



STEEL CONSTRUCTIONS

DR. SAMEIR M. HAMMAD

LECTURER OF ARCHITECTURAL ENGINEERING, BENHA FACULTY OF ENGINEERING

LECTURE CONTENT

DEFINITION AND SCOPE

- What is Steel Structure
- Advantages and Disadvantages
- Usage of Steel Structure

MAIN STRUCTURAL TYPES

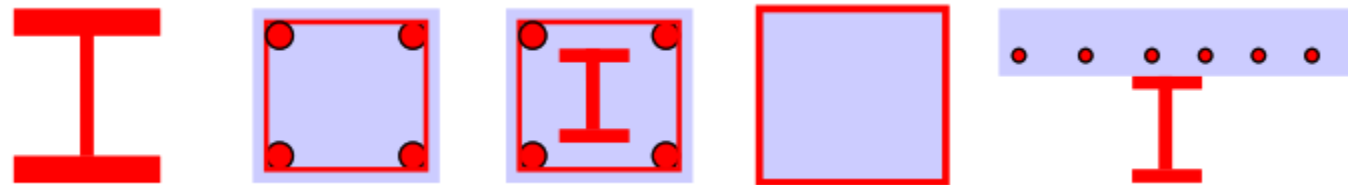
- Truss Structures
- Frame Structures
- Grid and Domes
- Pre-stressed Structures

STEEL STRUCTURE SYSTEM

- Columns
- Beams
- Walls

WHAT IS STEEL STRUCTURE

- Steel Structure: a structure which is made from organized combination of structural STEEL members designed to carry loads and provide adequate rigidity.
- steel structure, reinforced concrete (RC) structure, concrete-filled steel tubular (CFT) structure, steel-RC composite structure.



WHAT IS STEEL STRUCTURE

- **Steel Structures** involve sub-structure or members in a building made from structural steel



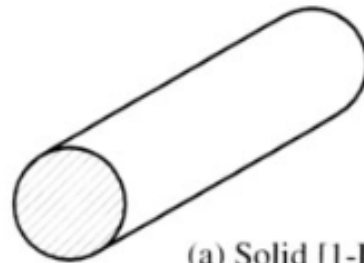
SHANGHAI STADIUM
Steel roof, concrete stand



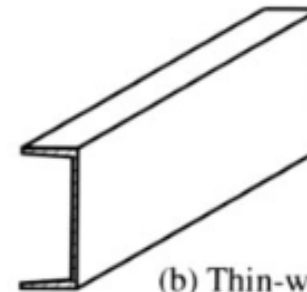
SHANGHAI GRAND THEATER
Steel roof, concrete columns

WHAT IS STEEL STRUCTURE

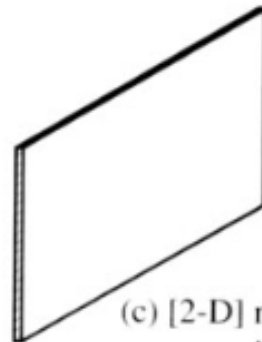
- **Structural Member** is physically distinguishable part of structure with independent structural function.



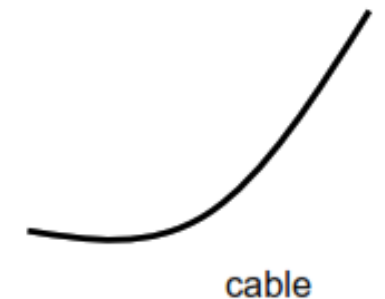
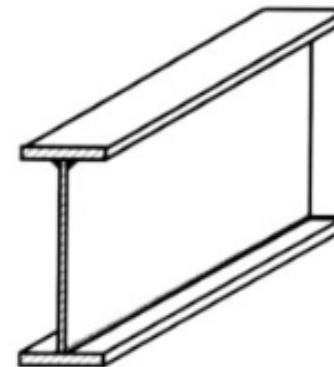
(a) Solid [1-D] member
 $t \approx d \ll L$



