

1.06 U.S Energy Information Administration

that indicates building are responsible for almost 50% the total U.S energy consumption

- Industrial 31.4%
- Transportation 27.8%
- Commercial 18.5%
- Residential 22.2%

2030 Challenge

70% 2015 - 80% in 2020 =

90% in 2025

2030

All Building be carbon-neutral

1.07 SITE ANALYSIS

- Draw the area and shape of site
- Locate soil surface
- identify areas of runoff surface water
- Map climate condition
- desired views
- Compatibility of adjacent and proposed land use
- Map the proximity to public, commercial, medical

2.03 Building Systems

Structural System

- Columns, beams
- Constructed to support and transmit applied gravity and lateral loads safely to the ground with out exceeded the strength

Enclosure System

- Inherent weather and control moisture
- Exterior walls and roofs dampen noise
- Shell
- envelope

Mech System

- The Water Supply
- The sewage disposal
- Heating ventilation
- The electrical System
- Vertical transportation System
- Fire-fighting System
- Elevator

HVAC = Heating Ventilation Air Conditioning

- Egress - emergency Path

2.04 Building System

* Aesthetic Qualities

- Desired relationship to its site
- Pretimed qualities of form

* ECONOMIC CONSIDERATION

- Initial cost comprising material
- Life cycle cost

OSHA

* Environmental Impact

Construction Practices

- Safety
- Budgets

2.05 BUILDING CODES

International Building Code

- BOCA
- IBCO
- SBCC
- ICC
- IBC

2.06 TYPES OF CONSTRUCTION

TYPE I

Non combustible material such as concrete, steel

TYPE II - Similar to I But smaller scale

TYPE III -

Building have non combustible exterior walls

TYPE IV - Heavy Timber

2.07

OCCUPANCY CLASSIFICATION

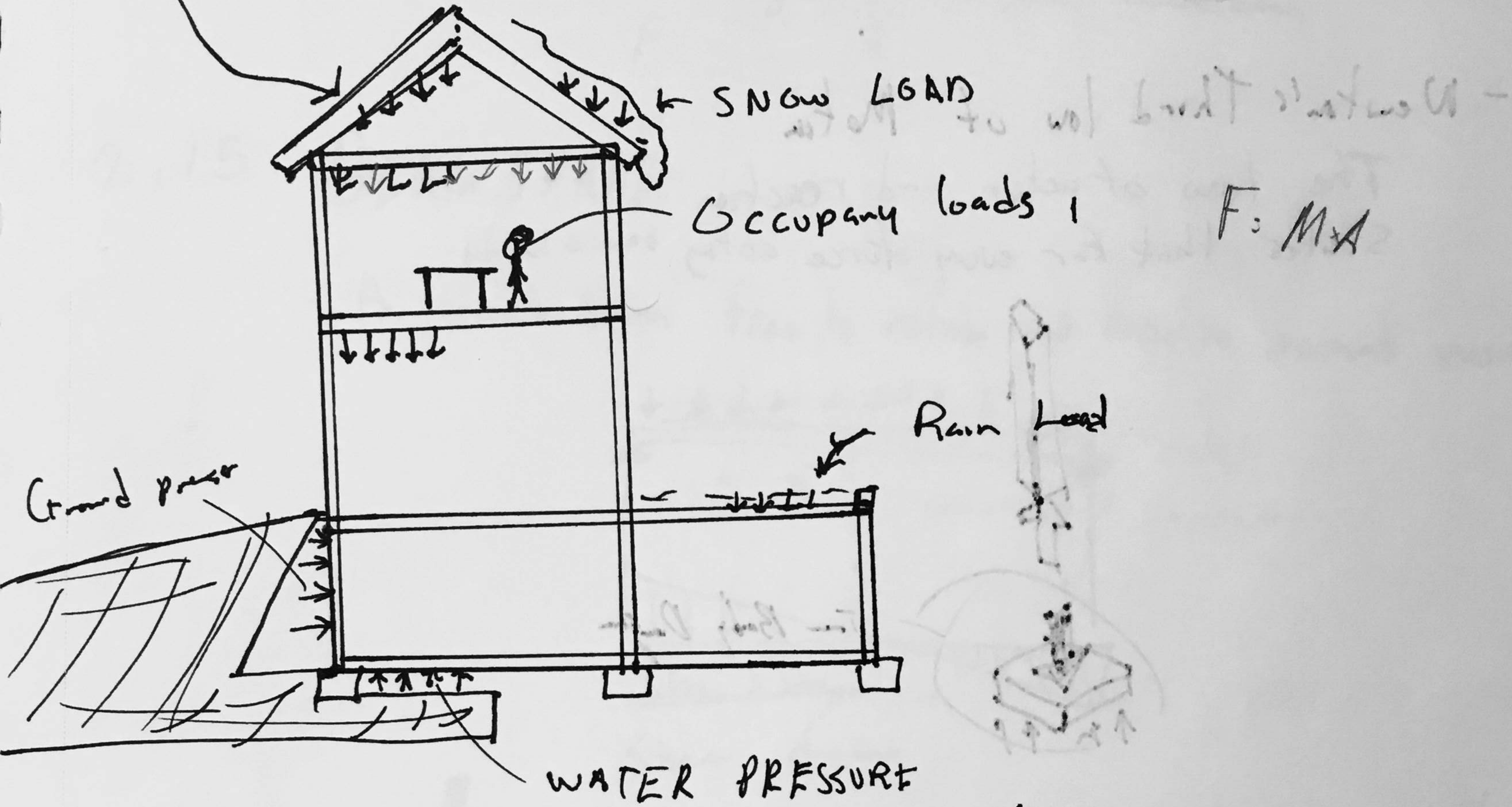
- Occupancy Separations refer to fire to fire-resistant vertical and horizontal constructions, spread fire
- Fire separation distance refers to space required between property line

