



Construction Applied to Heritage



Erasmus+

Construction Applied to Heritage

3 ECTS

SH

Sustainable Heritage

EC

Elective Courses



Construction Applied to Heritage

SH

Sustainable Heritage

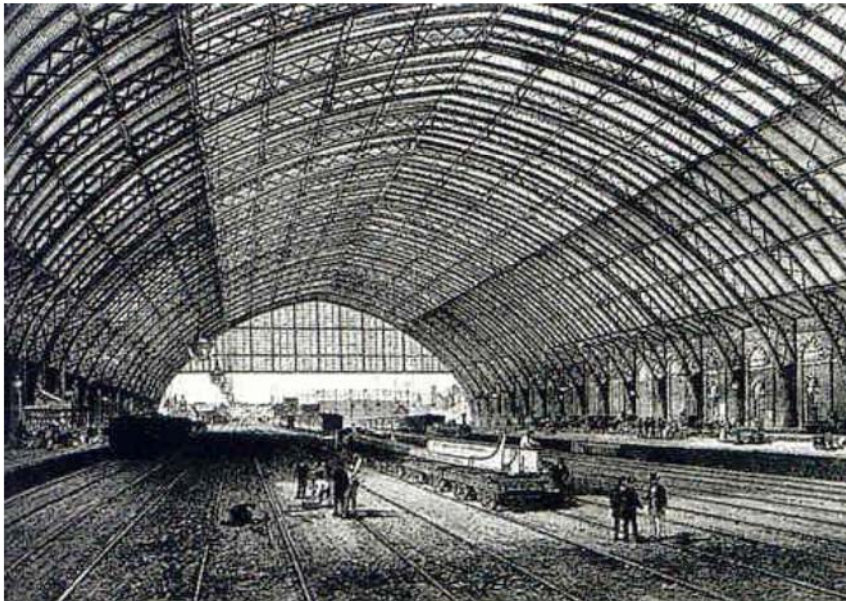
EC

Elective Courses

1. Foundations.
2. Retaining Works.
3. Drainage and Sewerage Systems.
4. The Porous Loadbearing System.
5. The Porous Loadbearing System. Walls.
6. The Porous Loadbearing System. Grid Structures.
- 7. The Compact Loadbearing System.**
8. The Porous and Mixed Horizontal Loadbearing System. Slabs.
9. The Porous and Mixed Horizontal Loadbearing System. Grid slabs.
10. Roofs.
11. Sloping Roofs.
12. Flat Roofs.
13. Façades. Porous System. Ventilated Façades.
14. Façades. The Compact System. Curtain Walls.
15. The Internal Partitioning Layout. Construction Process.

Construction Applied to Heritage

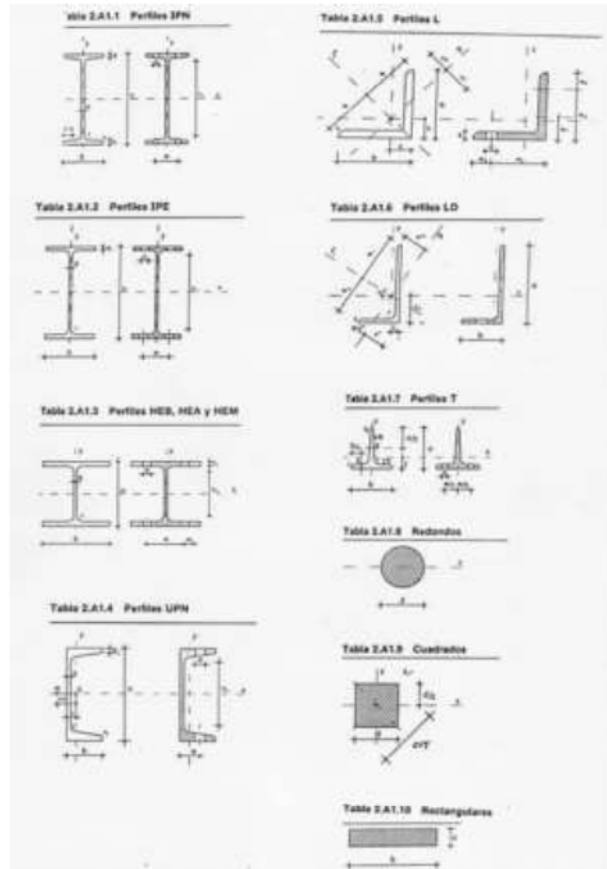
3 ECTS



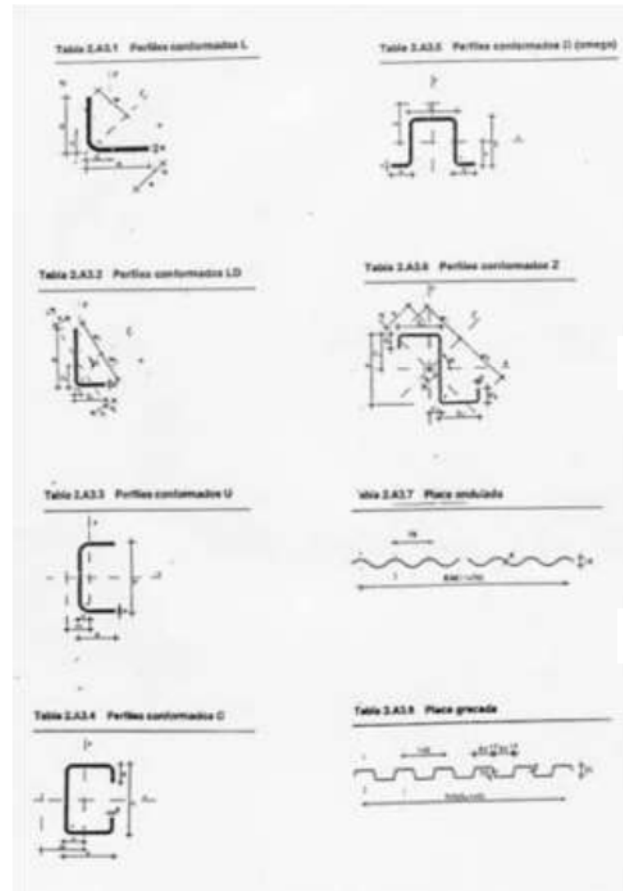
07 THE COMPACT LOADBEARING SYSTEM

- Steel reticular structures.
- Light structural systems.
- The joining system: welding and screwing.
- Using criteria.
- Methods and execution process. Quality control: penetrating liquids, ultrasound and X-rays.

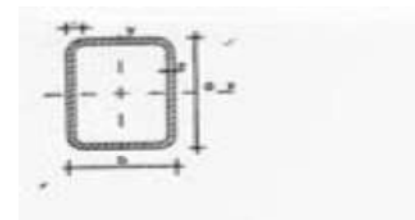
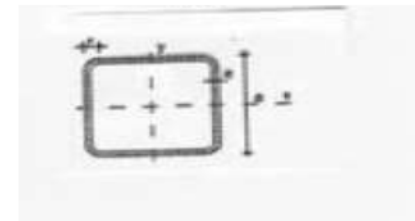
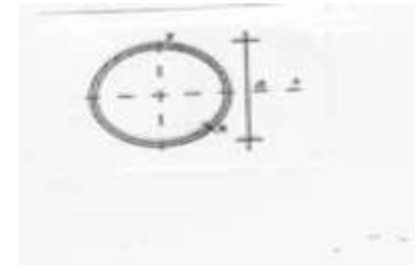
METALLURGY COMPANIES MANUFACTURE PRODUCTS:



LAMINATED



CONFORMED



HOLLOW
PROFILES AND
SCREWS

Metallurgy companies publish compendiums containing the following data:

- Section Area
- Modulus of Toughness
- Radius of gyration
- Weight per linear metre
- Profile's span a function of load and permissible deflection
- Diameter of bolts and rivets and boring lines.

In this type of structures the following issues must be taken into account:

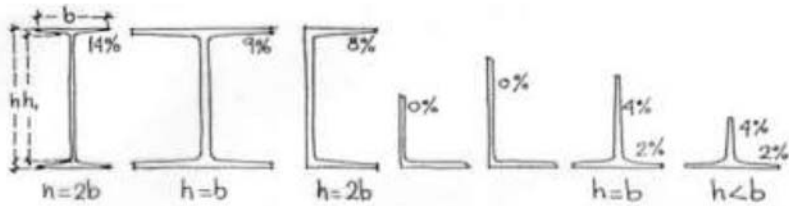
- Continuity, by means of through bars, crosses, etc.
- Clutches, by means of bushes and linings.
- Movement limitations, by means of reinforcements.
- The stiffening, by means of plates.
- Lightning effects, by means of the Faraday cage, earth connection.
- Effects of the electric current: telluric derivation, earth connection, sacrificial anodes.
- Corrosion, by means of intumescent paint, internal cooling.