(b) Thin-walled [1-D] members
 $t \ll d \ll L$

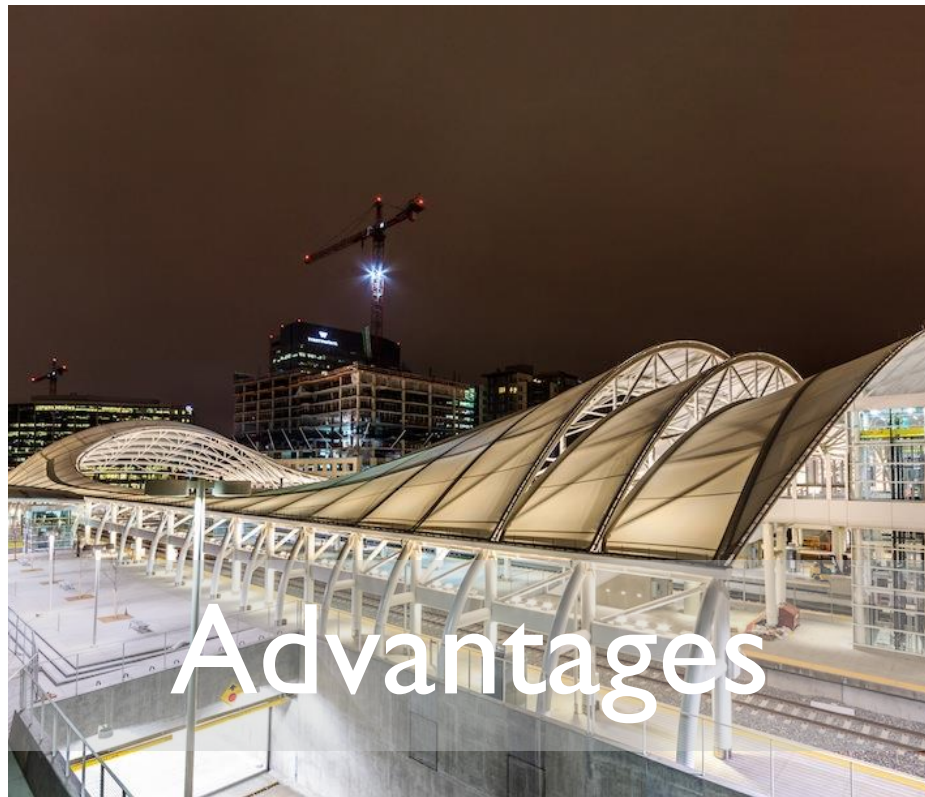


(c) [2-D] member
 $t \ll d \approx L$



cable

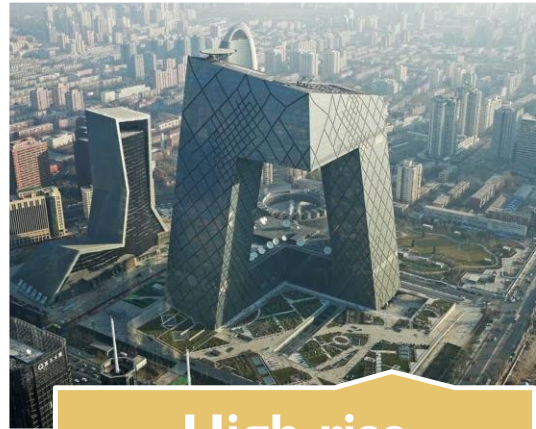
ADVANTAGES AND DISADVANTAGES OF STEEL STRUCTURE



USAGE OF STEEL STRUCTURE



Wide Spans



**High-rise
Buildings**



Bridges



Infrastructures

USAGE OF STEEL STRUCTURE



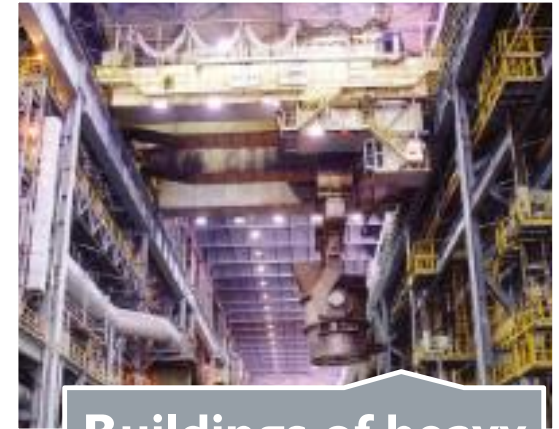
Sight-seeing



Tower & Mast structures



Agricultural Buildings



Buildings of heavy duty plant

10 MINS. EXERCISE

On A4 paper using appropriate sketches, compare between RC Construction Systems and Steel Constructions