- 100A
- 100B
- 200C
- 100D
- 100E

2.08 LOADS ON BUILDING

Dead loads are static loads acting vertically downwards on structure

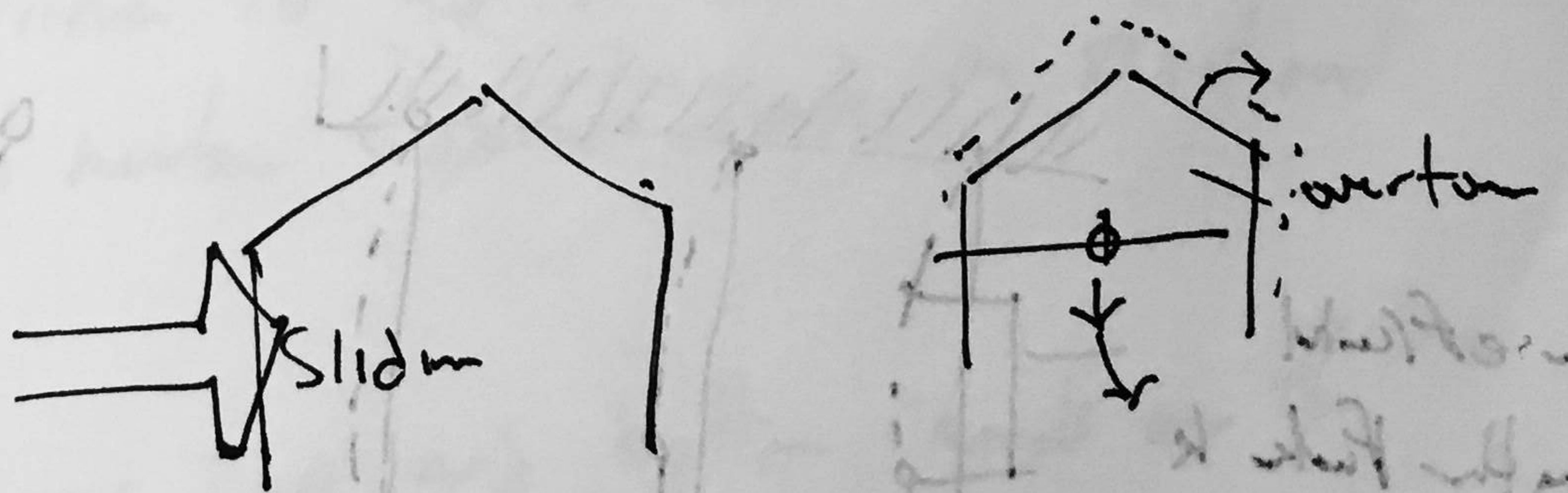
- Settlement loads are imposed - soil
- Ground pressure - Soil pressure



Dynamic loads - earthquake loads

WIND LOADS 2.09

Total Wind loads



Lateral force - Wind

earthquake

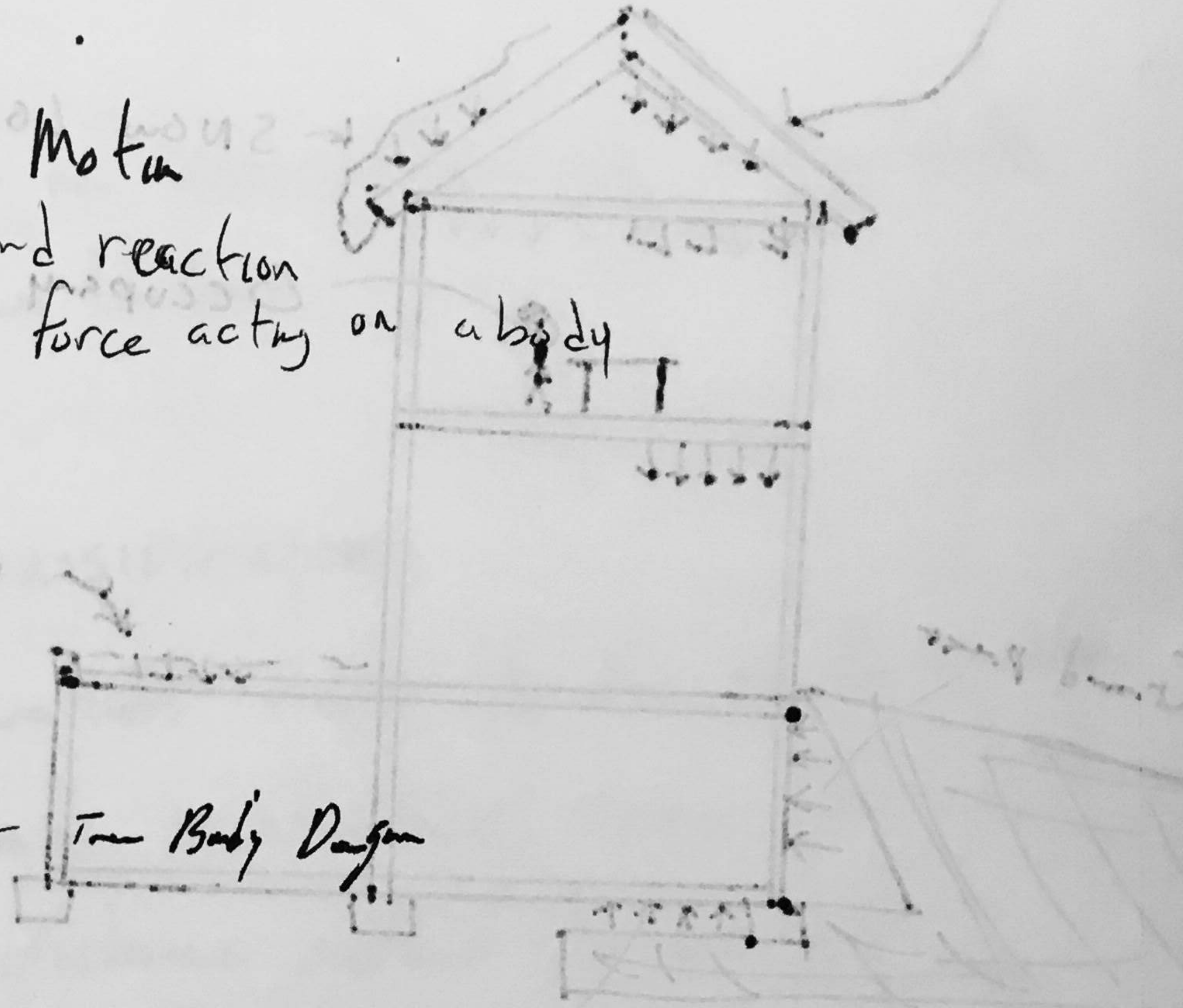
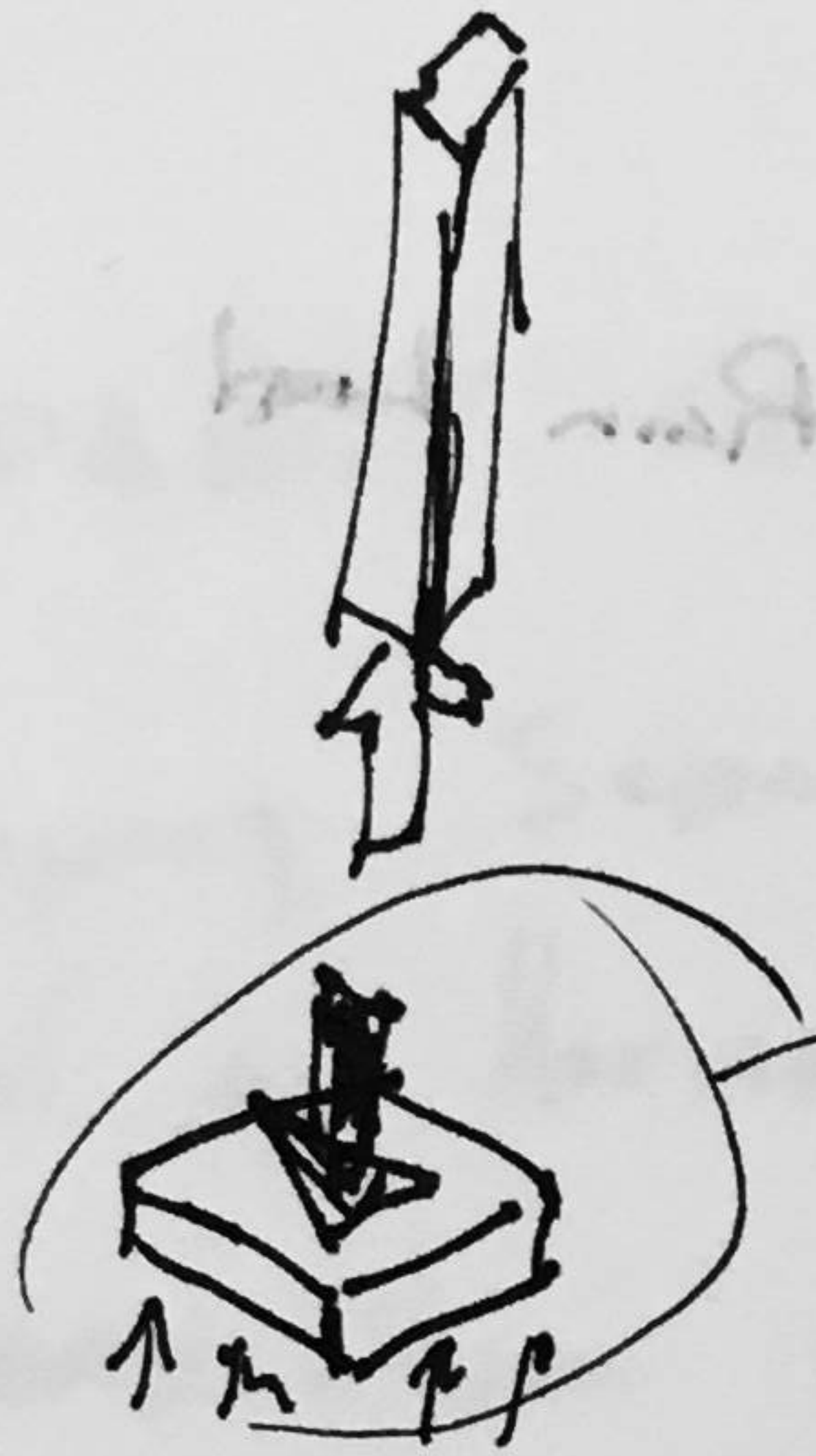
2.12 STRUCTURAL EQUILIBRIUM