TYPES:

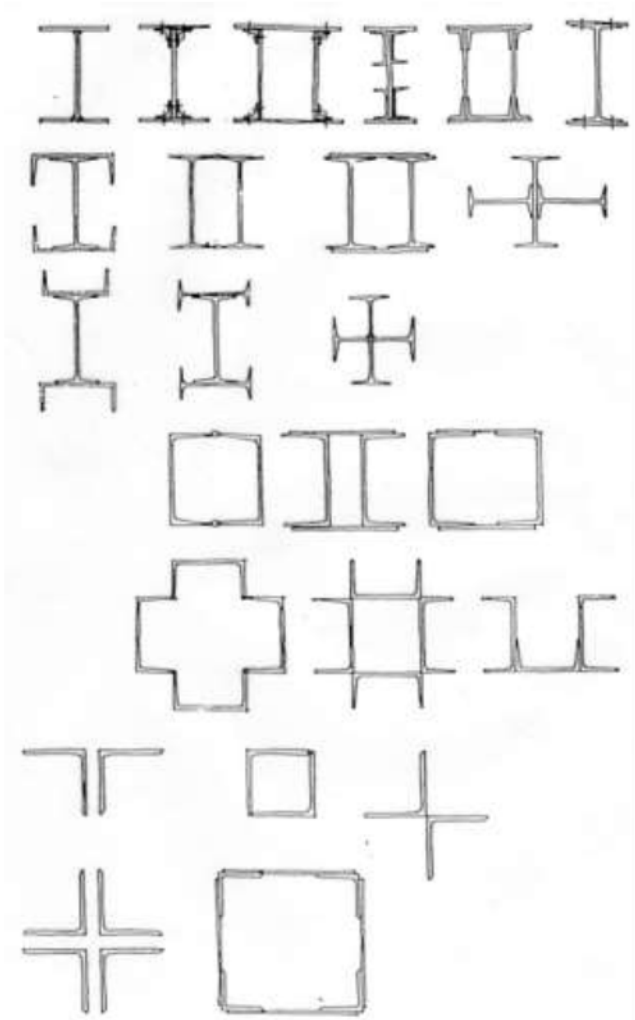
- A) REMOVABLE OR DEMOUNTABLE SYSTEM (“AMERICAN” SYSTEM)
- B) NON REMOVABLE SYSTEM (“EUROPEAN” SYSTEM)

PIERS

STEEL PROFILES



SIMPLE



COMPOUND

LAMINATED STEEL STRUCTURES. PIERS

SIMPLE PILLARS

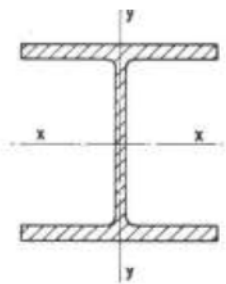
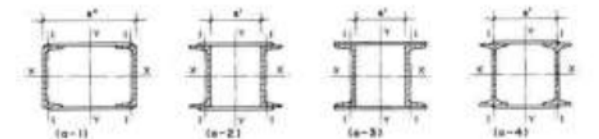
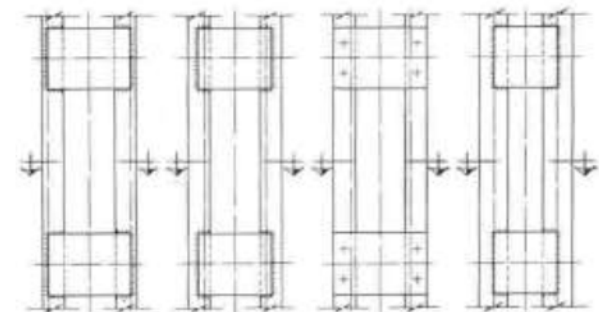
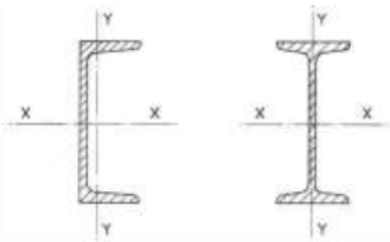
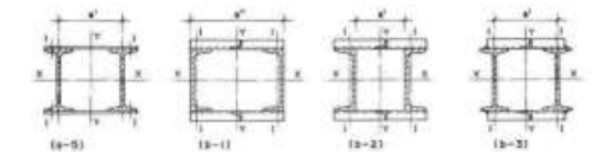
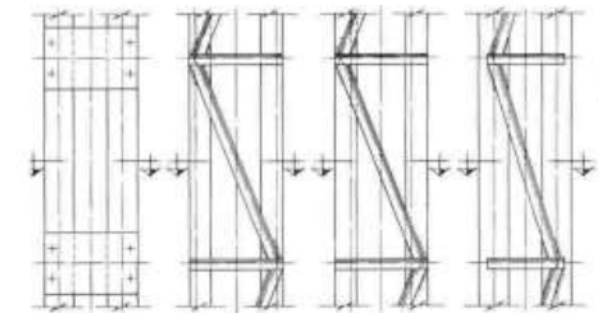
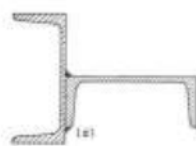
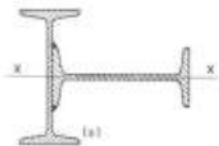
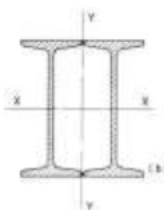
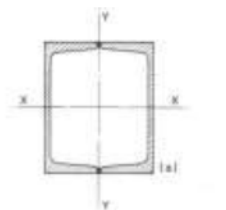


Fig. 4.23



COMPOUND PILLARS



STAPLES COMPOUND PILLARS

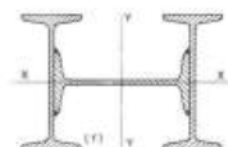
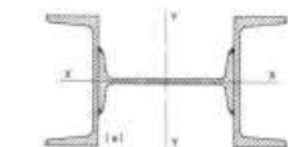
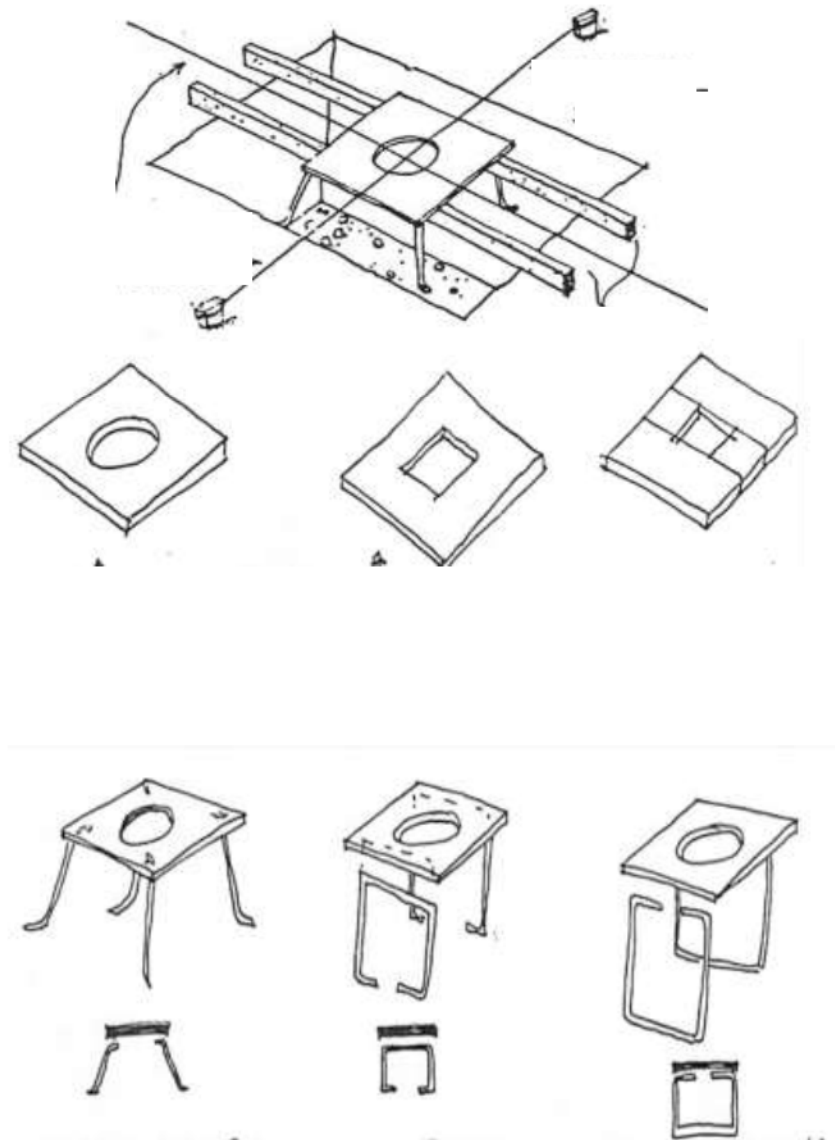
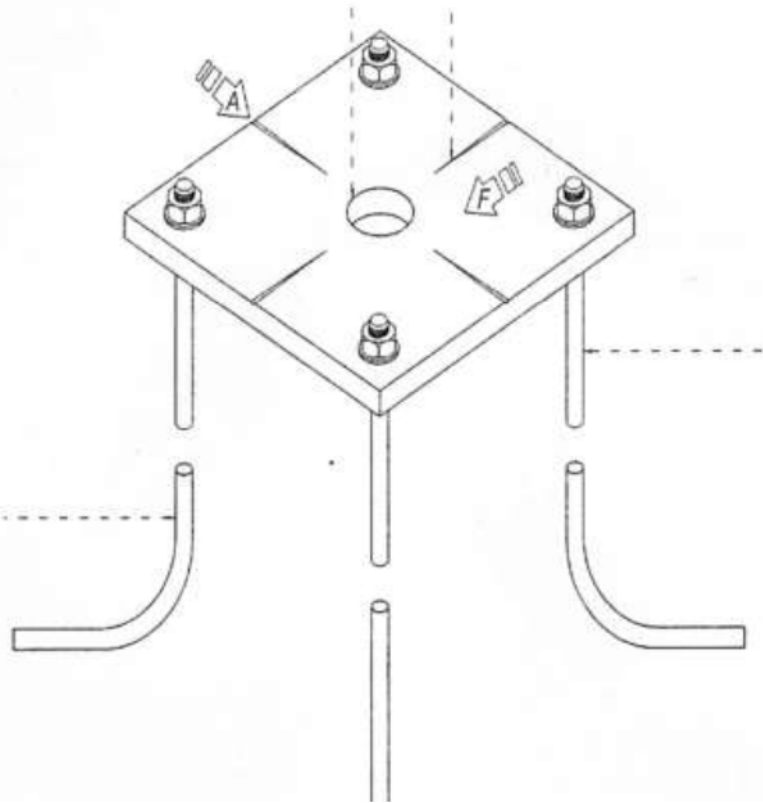
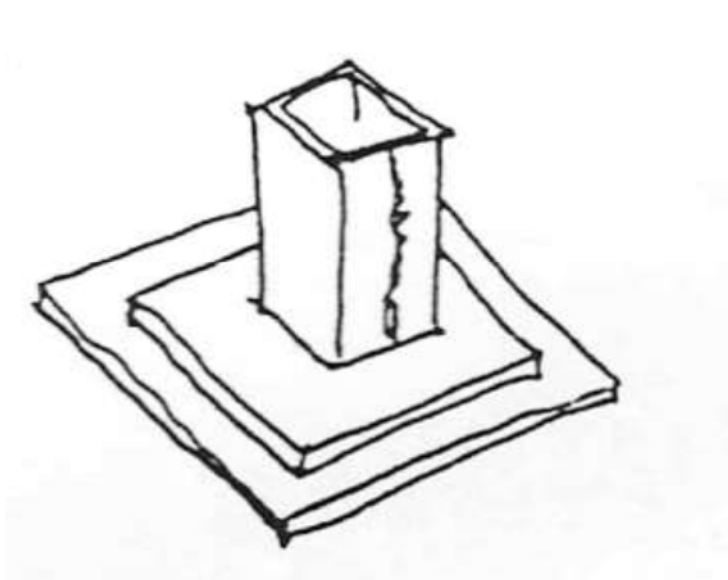