- Usage of each
- Advantages and Disadvantages for each



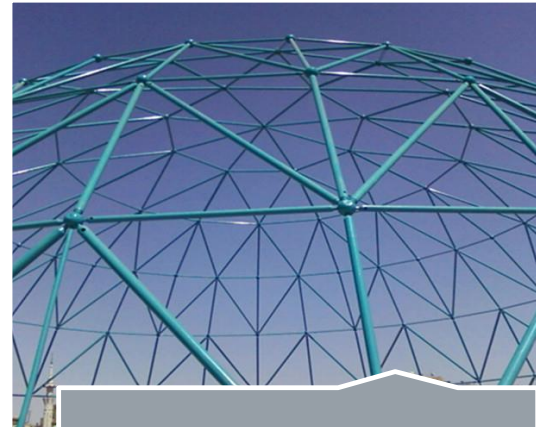
MAIN STRUCTURAL TYPES



Truss Structures



Frame Structures



Grid and Domes

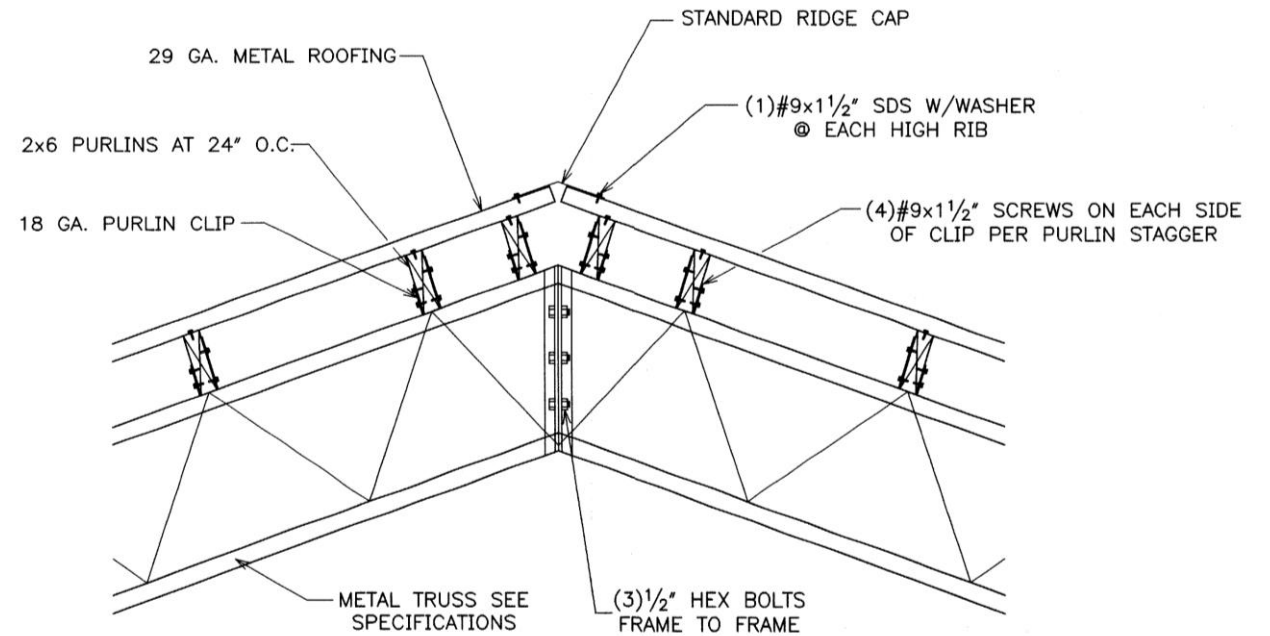
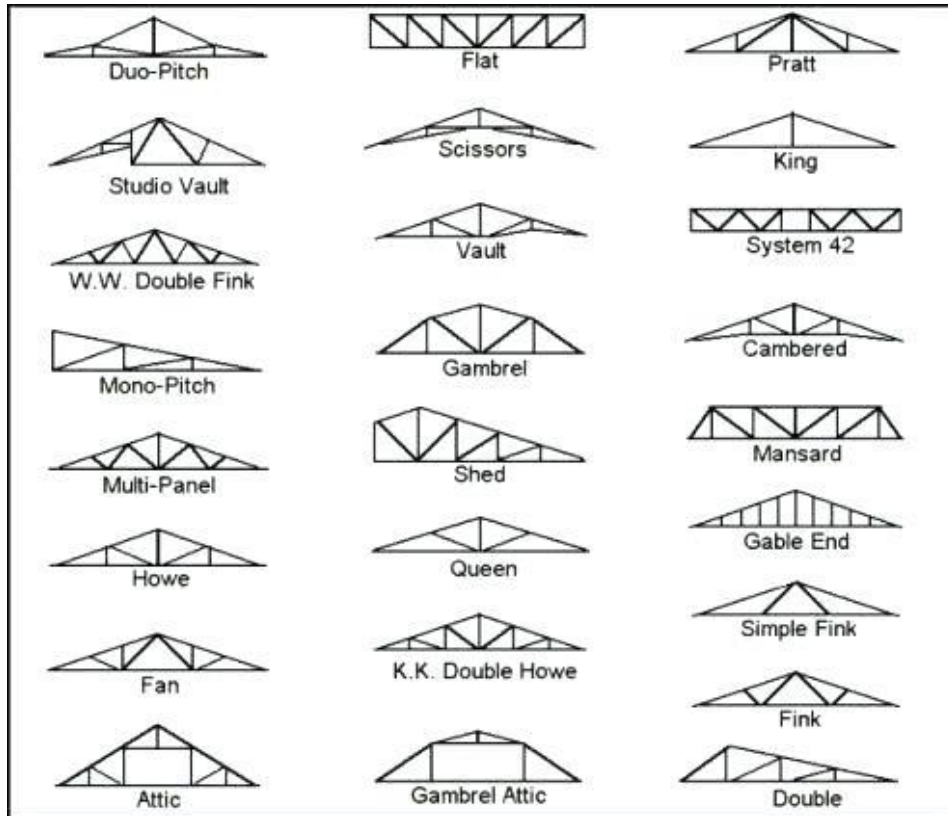