VECTOR SUM

$$\sum F_x = 0; \sum F_y = 0; \sum F_z = 0$$

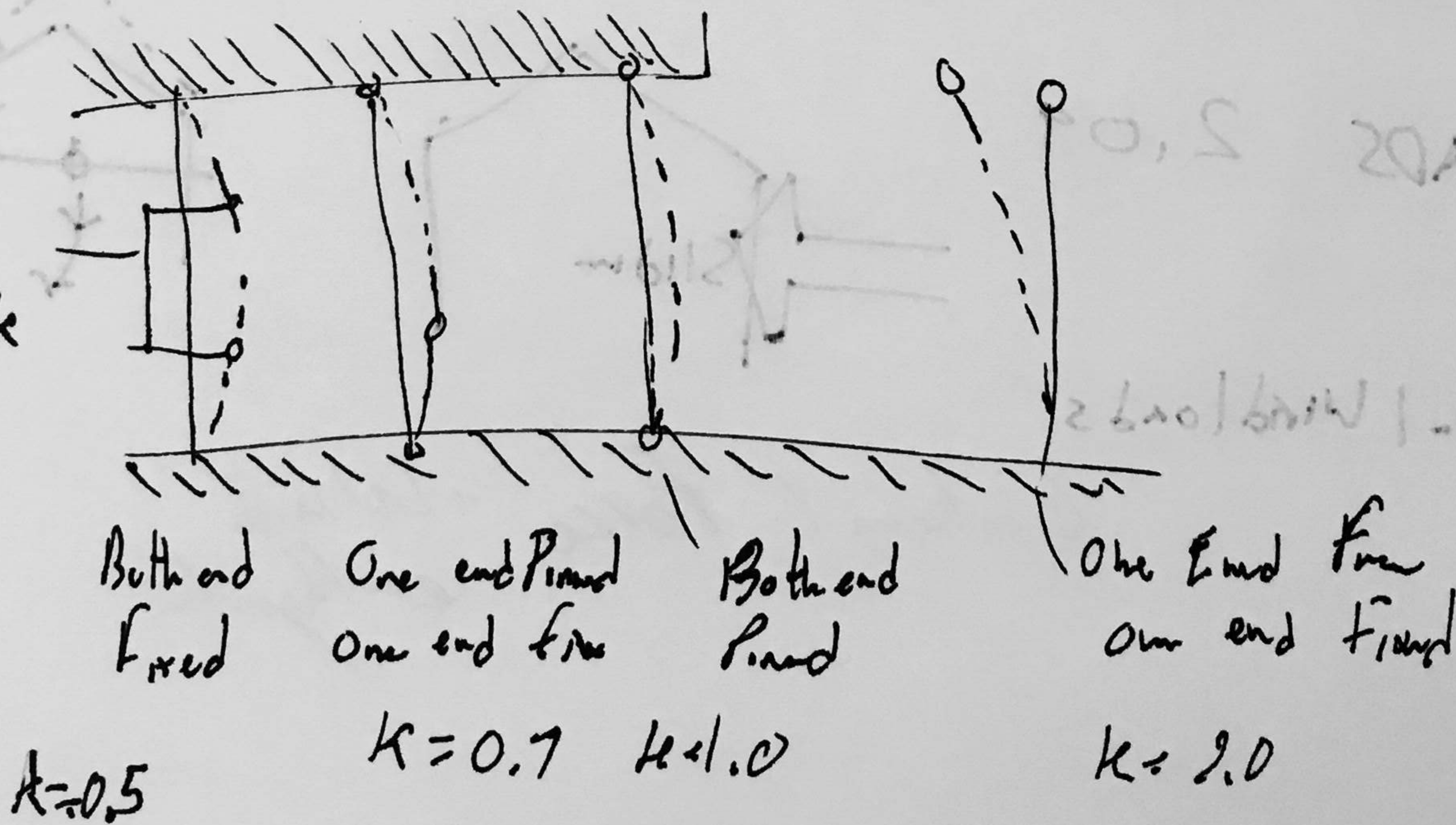
$$\sum M = 0$$

- Newton's Third law of Motion
The law of action and reaction states that for every force acting on a body