Fig. 4.25

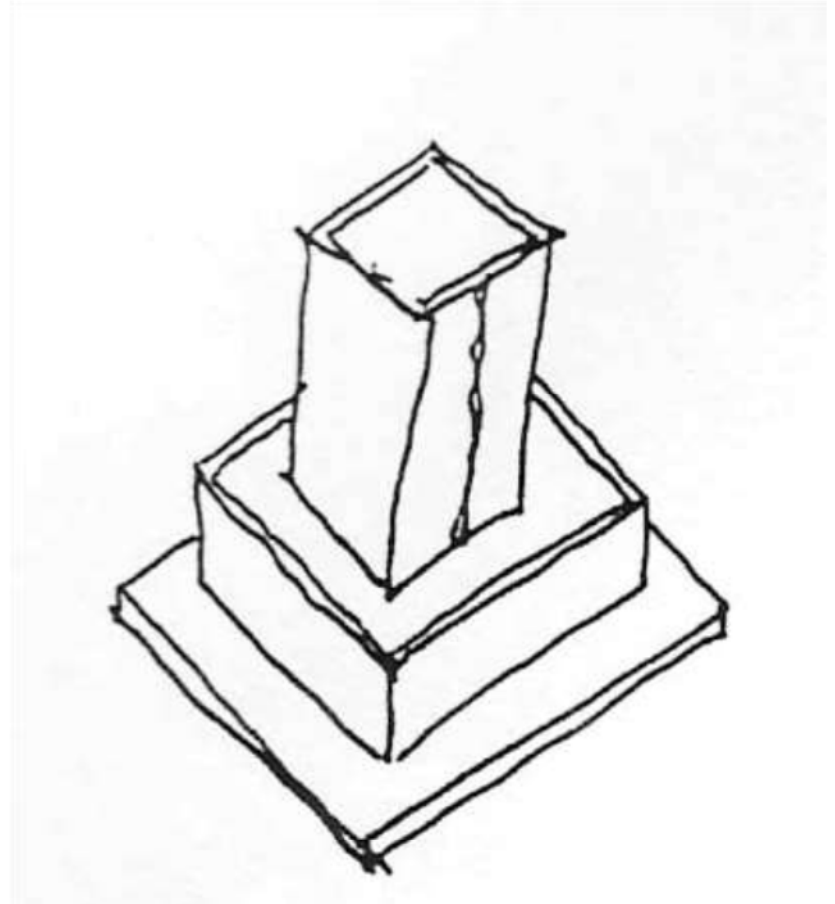
PLATES AND ANCHORS



A) SUPPORT ALLOWING EXPANSION

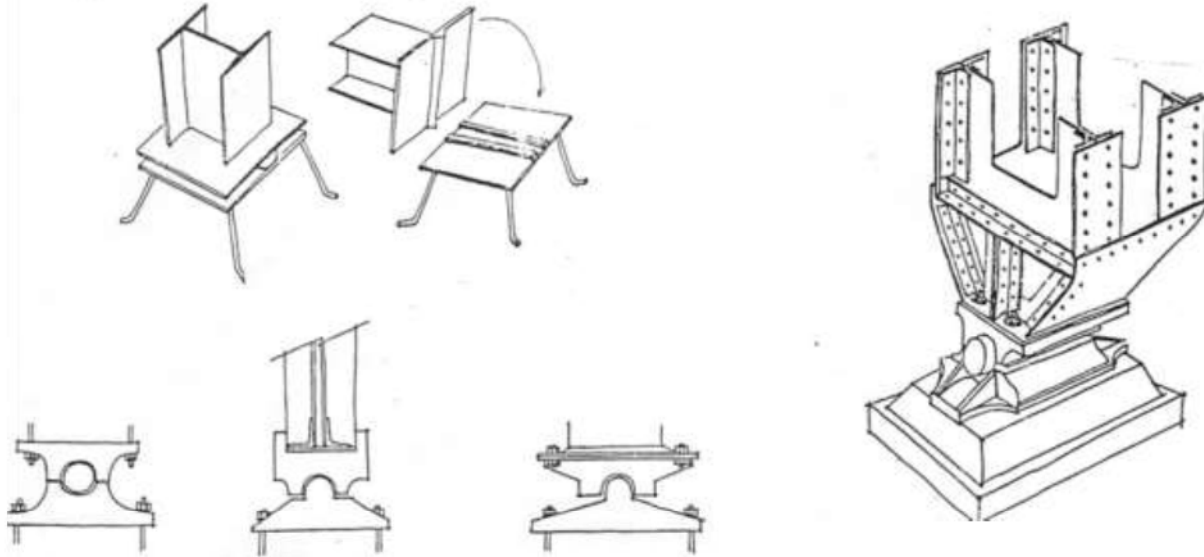


BY GRAVITY

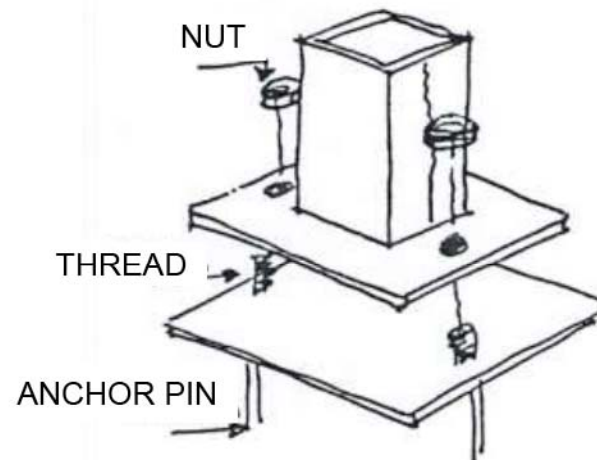
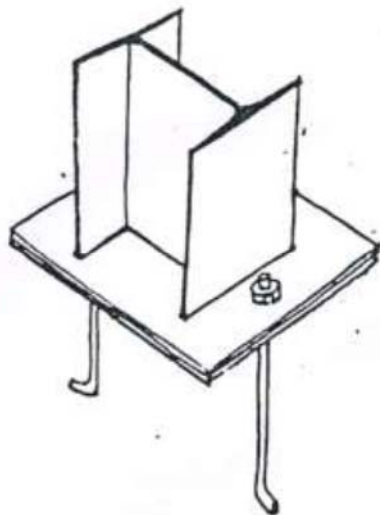


BY GRAVITY WITH LIMITED MOVEMENTS

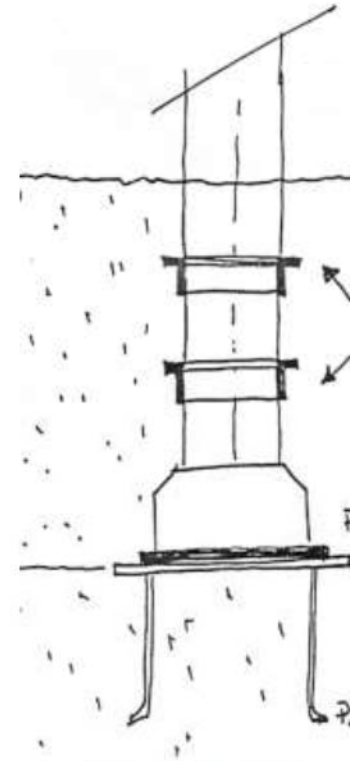
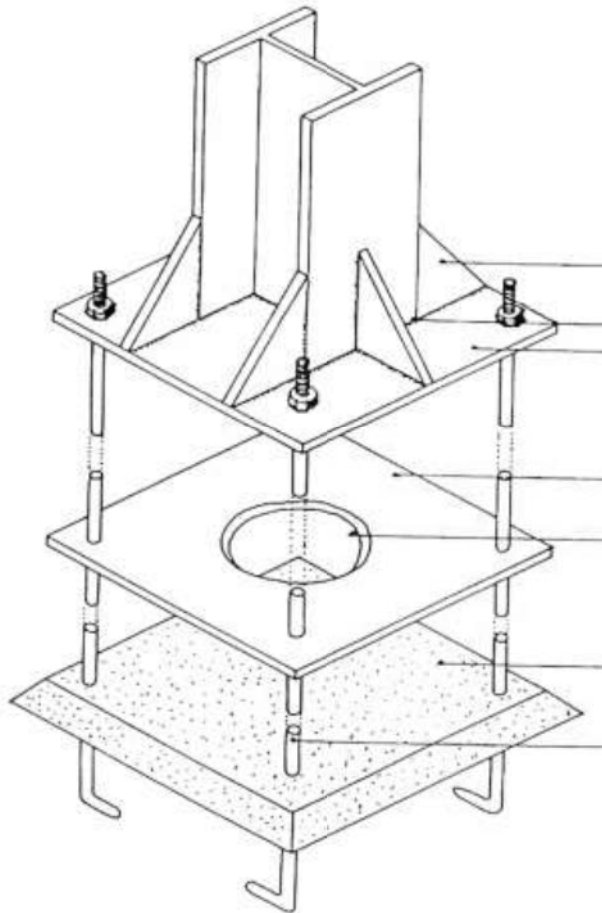
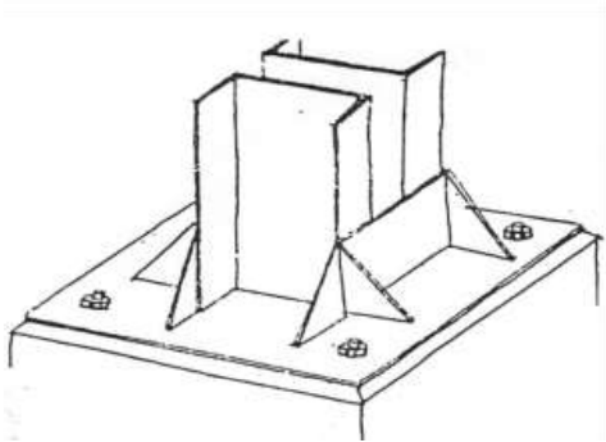
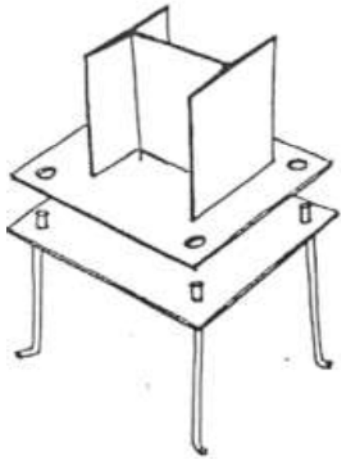
B) HINGED SUPPORT



