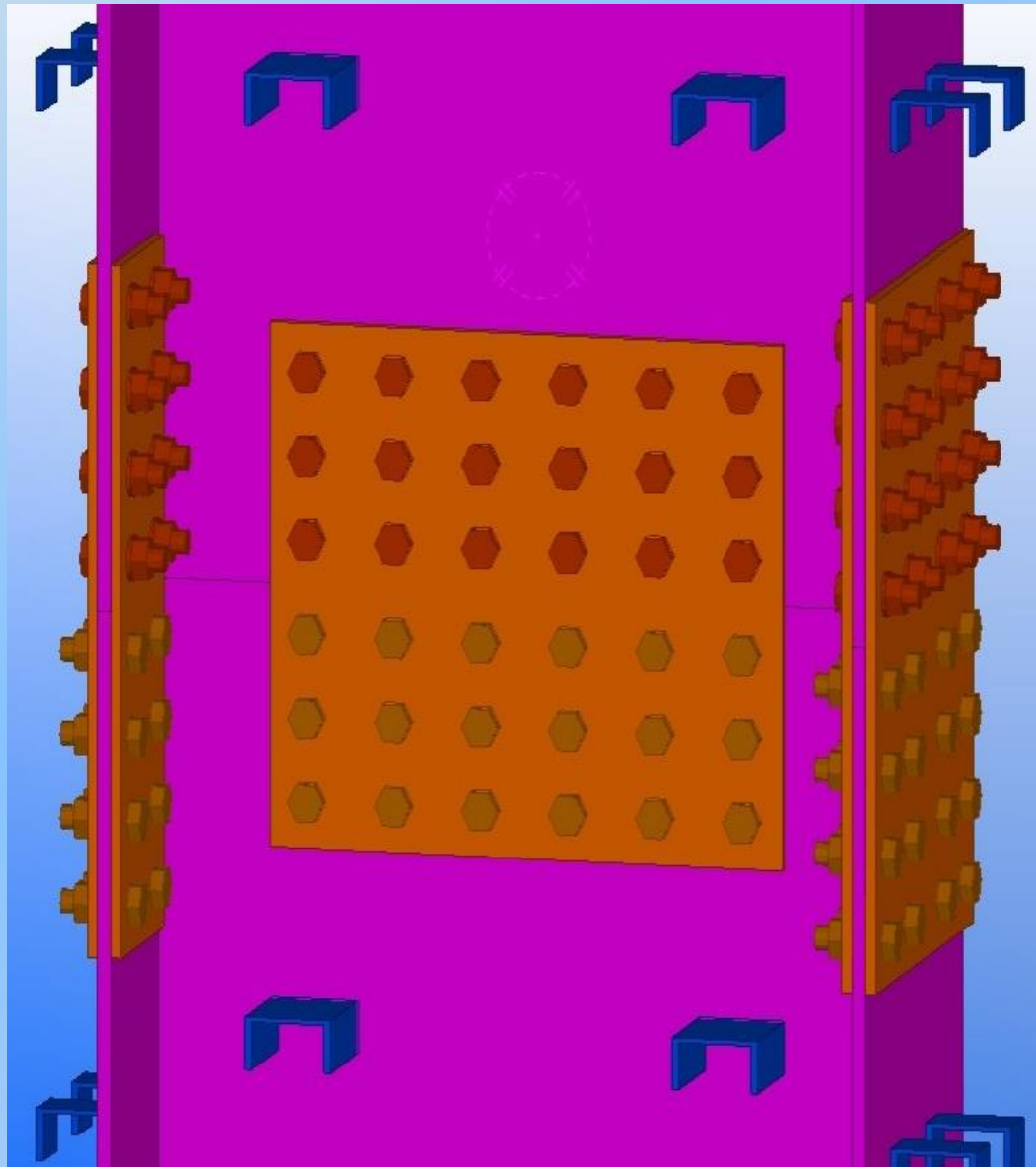
BEAM CONNECTION WITH COLUMN



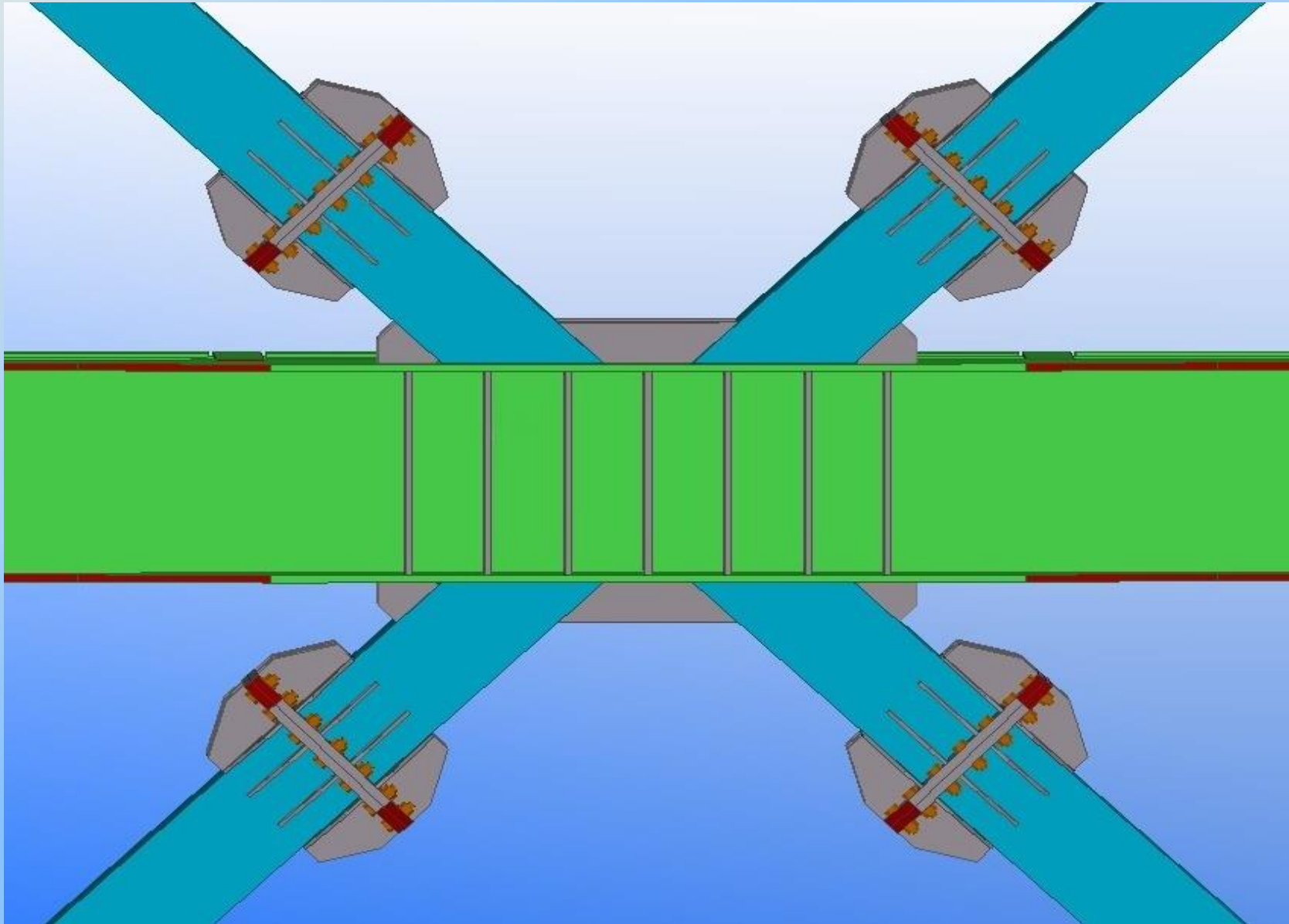
BEAM TO BEAM CONNECTION



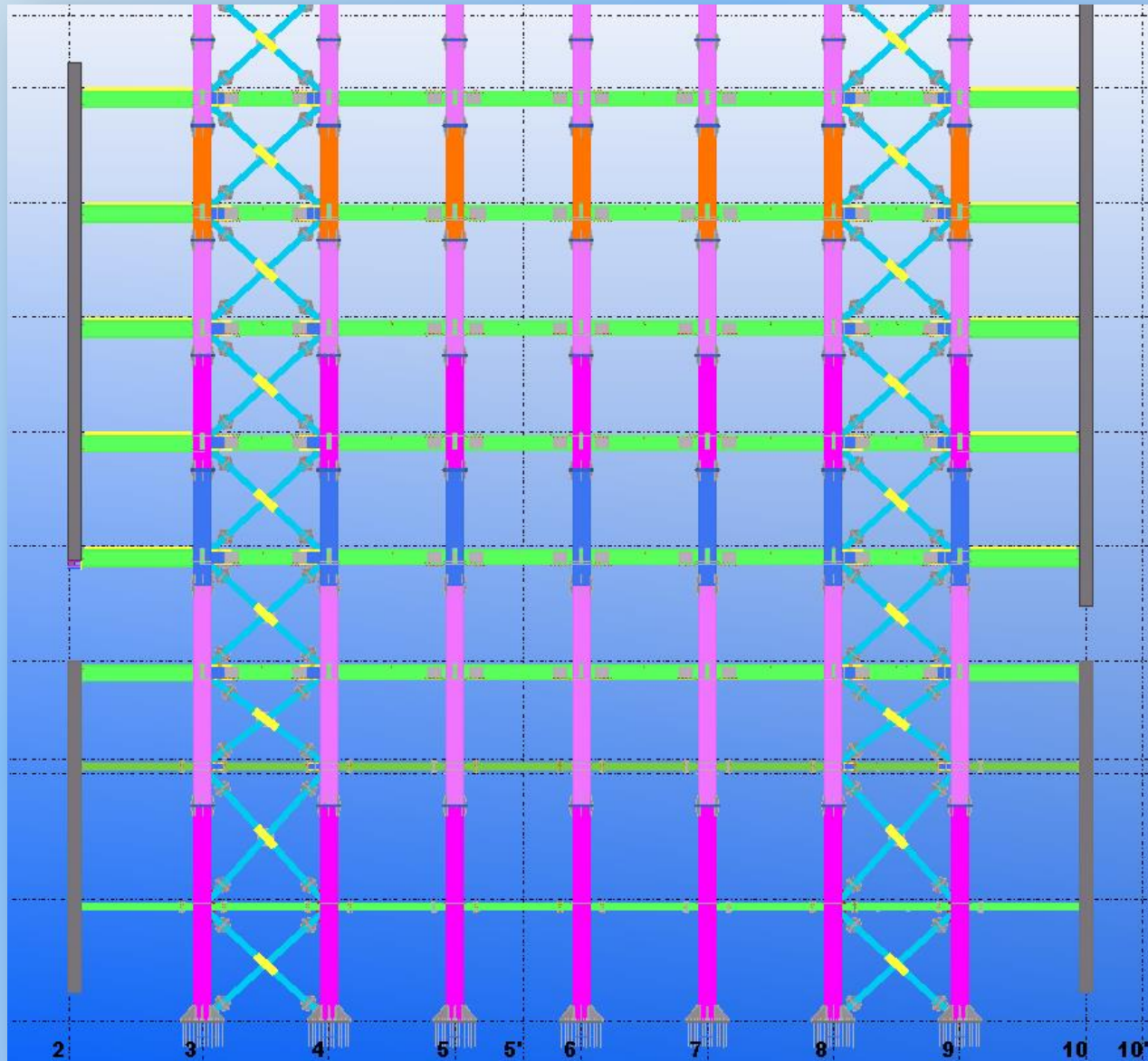
COLUMN SPLICE CONNECTION



BEAM & BRACE JUNCTION



BRACE CONNECTIONS



Architectural Flexibility



PROJECTS IN STEEL



Alphathum, Noida