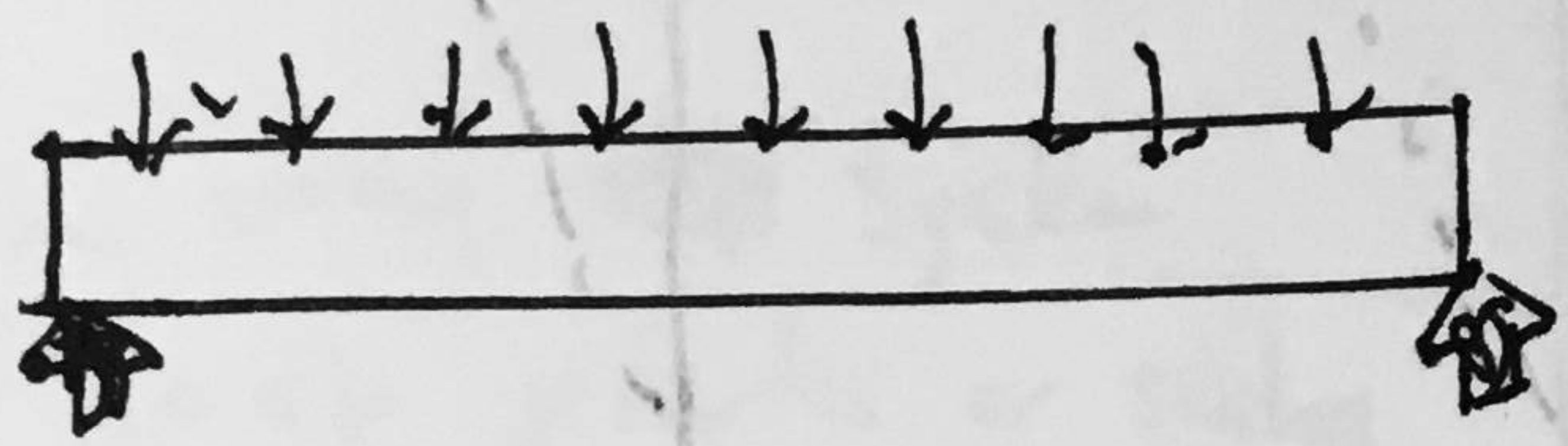


2.13 Columns

The effective length factor k



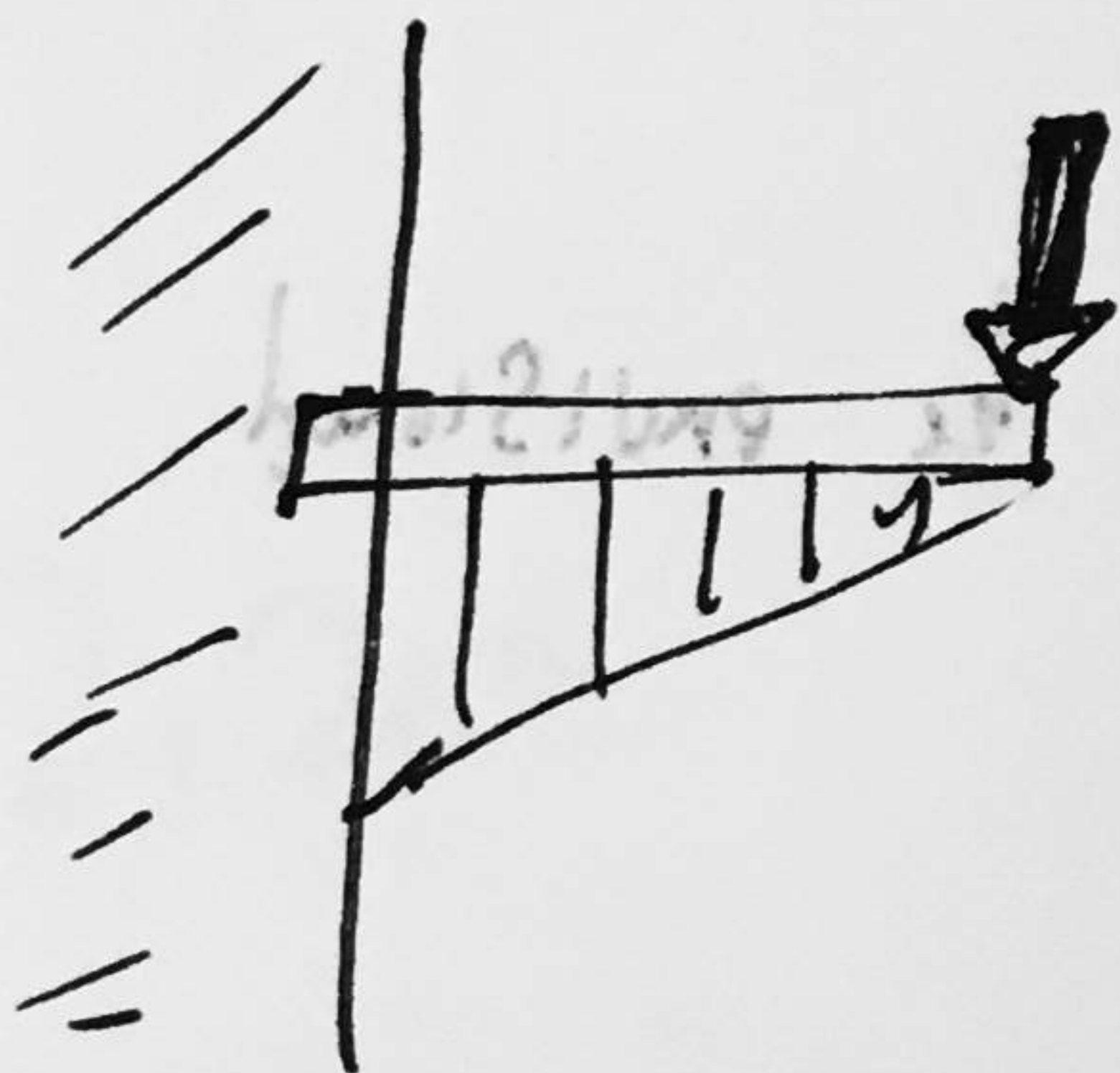
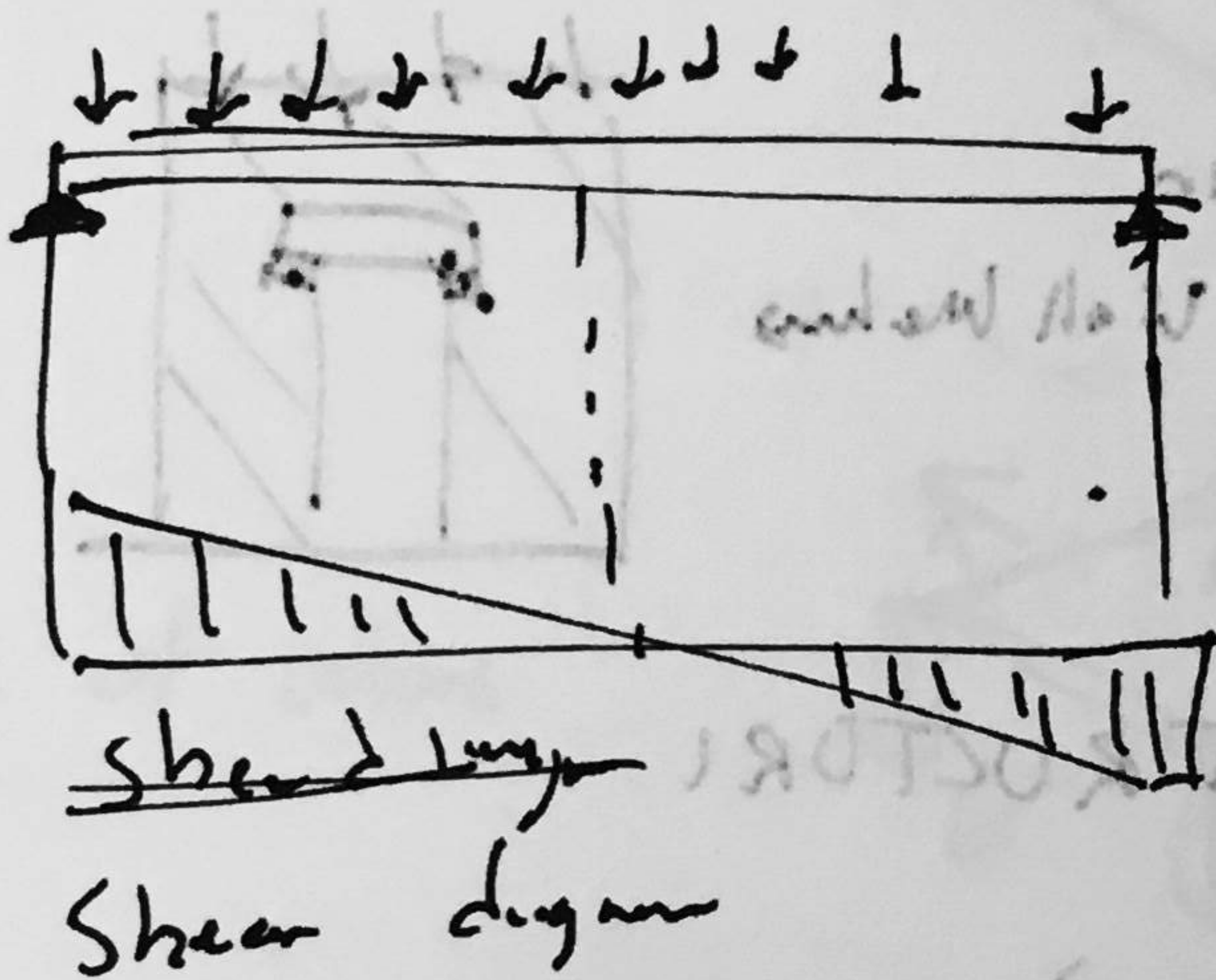
2.14 BEAMS