Pre-stressed
Structures

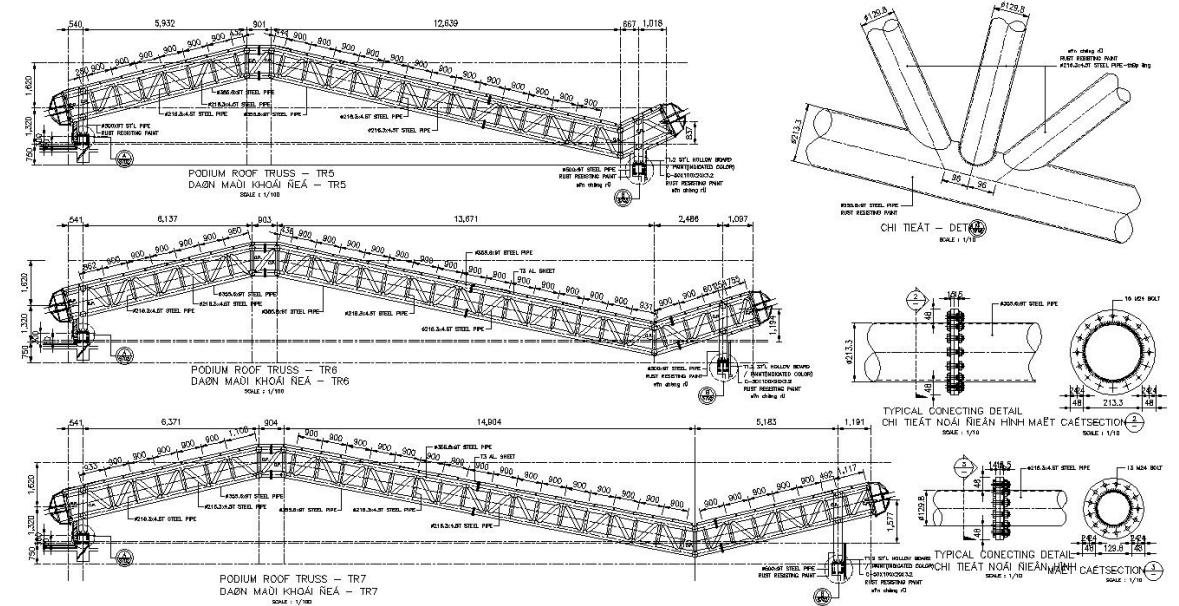
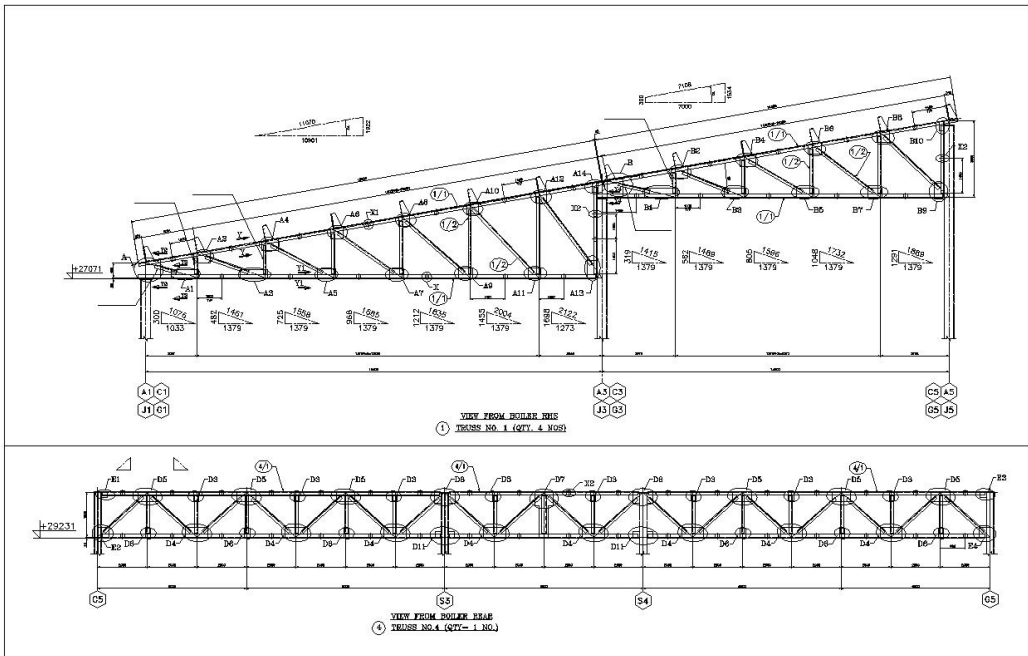
TRUSS STRUCTURES