C) HALF-HINGED OR HALF-FIXED



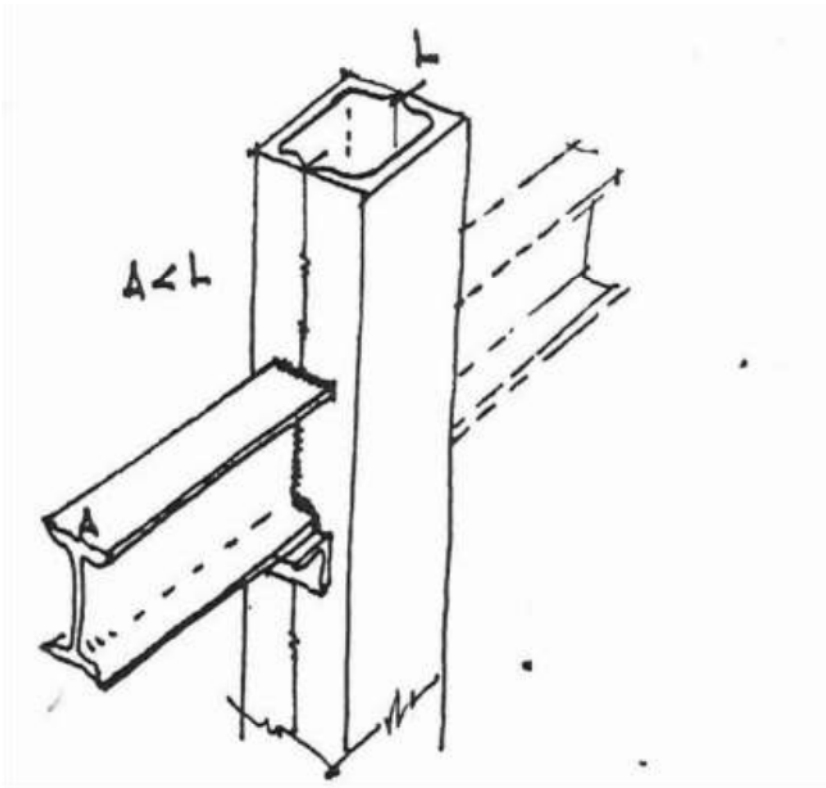
D) FIXED SUPPORT



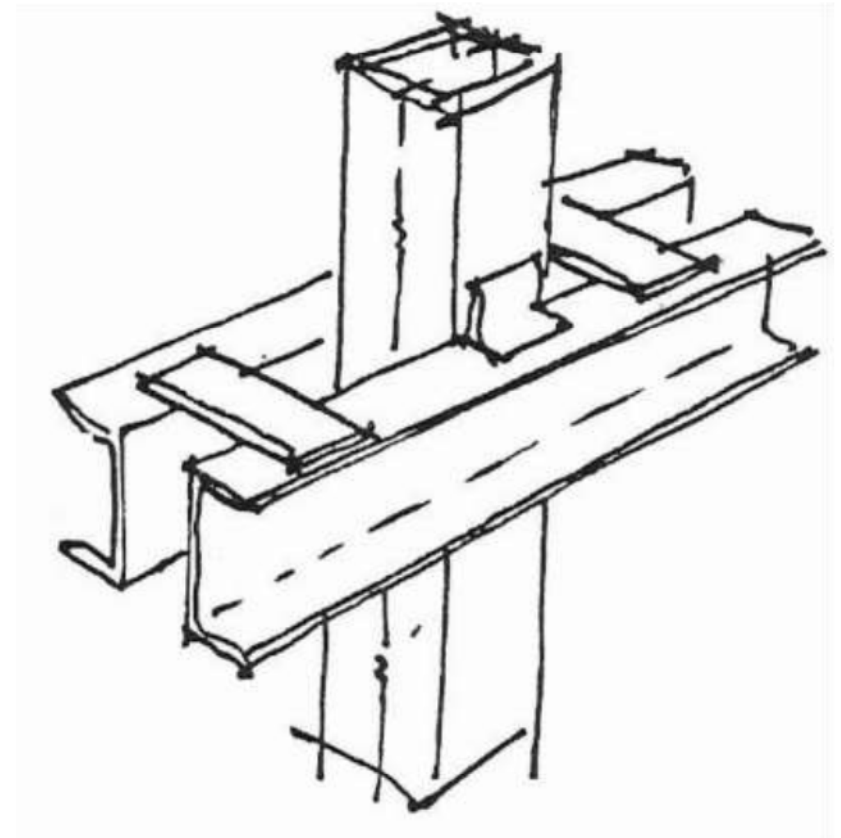
MAIN BEAMS

1. SIMPLE PROFILES, CONTINUOUS WEB

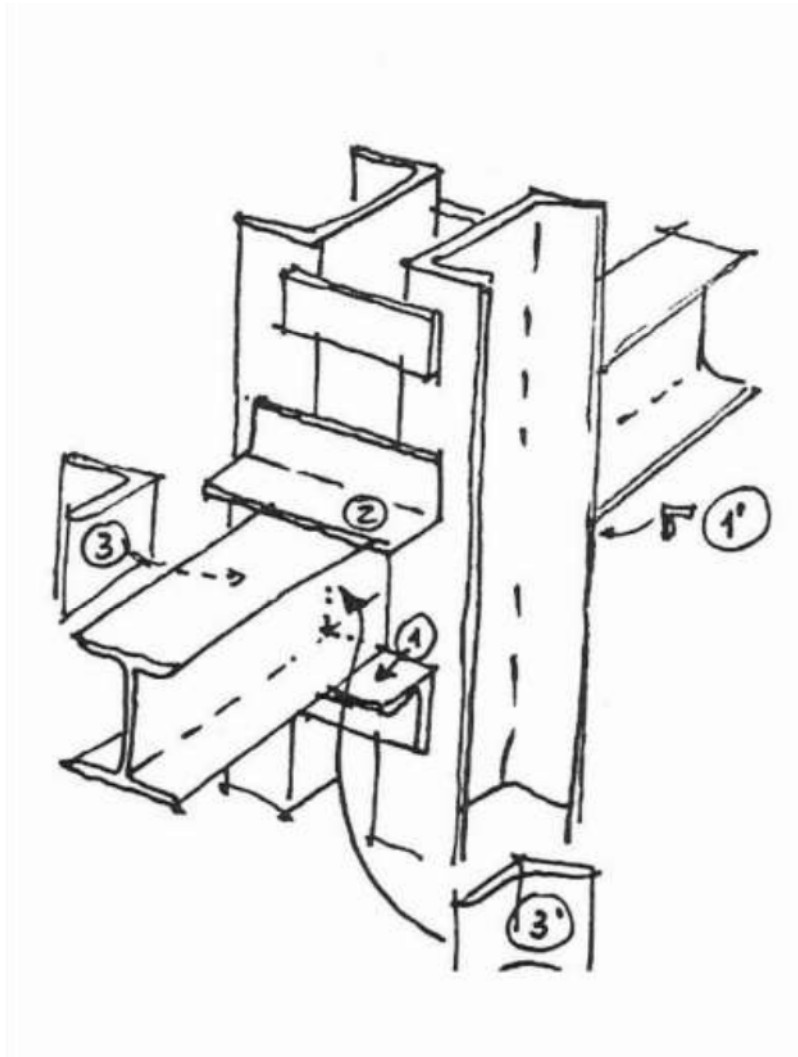
I-H-U SHAPES



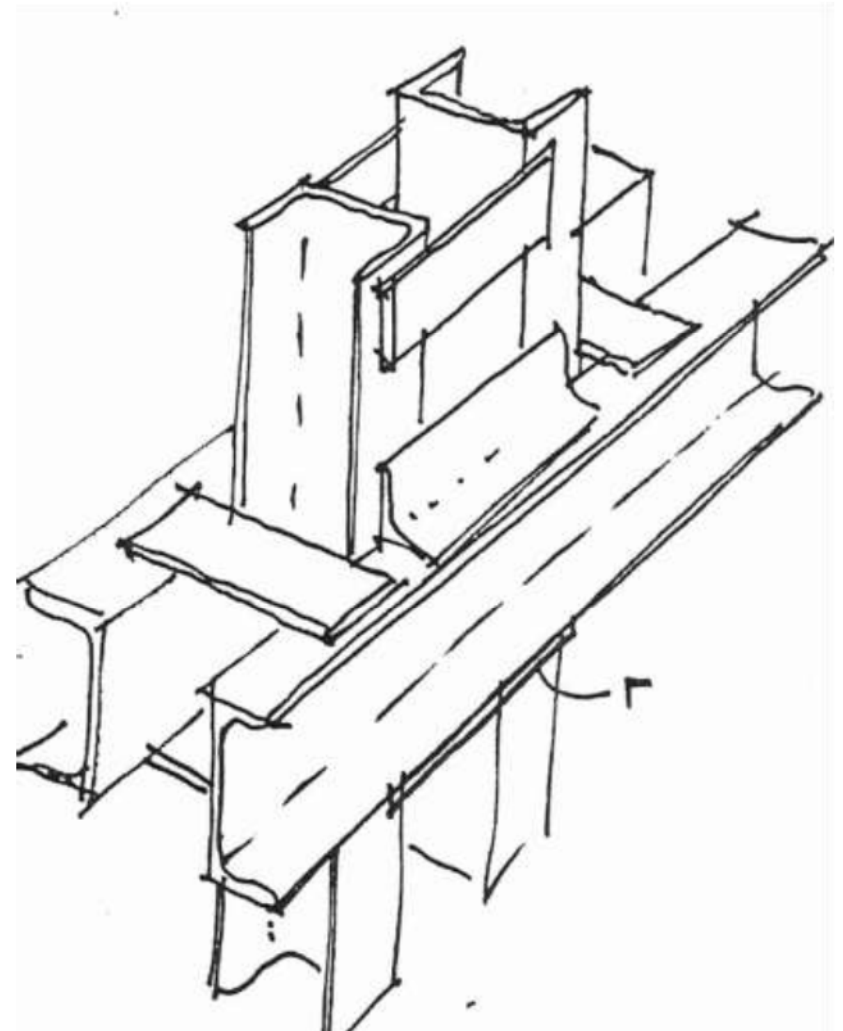
CONTINUOUS PIER,
DISCONTINUOUS MAIN BEAM