- Beams are rigid structural members

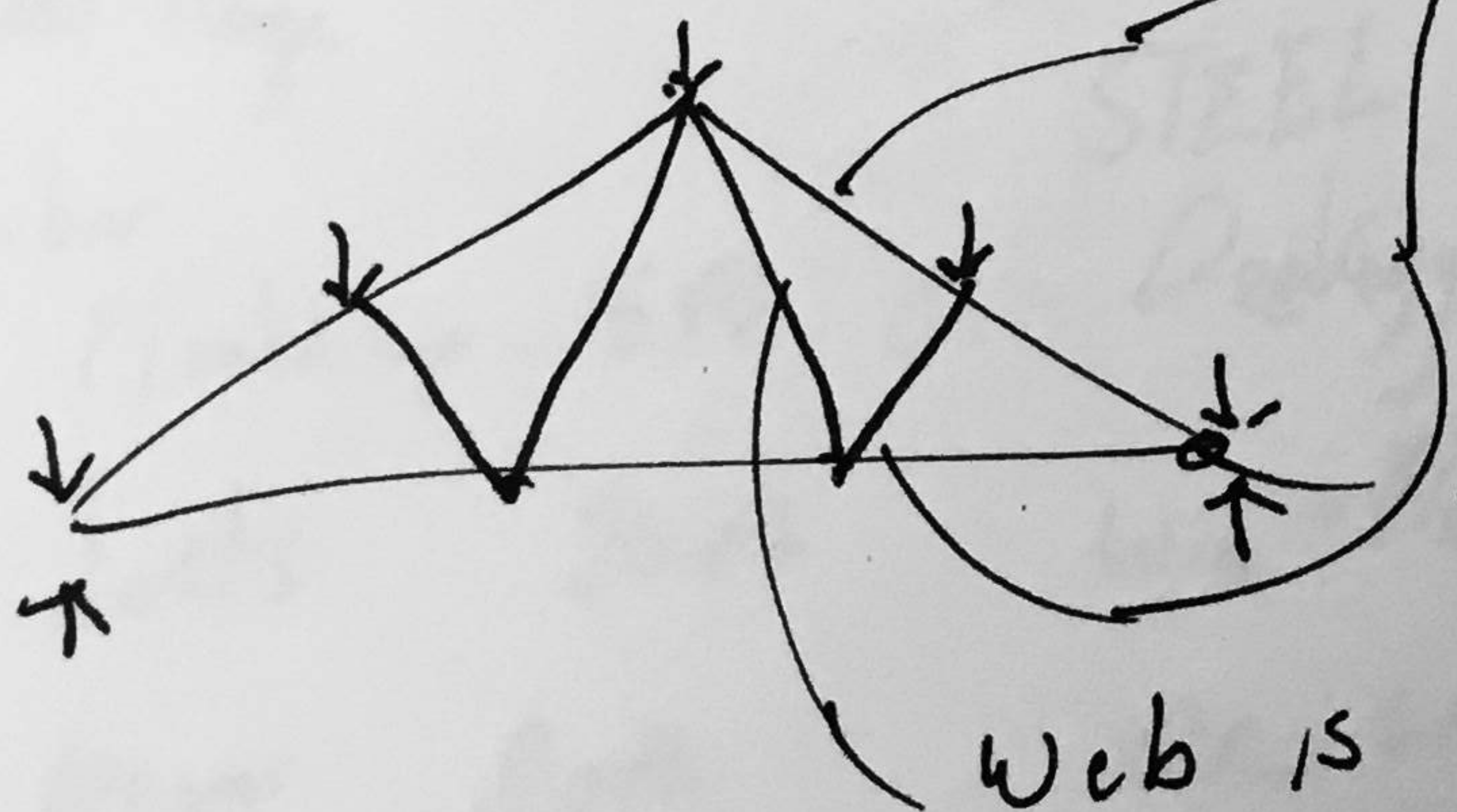
2.15 BEAM SPANS

- A simple beam free to rotate and having no moment resistance



- A cantilever is a rigidly beam or other good structural member supported at only one fixed end.