TRUSS STRUCTURES



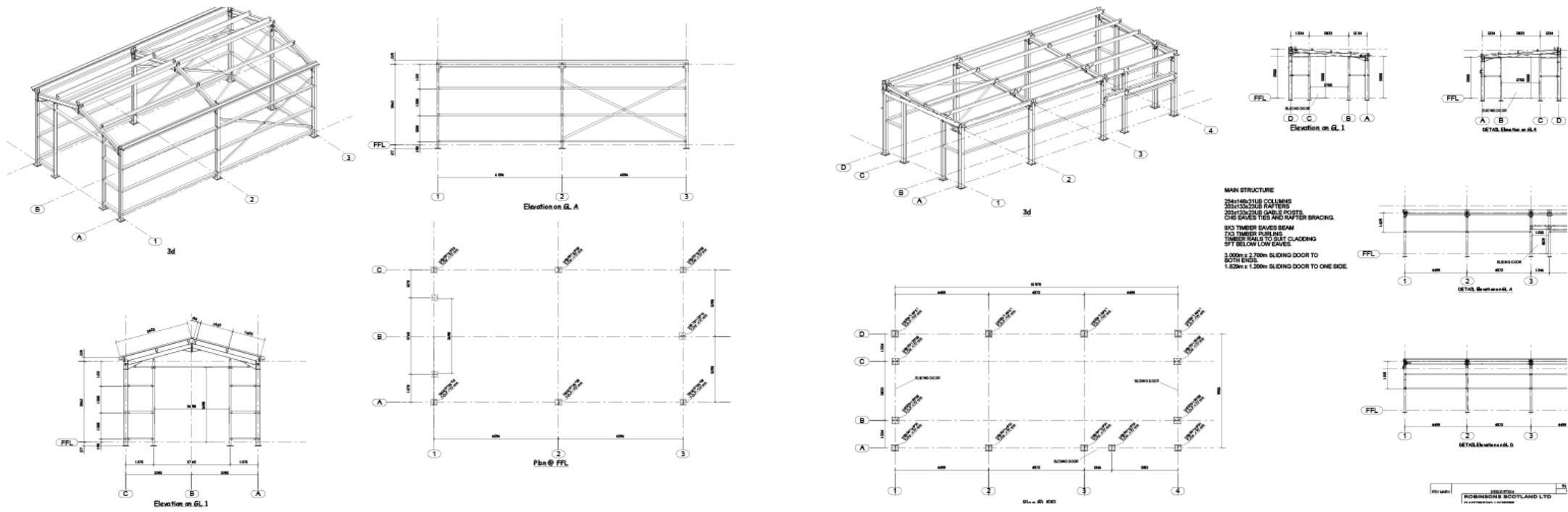
TRUSS STRUCTURES



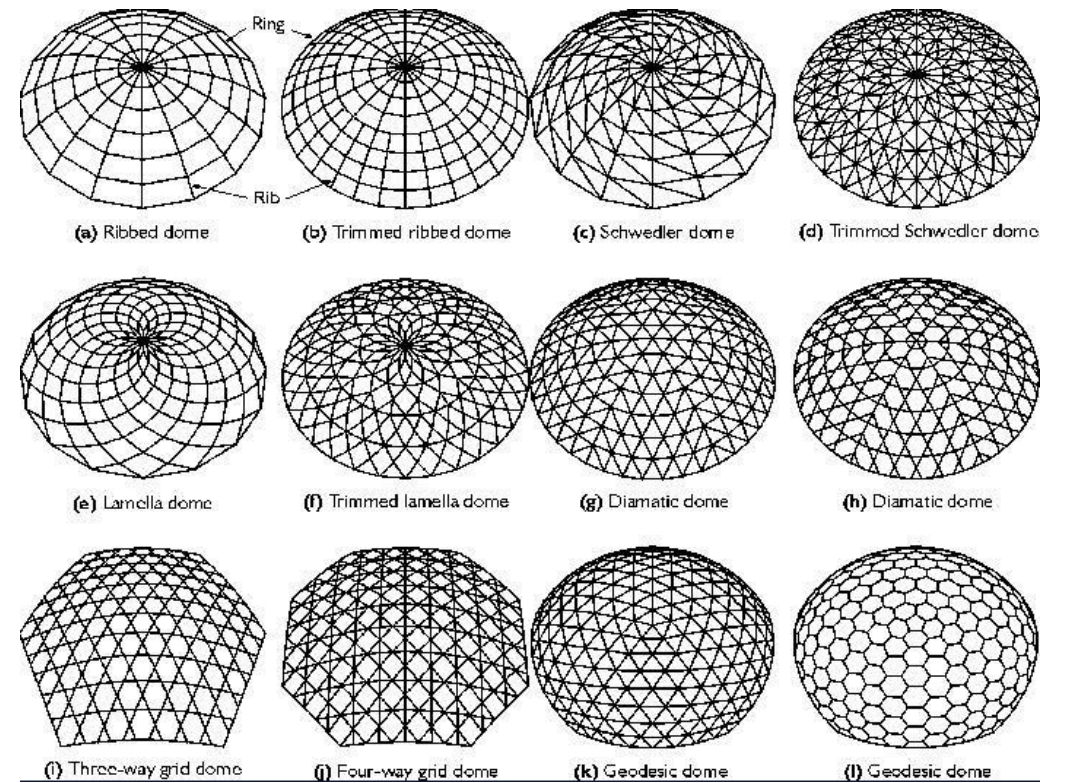
FRAME STRUCTURES



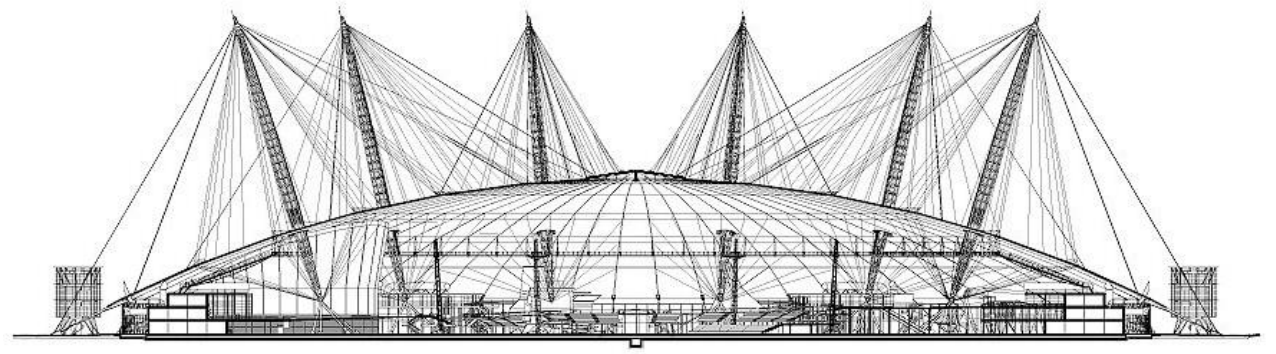
FRAME STRUCTURES



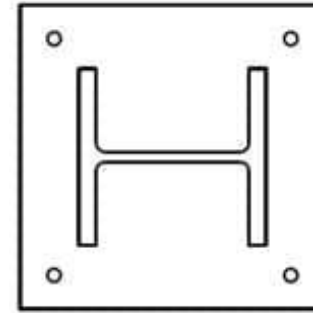
GRID AND DOMES



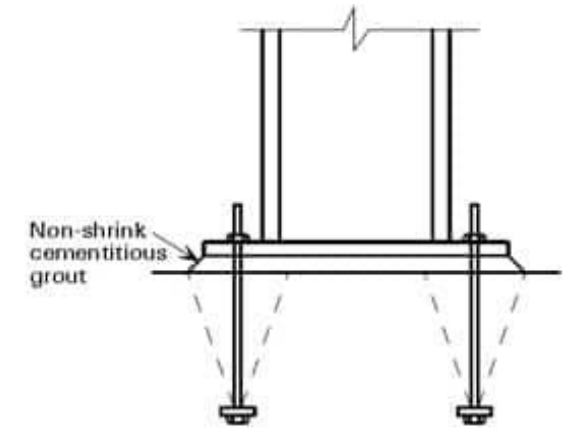
PRE-STRESSED STRUCTURES



STEEL COLUMNS



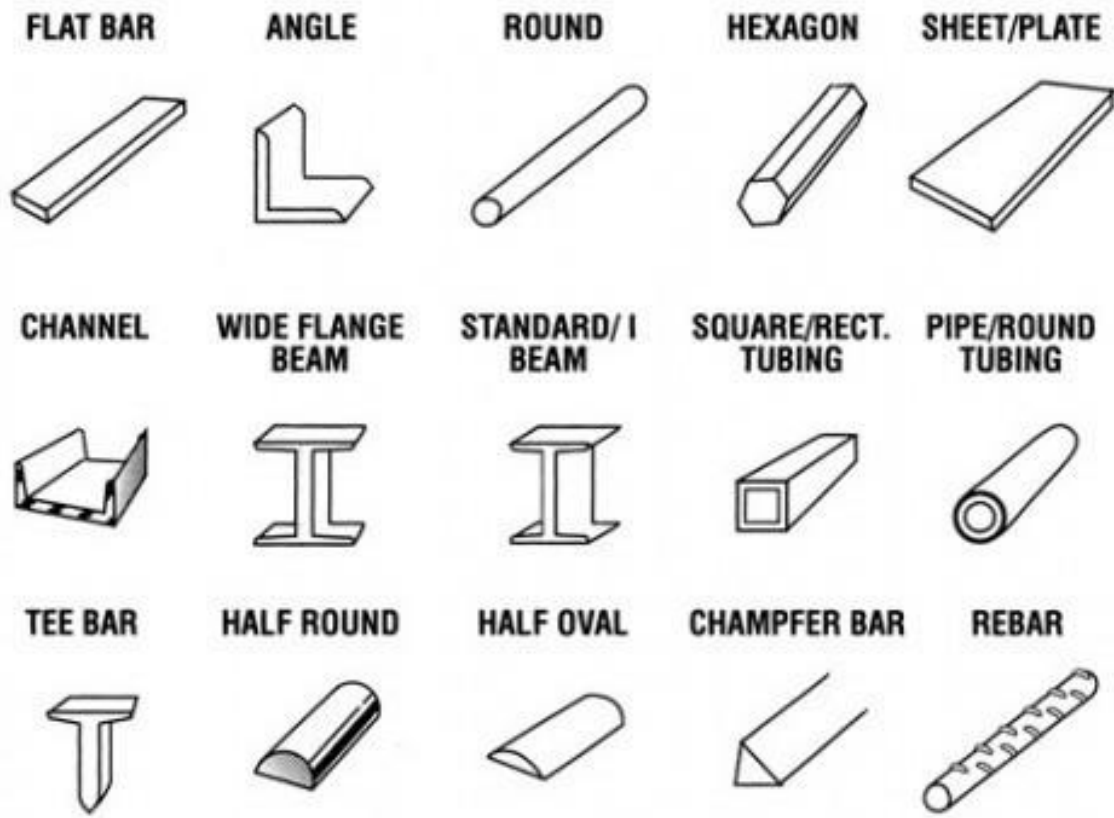
A



B

Frame	Storey level	Column size (mm)
10-Storey	1-10	700 × 700
	1-7	750 × 750
	8-14	600 × 600
20-Storey	15-20	450 × 450