CONTINUOUS PIER,
CONTINUOUS MAIN BEAM



CONTINUOS PIER,
CONTINUOUS MAIN BEAM



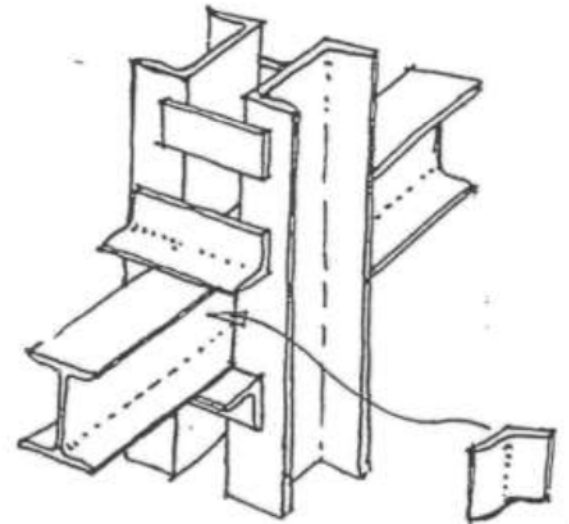
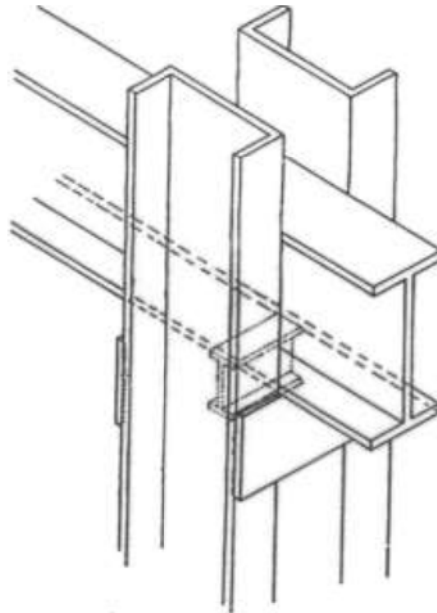
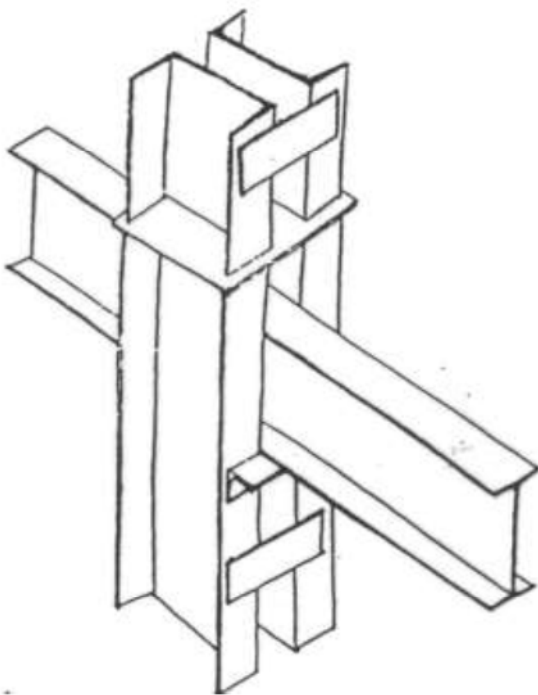
CONTINUOS PIER,
CONTINUOUS MAIN BEAM

MAIN BEAMS

2. COMPOUND PROFILES, THIN WALLED BEAMS

DIRECT UNION

USE OF PLATES



STEEL STRUCTURES. BEAMS

CONTINUOUS BEAMS

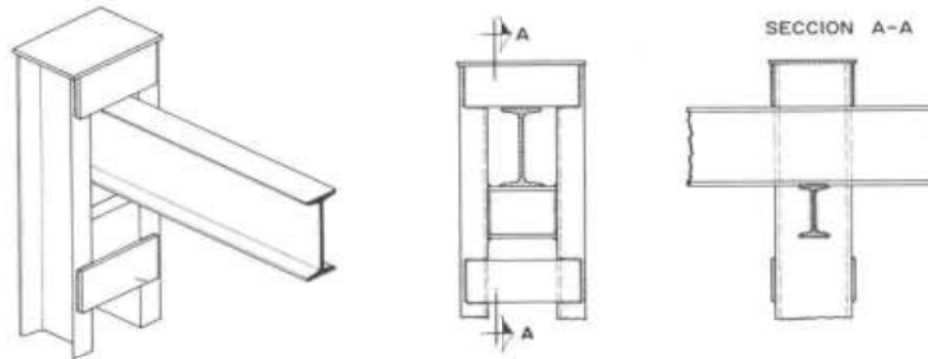


Fig- 5.32

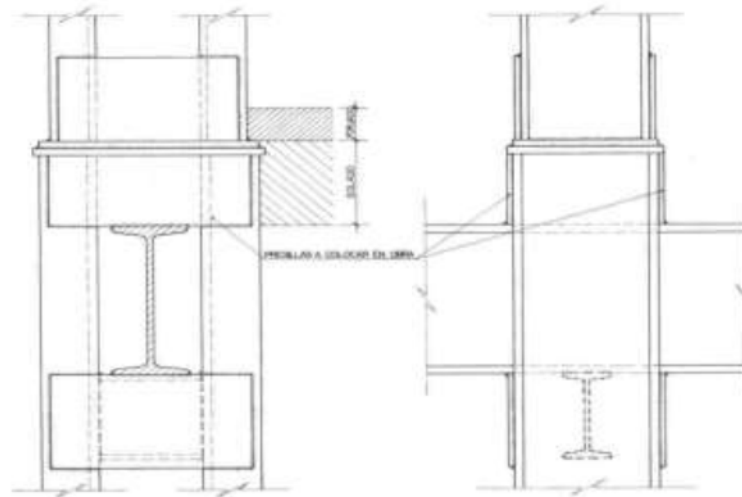
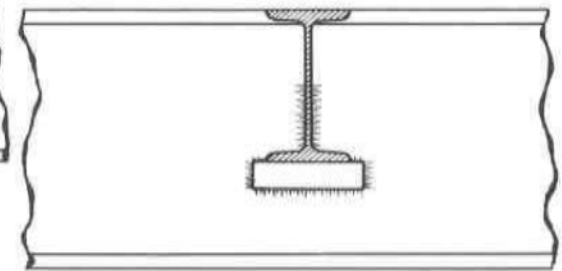
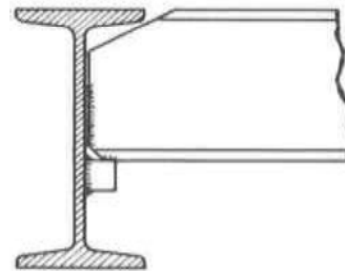
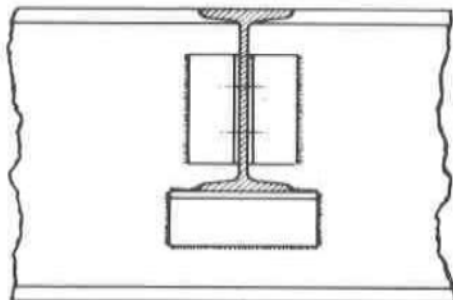
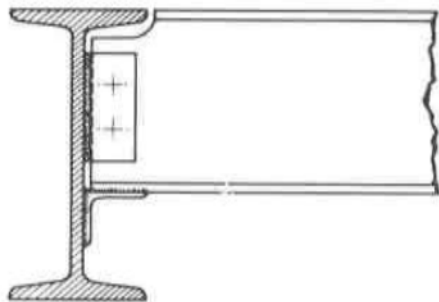
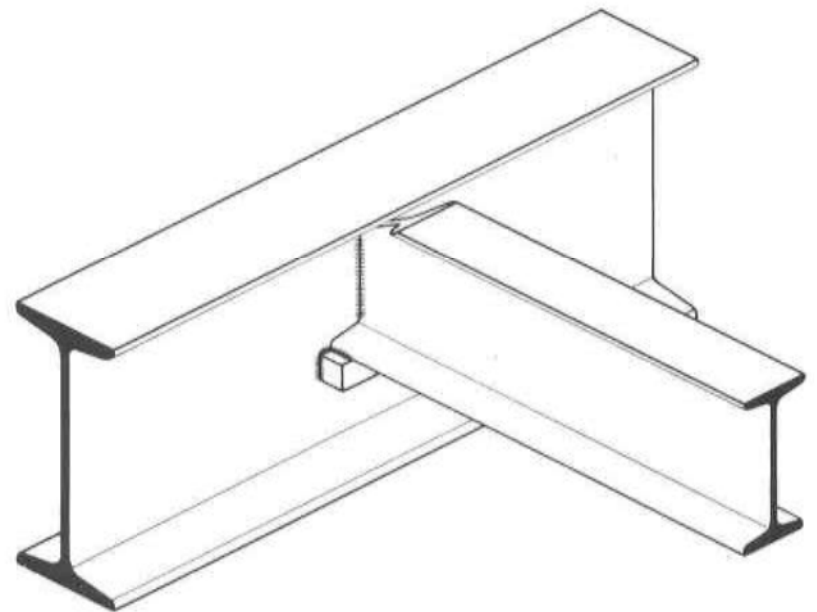
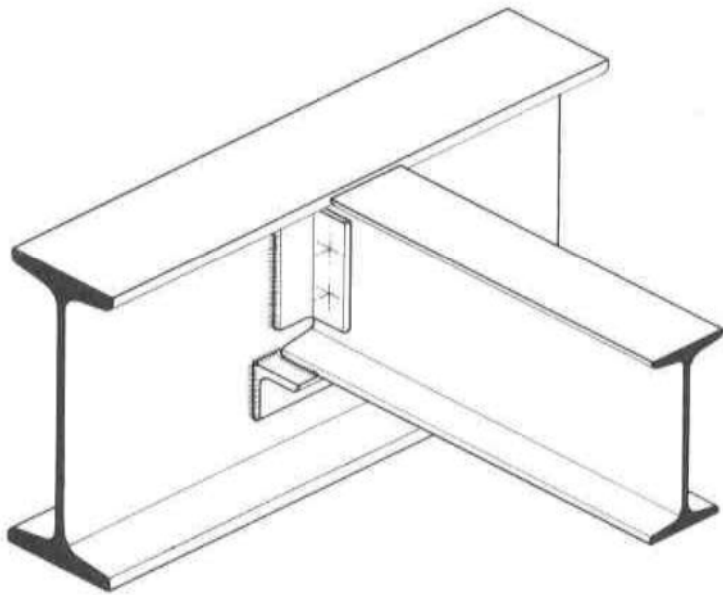