2.16 TRUSSES



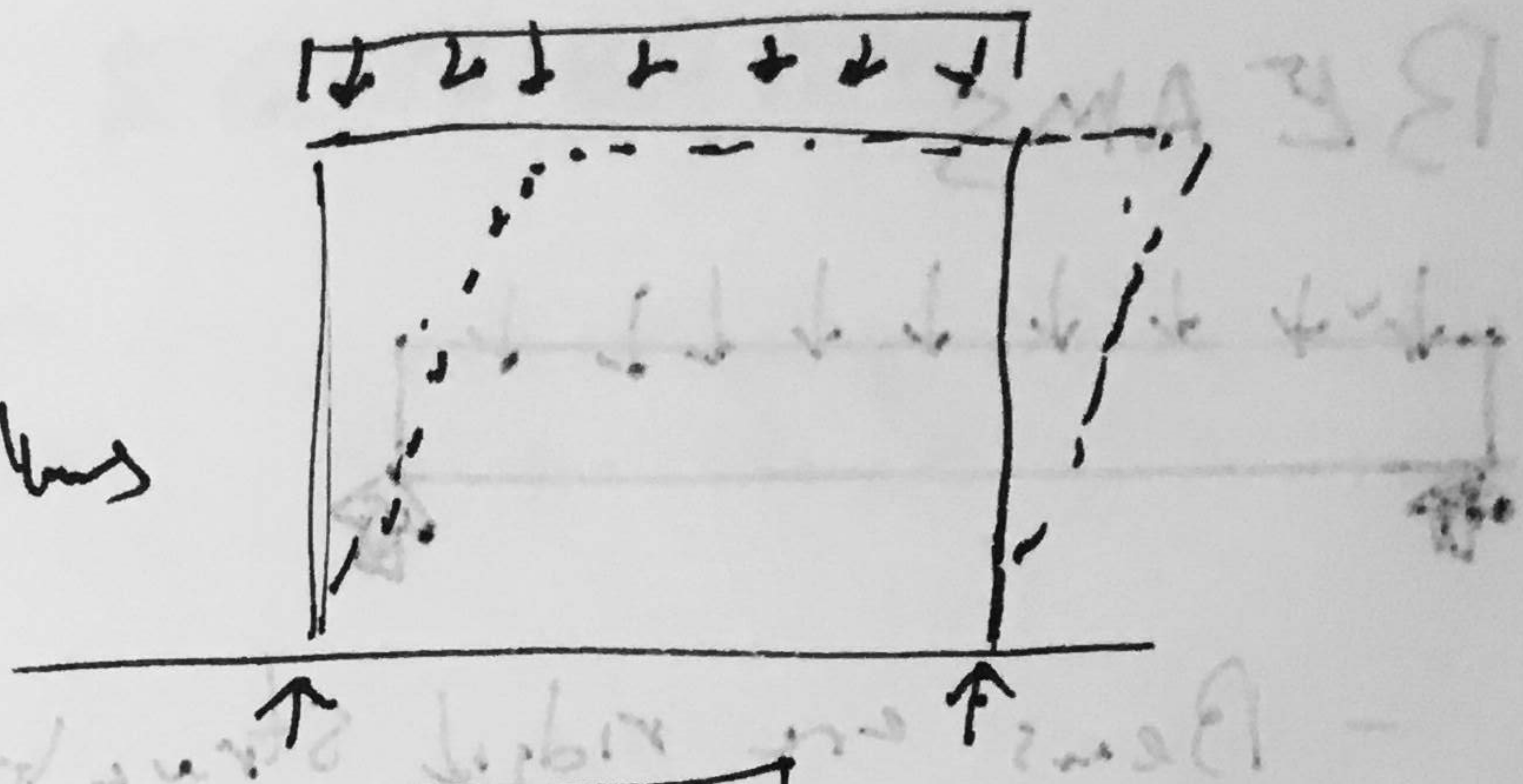
Top and bottom chords are the principal members