	1-10	800 × 800
	11-20	650 × 650
30-Storey	21-30	470 × 470

STEEL BEAMS



Stainless Structural

About Products Support Media

Stainless Steel Beams

Home Product Catalog Stainless Steel Beams

Inquiry List
No products in the list

Select Your Shape

Filter by Shape

- Stainless Steel Angles
- Stainless Steel Beams
- Stainless Steel Channels
- Stainless Steel Tees
- Stainless Steel Plate

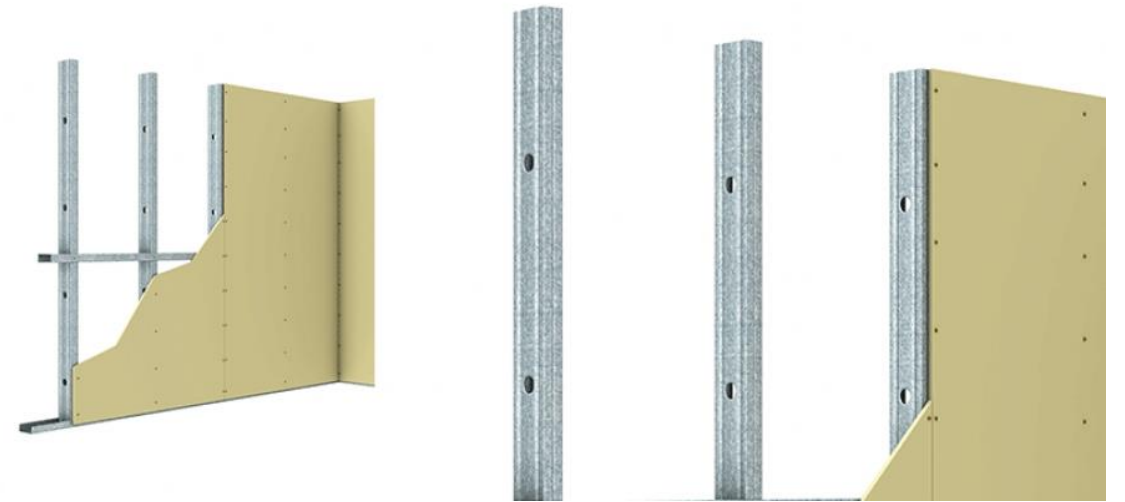
LASER **HOT ROLLED**

We produce and distribute hot rolled and laser fused stainless steel beams throughout the world in both imperial and metric sizes. Please select the catalog for your region below to view a list of available standard size beams. Our range of capabilities far exceeds standard sections, though. We are a profile solutions company, and custom shapes, sizes and alloys are available upon request. If you do not see what you are looking for, please contact us, and our experienced staff will help guide you with your custom profile needs. If you can dream it up, chances are we can make it.