Fig- 5.33

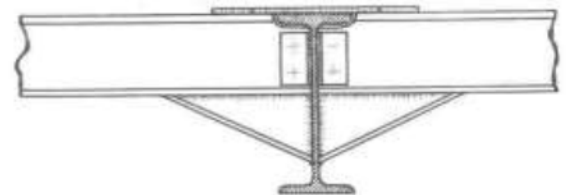
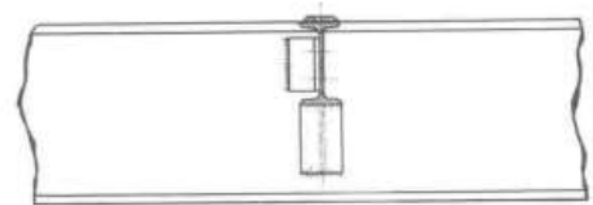
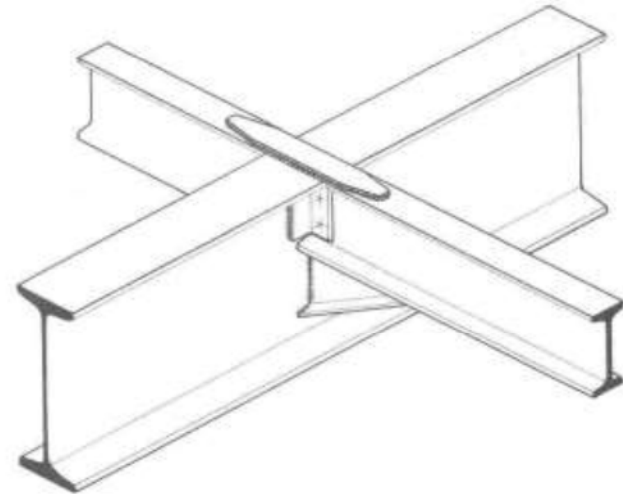
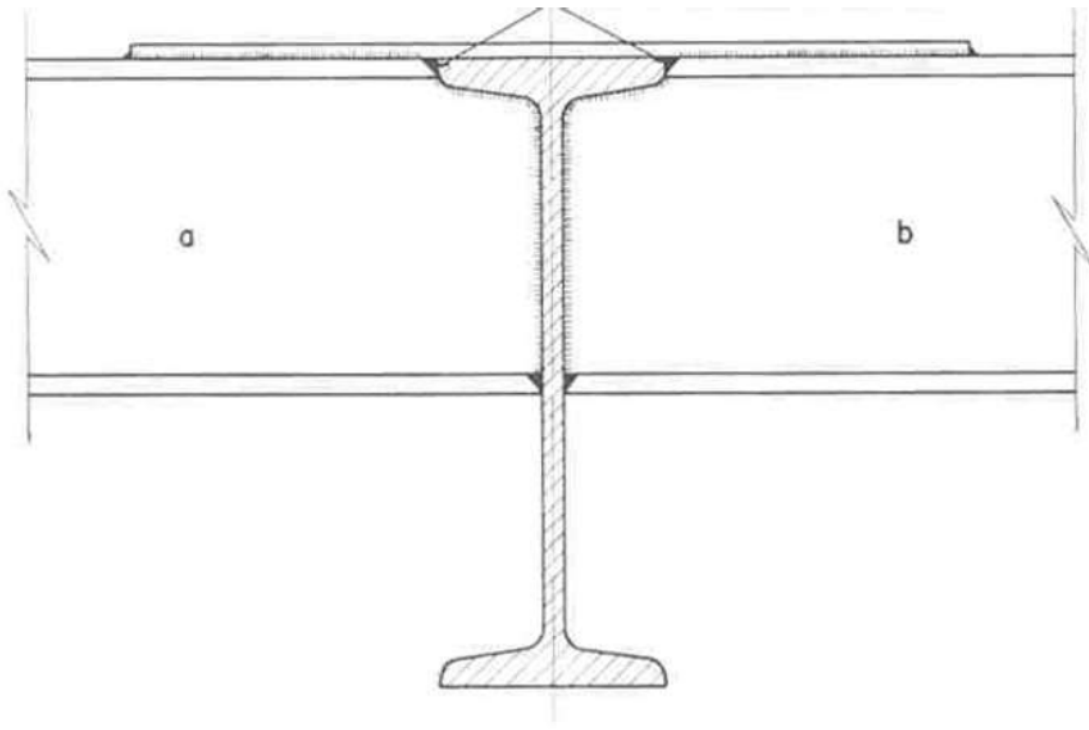
STEEL STRUCTURES. BEAMS

TRIMMER JOISTS



STEEL STRUCTURES. BEAMS

FIXED UNION

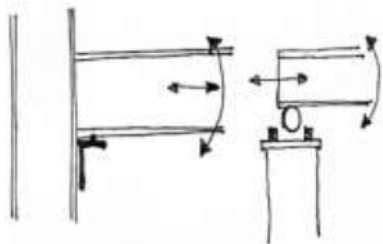


SUPPORT

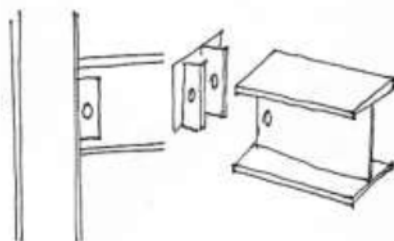
BY GRAVITY
(SIMPLE)



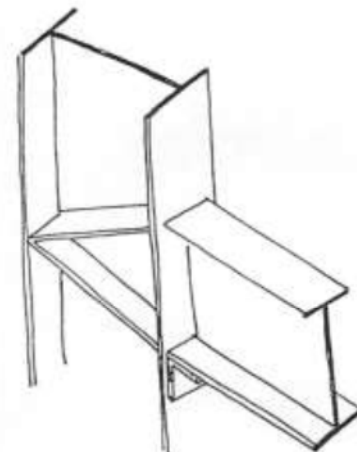
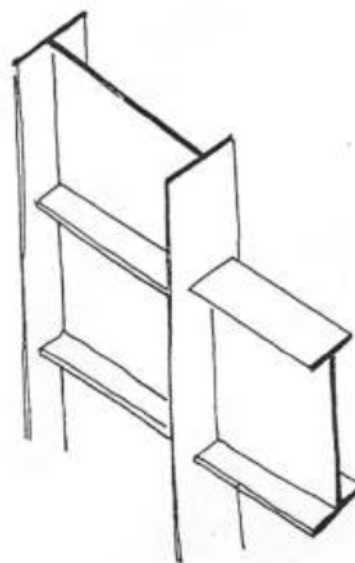
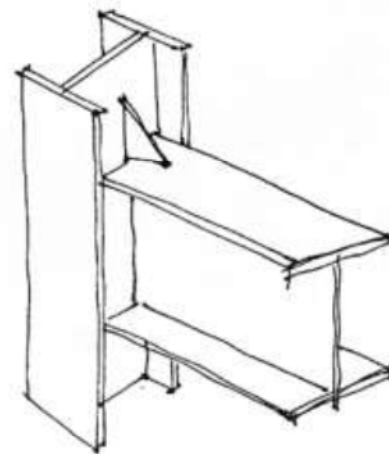
ARTICULATED AND
IN EXPANSION