Project Functional – 223,000 sqm. area



Foundation Ready



Two storey structure steel erected



Steel structure starts to go up while
concrete encasing is done on below floors



Progress



Speedy construction



Architectural finishings





MLCP Chandni Chowk

MLCP Chandni Chowk
Under construction – 116,000 sqm. area

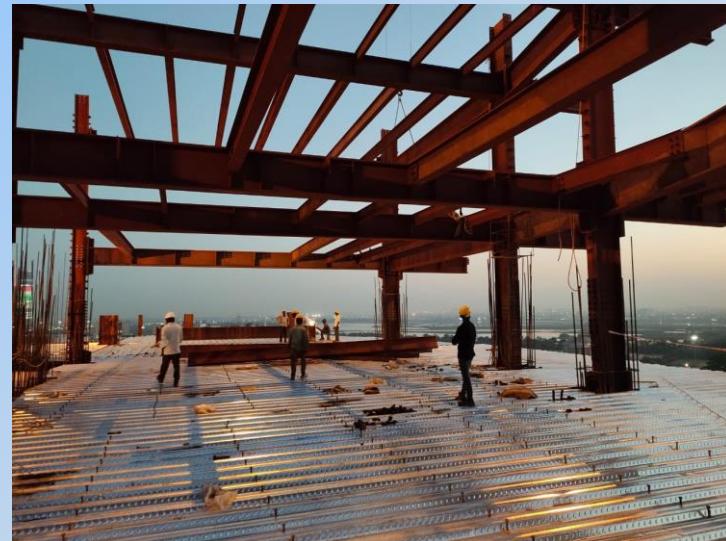


Cyberthum, Noida
Tonnage 12500 MT (Tallest Building - 208 MTRS)

BHEL CORPORATE TOWER, NOIDA



Pre Engineered Steel
consumed is approx. 6000 MT
Project coverage of Tower
Area is around 55,000 sqm.



ITHUM'73, NOIDA



Under Construction
70,000 sqm. Tower Area



IT PARK, NOIDA



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