Heel is the lower, supported end of a truss

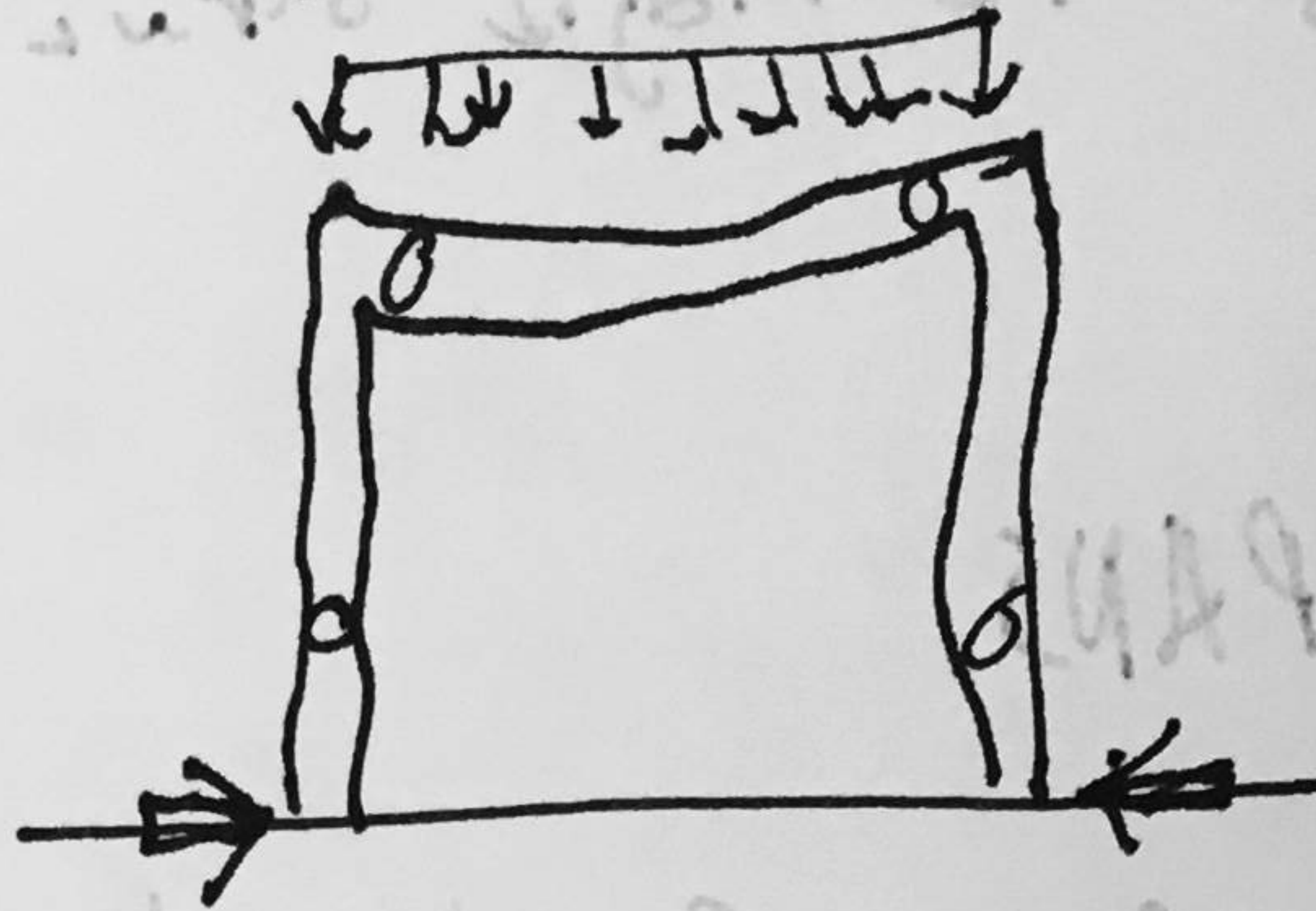
Web is the integral system spreads load

2.17 FRAMES

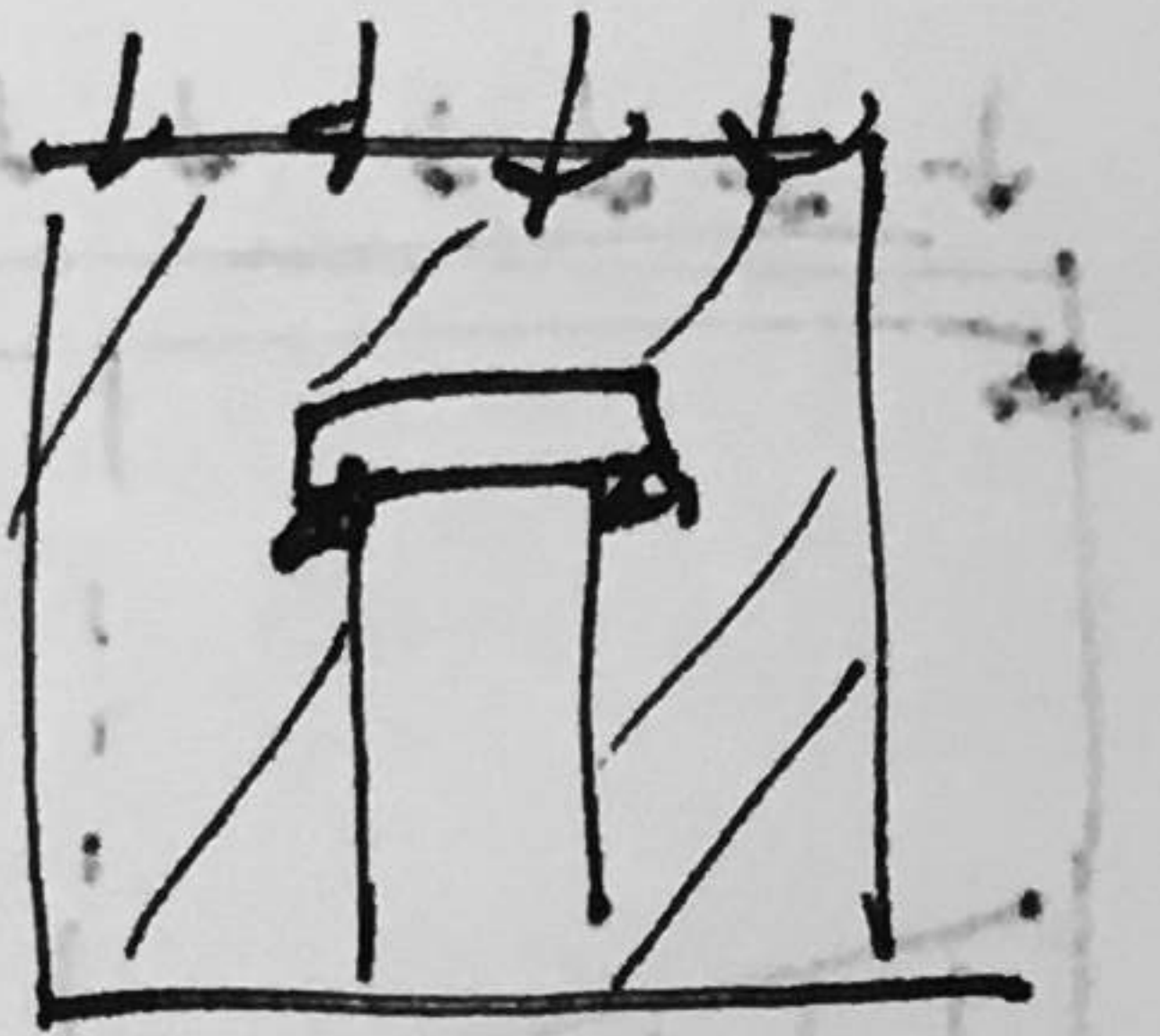
A Beam Sample