ARTICULATED
WITHOUT
EXPANSION

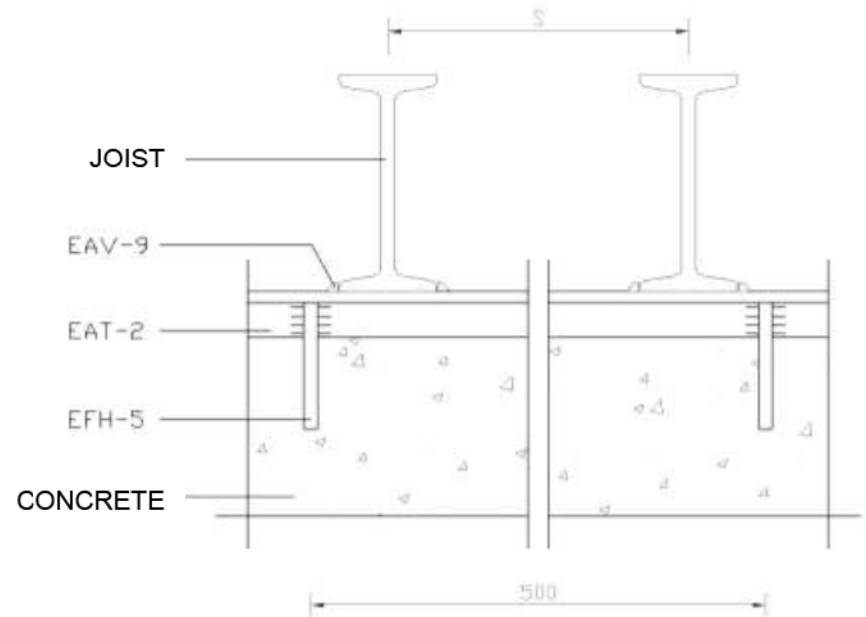
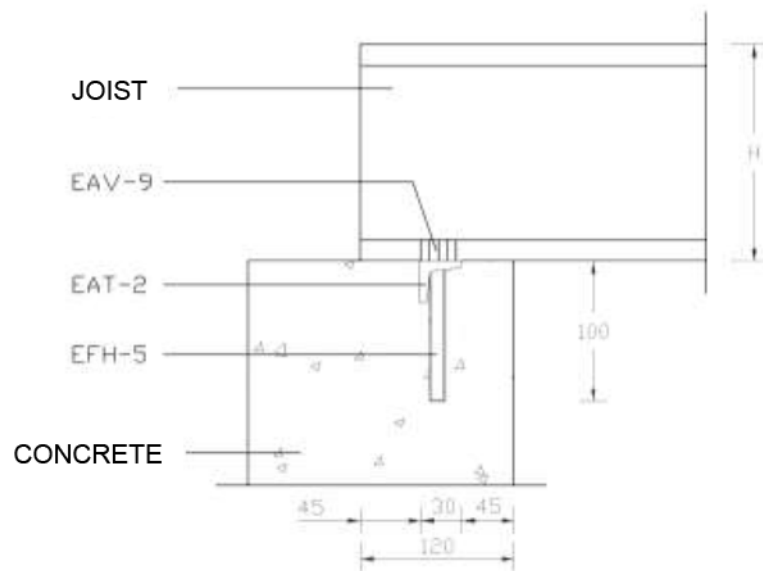


FIXED UNIONS



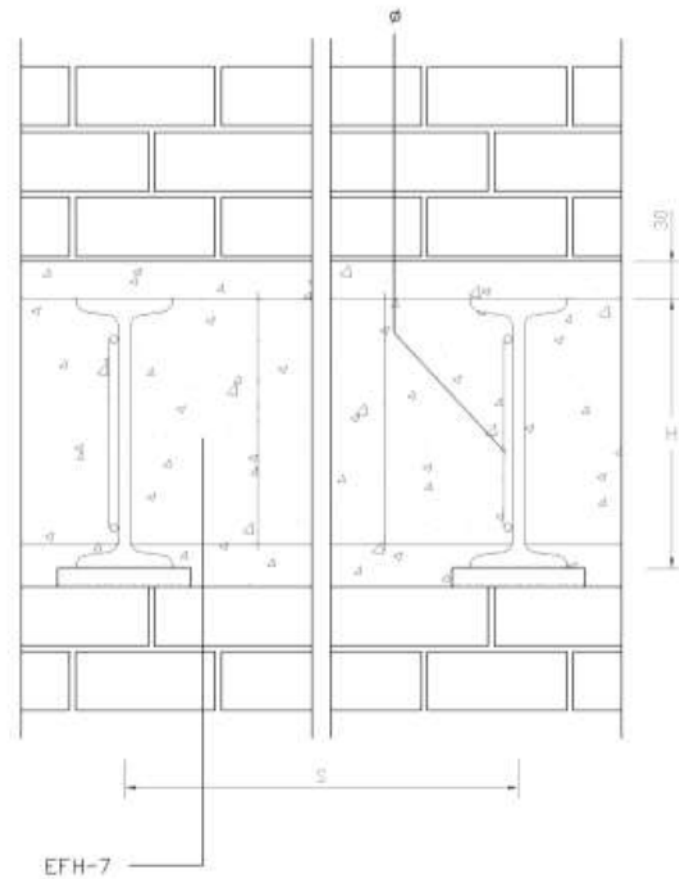
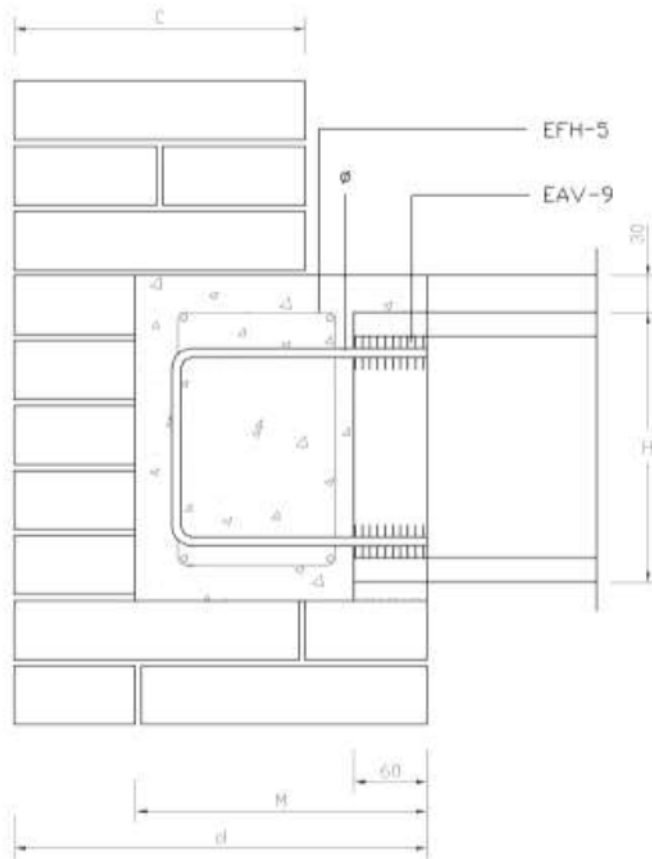
STEEL STRUCTURES. BEAMS. SUPPORTS

SUPPORT ON CONCRETE



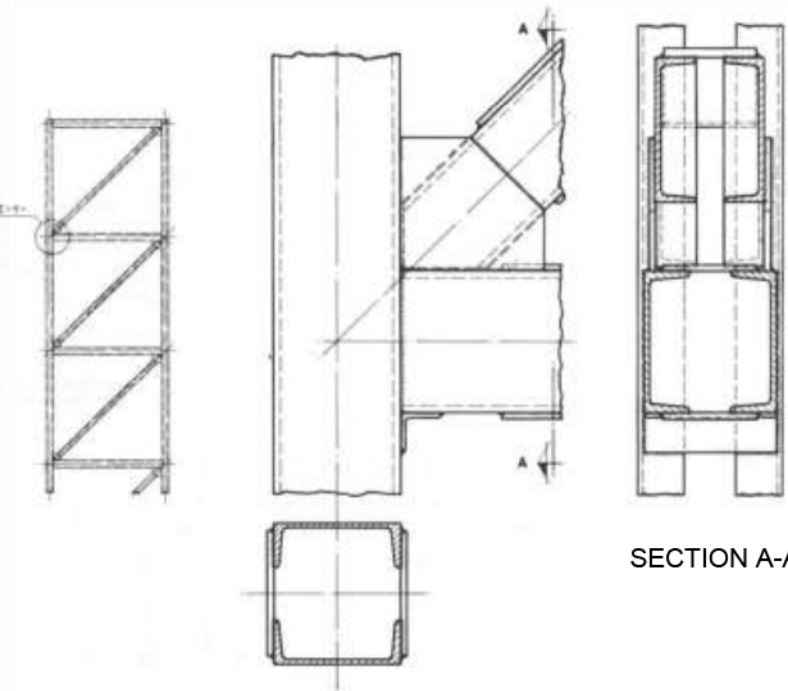
STEEL STRUCTURES. BEAMS. SUPPORTS

SUPPORT ON MASONRY BRICKWORK

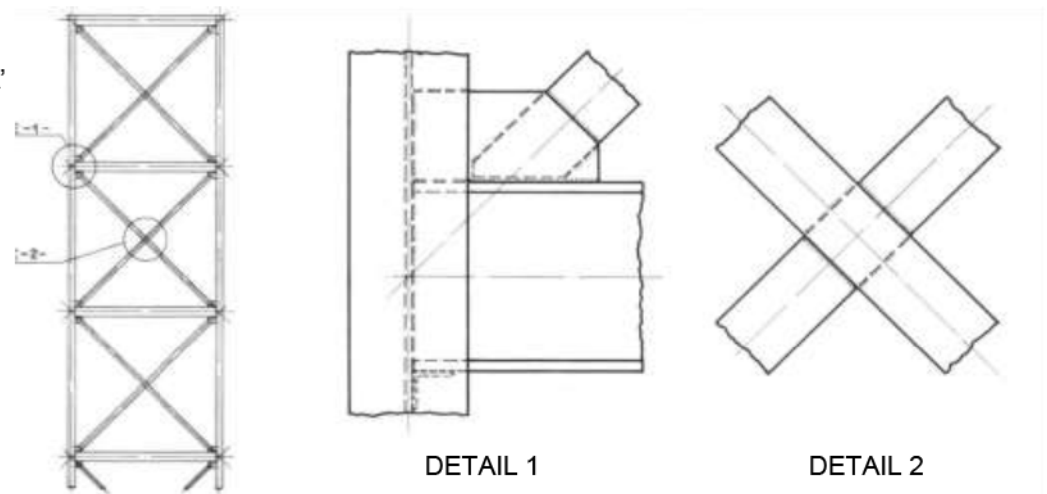


STEEL STRUCTURES. BRACING.

