# Steel structures

PRESENTED BY :- SAURABH MALPOTRA

# ? WHAT ARE STEEL STRUCTURES

- A structure which is made from organised combination of structural STEEL members designed to carry loads and provide adequate rigidity

- Steel structures involve a sub-structure or members in a building made from structural steel.

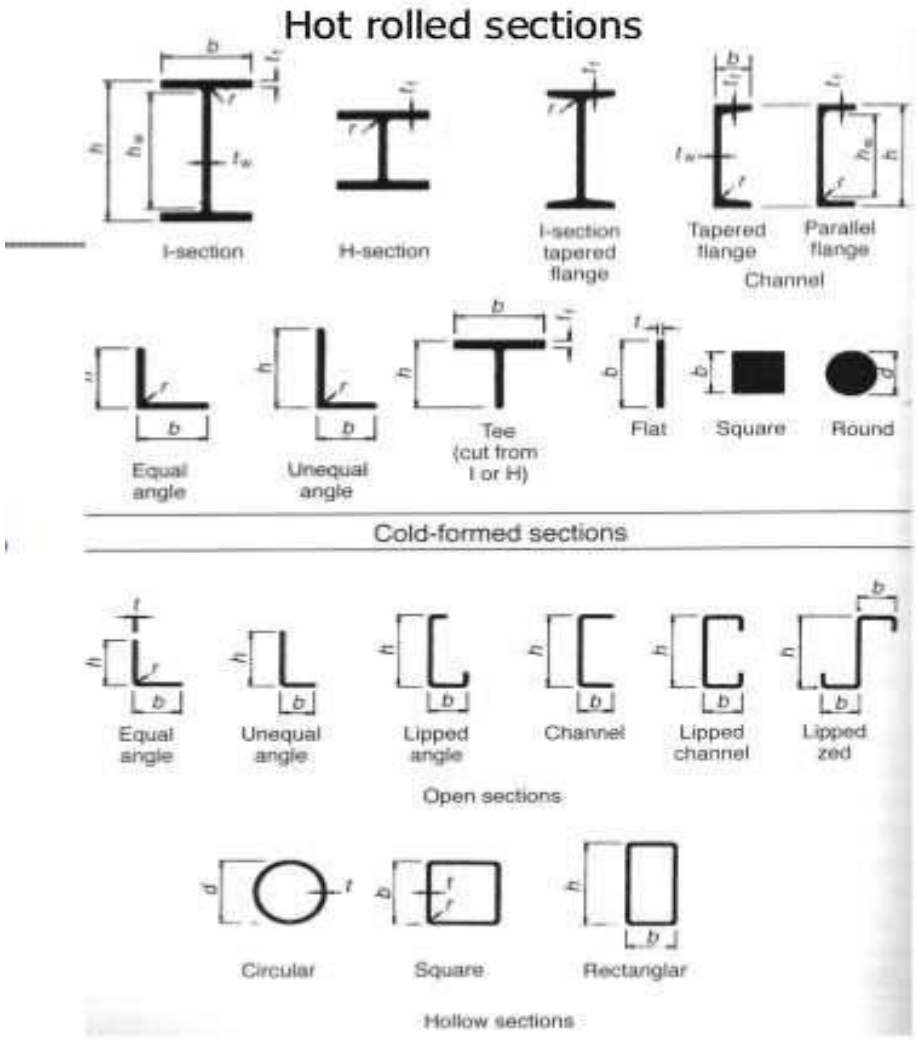
*Some famous steel structures are-*

WALT DISNEY CONCERT HALL,US

TYNE BRIDGE,UK

HOWRAH BRIDGE,INDIA

# ELEMENTS IN A STEEL STRUCTURE




Structural member is physically distinguishable part of structure with independent structural function, e.g. member elements,cable,beams,sections etc

# ADVANTAGES OF USING STEEL IN STRUCTURES

- High strength
- The high ratio of strength to weight (the strength per unit weight)
- Excellent ductility and seismic resistance
- Withstand extensive deformation without failure even under high tensile stress.
- Elasticity, uniformity of material
- Predictability of properties, close to design assumption
- Ease of fabrication and speed of erection