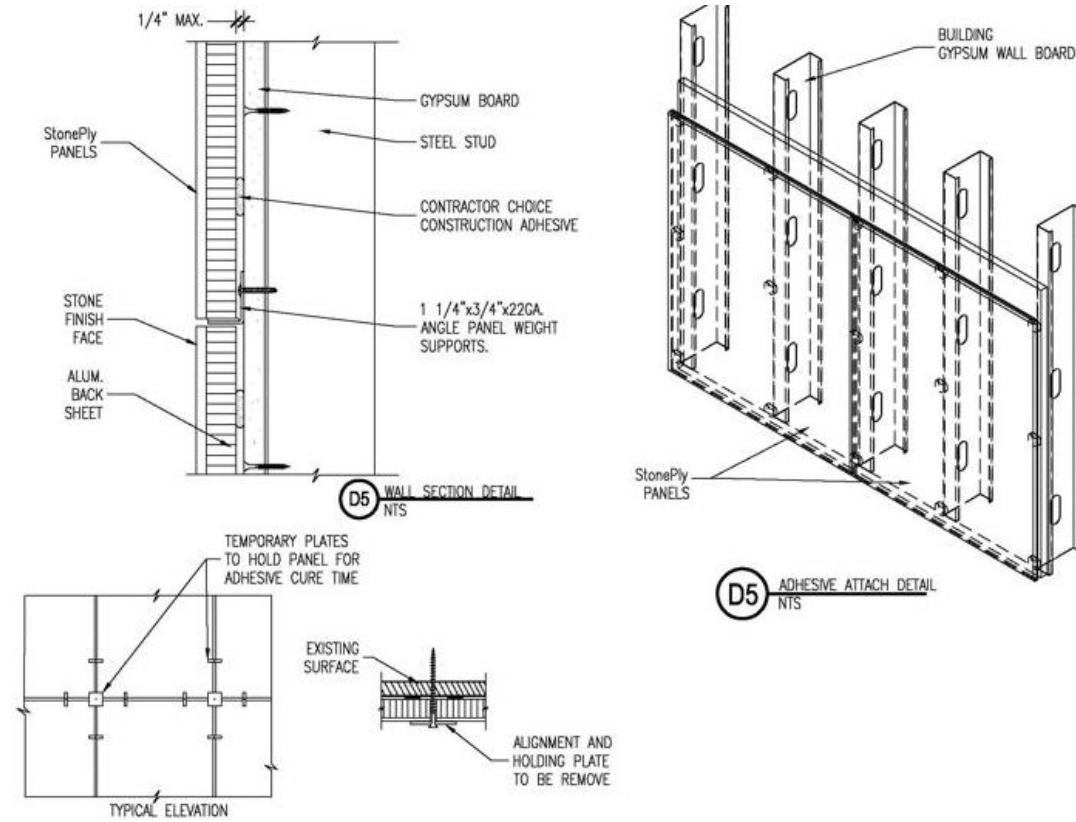
Reset

Products	Select h	Select b	Select tw	Select tr	Select est-wt	Production	Availability	Alloys
S 3x5.7	3	2.33	0.17	0.26	5.7	Hot Rolled	Stock Item	Select To Add
S 3x7.5	3	2.51	0.349	0.26	7.5	Laser Fused	Stock Item	Select To Add

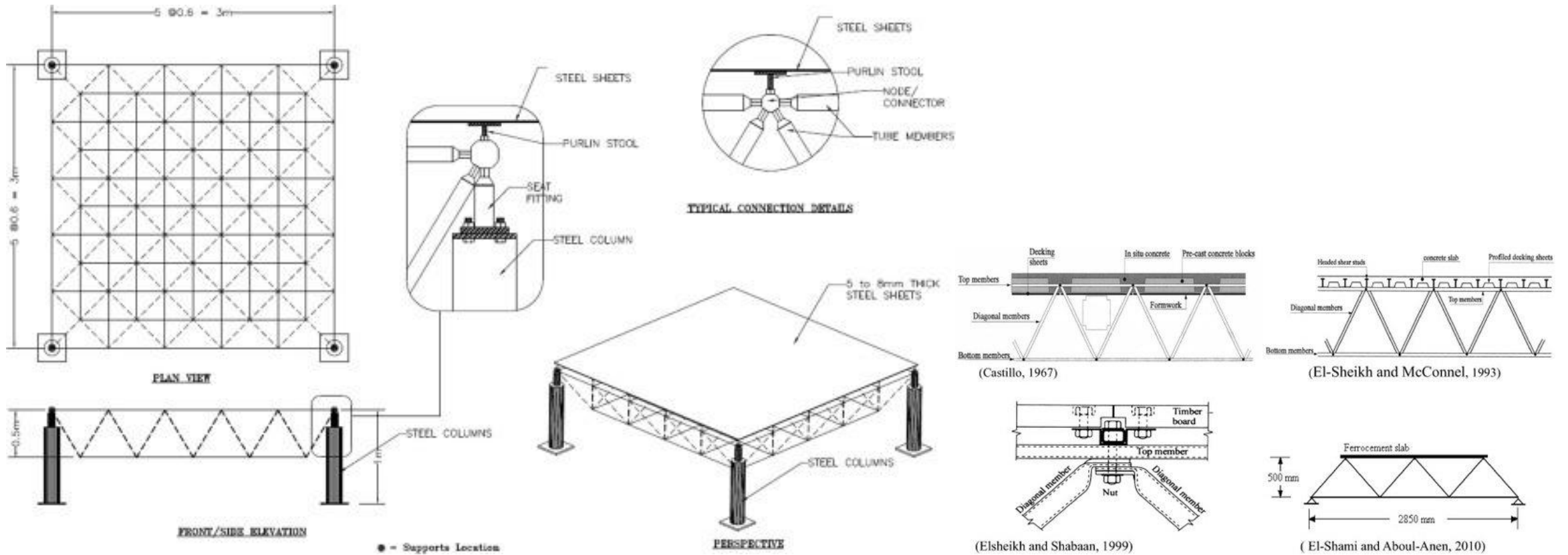
STEEL WALLS



STEEL WALLS



EXAMPLES



ASSIGNMENT # 12

On 50x70 cm paper, Draw to scale **1:20** the Steel Components (Beams, Columns and Walls)

Assume:

- column dimensions 450x450 mm
- Any missing dimensions.

CONTACTS



<http://bu.edu.eg/staff/sameir.hammad>



Saturday, Sunday and Tuesday ... 9:00 am to 2:00 pm



Sameir M. Hammad