SIMPLE BRACING



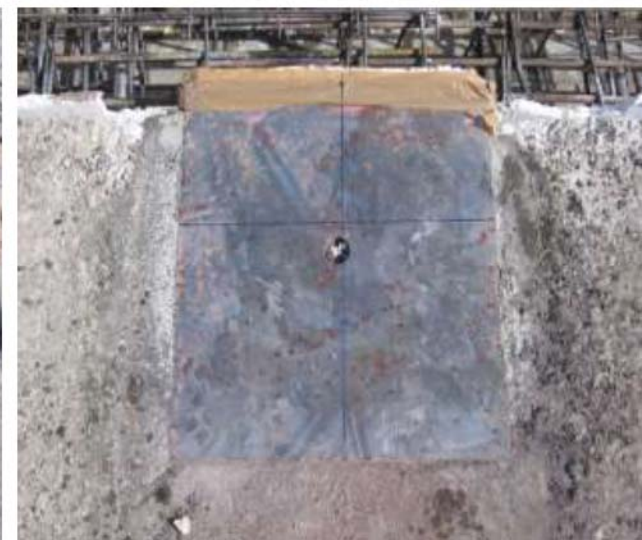
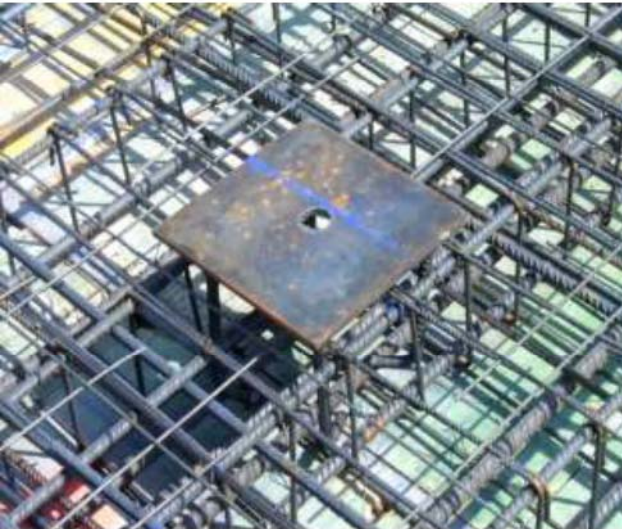
DOUBLE BRACING. SAINT ANDREW'S CROSS



DETAIL 1

DETAIL 2

STEEL STRUCTURES EXECUTION PROCESS

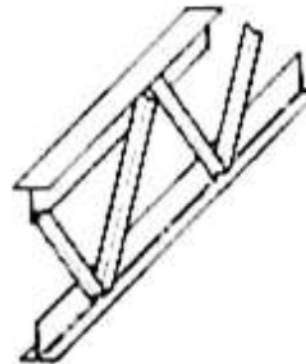
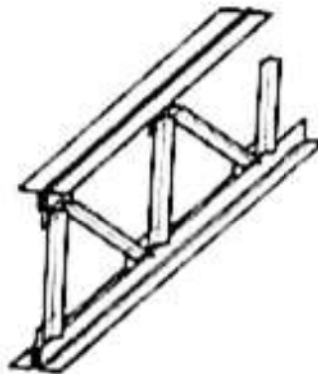
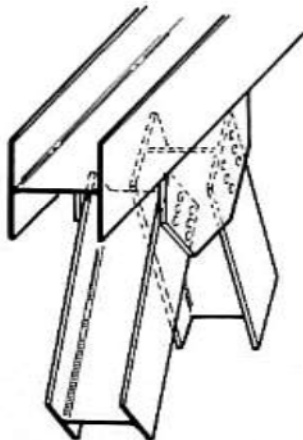
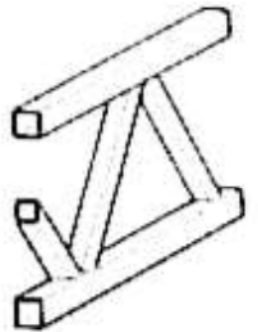
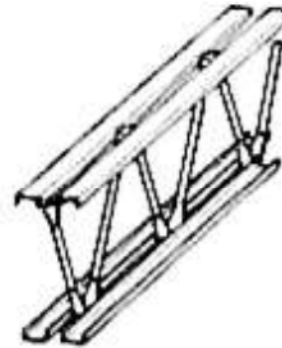
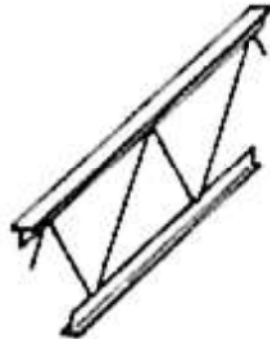
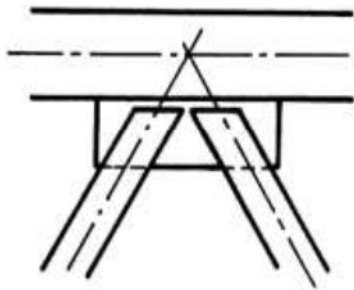
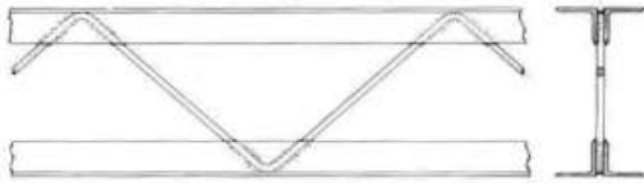


STEEL STRUCTURES EXECUTION PROCESS



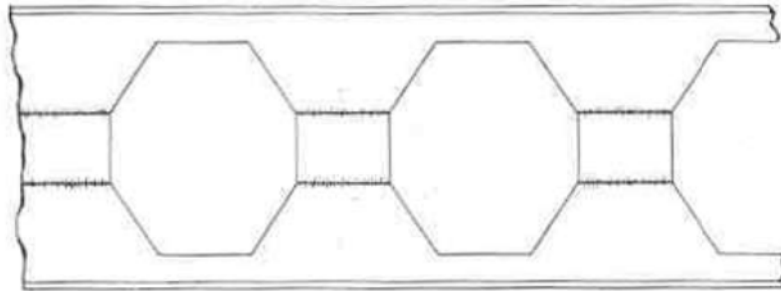
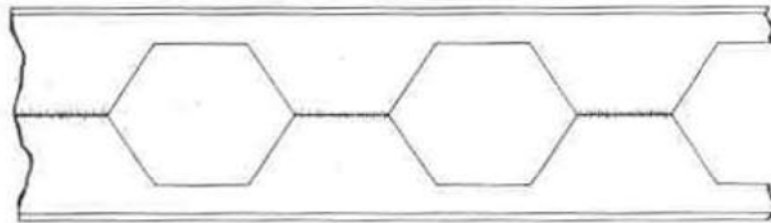
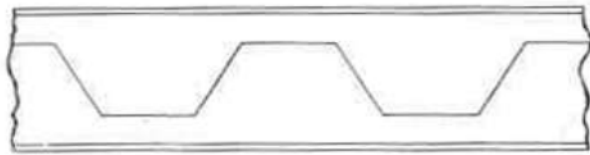
LIGHTWEIGHT STRUCTURAL SYSTEM

TRIANGULAR STRUCTURE



LIGHTWEIGHT STRUCTURAL SYSTEM

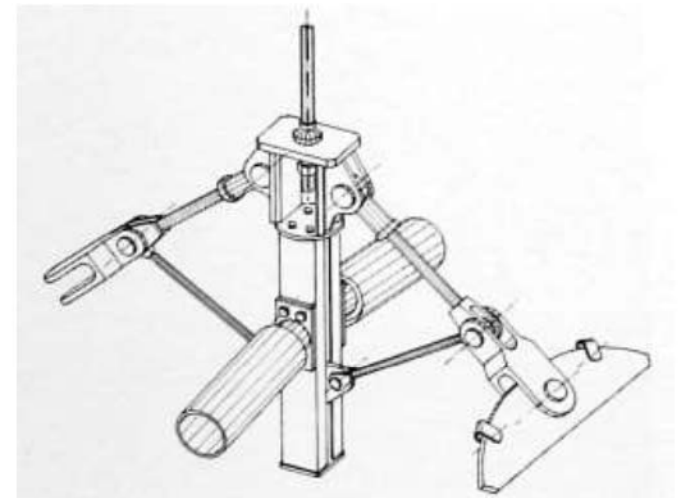
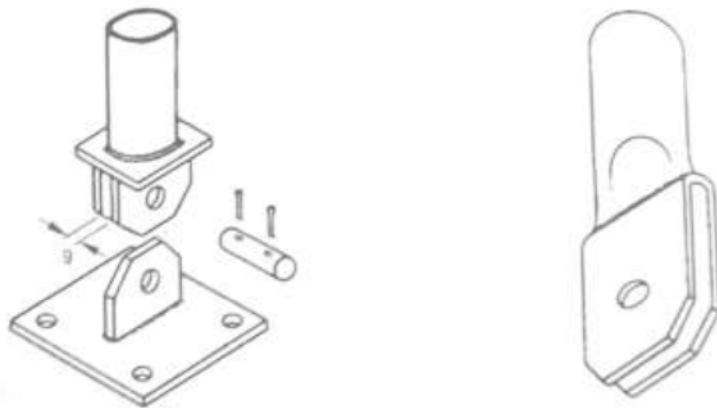
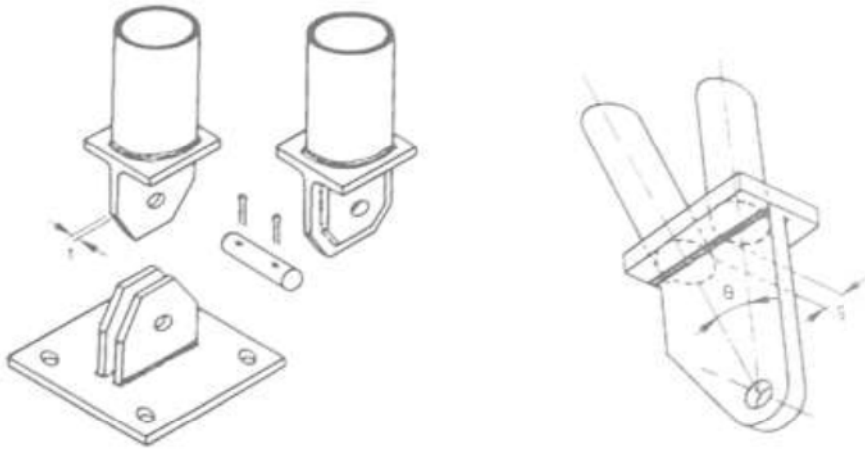
BOYD BEAMS



TUBULAR LIGHTWEIGHT STRUCTURAL SYSTEM

SPACE FRAMES

TIED SPACE FRAMES



Examples of screwed unions



**Project "SURE - Sustainable Urban Rehabilitation in Europe"
implemented in frames of Erasmus+ Programme
Key Action 2: Strategic Partnership Projects
Agreement n° 2016-1-PL01-KA203-026232**

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