# STEEL

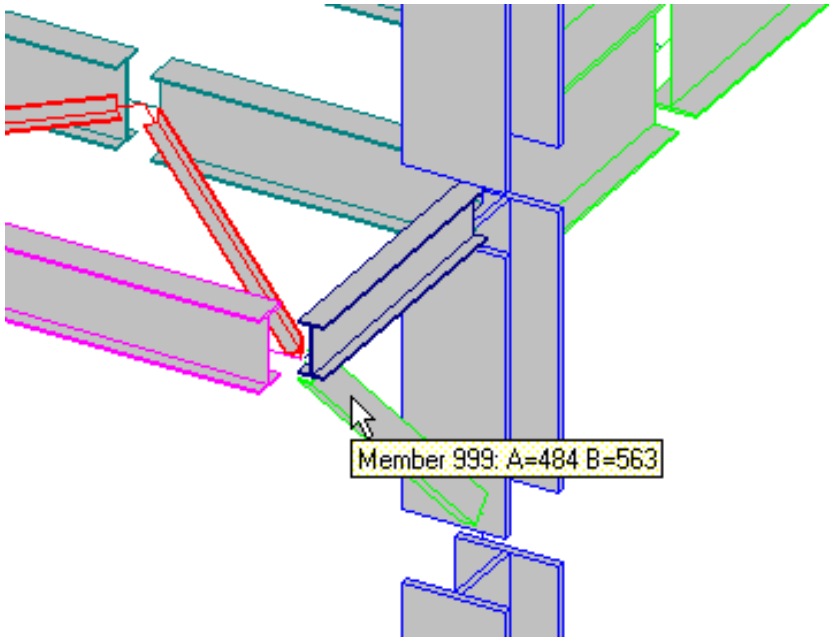
The **specific strength** is a material's strength (force per unit area at failure) divided by its density. It is also known as the strength-to-weight ratio or **strength/weight ratio**. In fiber or textile applications

Specific tensile strength of various materials

| Material | Strength (MPa) | Density (g/cm³) | Specific Strength (kN·m/kg) | Breaking length (km) | source |
|---|---|---|---|---|---|
| Magnesium | 275 | 1.74 | 158 | 16.1 | [5] |
| Aluminium | 600 | 2.80 | 214 | 21.8 | [6] |
| Stainless steel | 2000 | 7.86 | 254 | 25.9 | [6] |
| Titanium | 1300 | 4.51 | 288 | 29.4 | [6] |

# MOST IMPORTANT

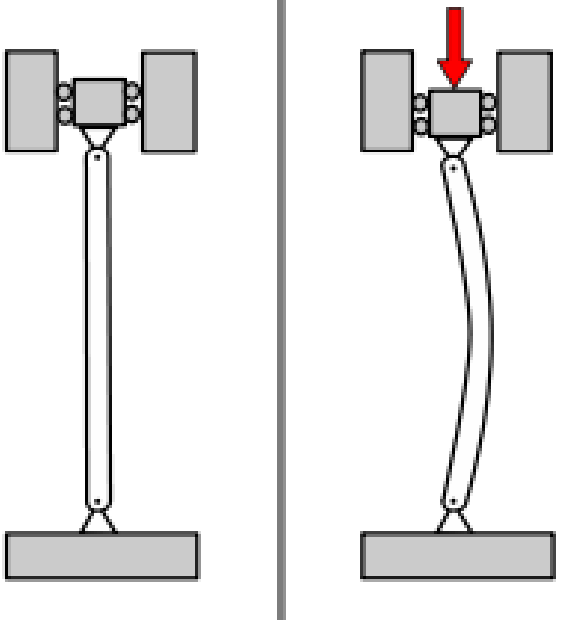
- Steel structures facilitate ease of fabrication and faster erection of structure .Bolts and welding employed for joining .




# *DISADVANTAGES OF USING STEEL IN A STRUCTURE*

- Susceptibility to corrosion
- Maintenance costs / thin-walled structure
- Loss of strength at elevated temperature
- Fireproofing costs
- Susceptibility to buckling
- Fatigue and brittle fracture

Bucling phenomenon



# Where & when use steel structures?

1)Long-span structures
2)Multi-storey & high-rise buildings
3)Buildings of heavy duty plants
4)Tower & mast structures
5)Portal frames
6)Bridges
7)Infrastructures
8)Deployable structures
9)Generalized structures: mechanical

# HOWRAH BRIDGE

**When commissioned in 1943, Howrah was the 3rd-longest cantilever bridge in the world**

STEEL MARVEL OF INDIA

# THANK YOU

Er. Saurabh Malpotra