Supported by two columns



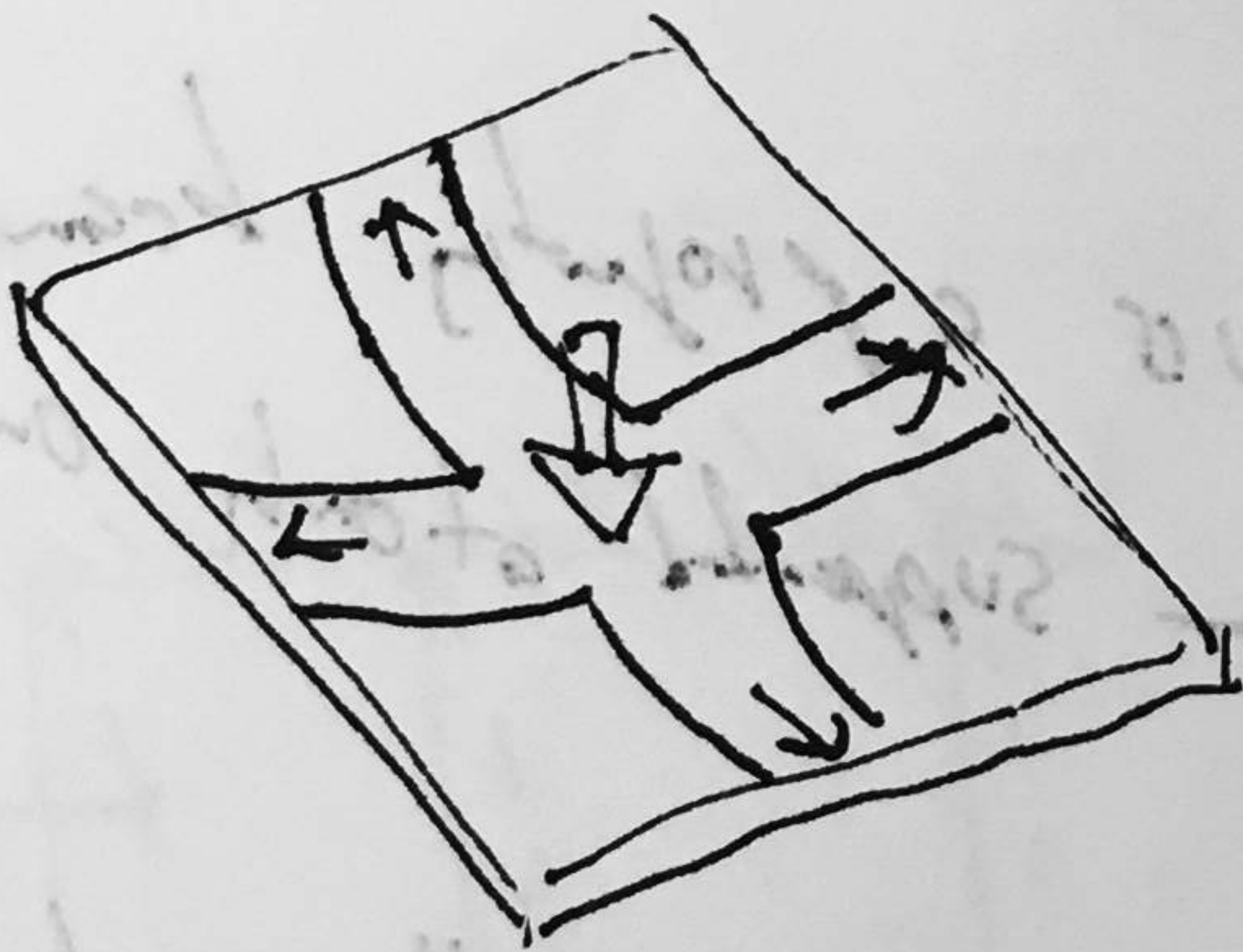
A Fixed Frame



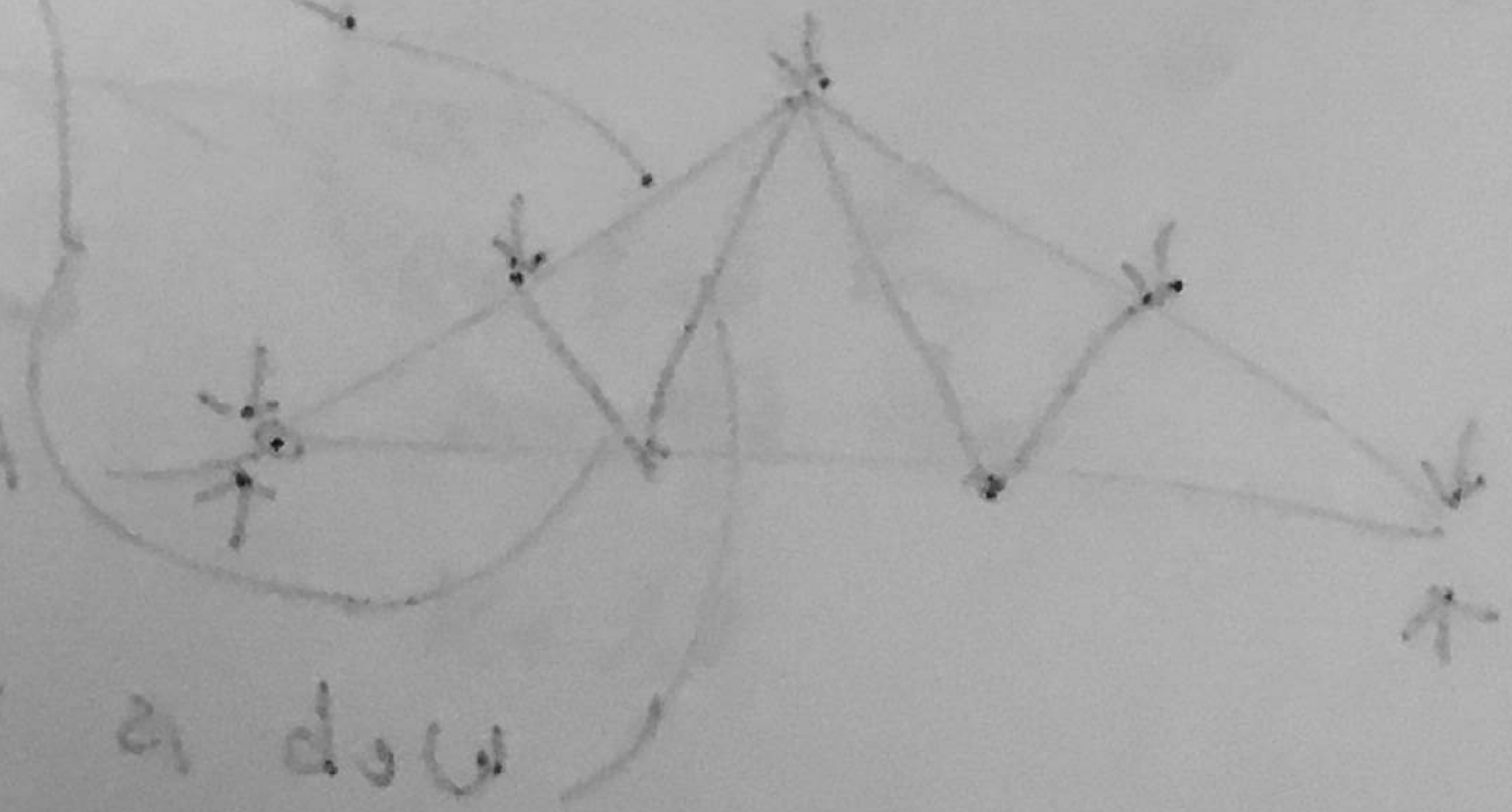
Any Open in
loady loady wall makes



2.18 PLATE STRUCTURE

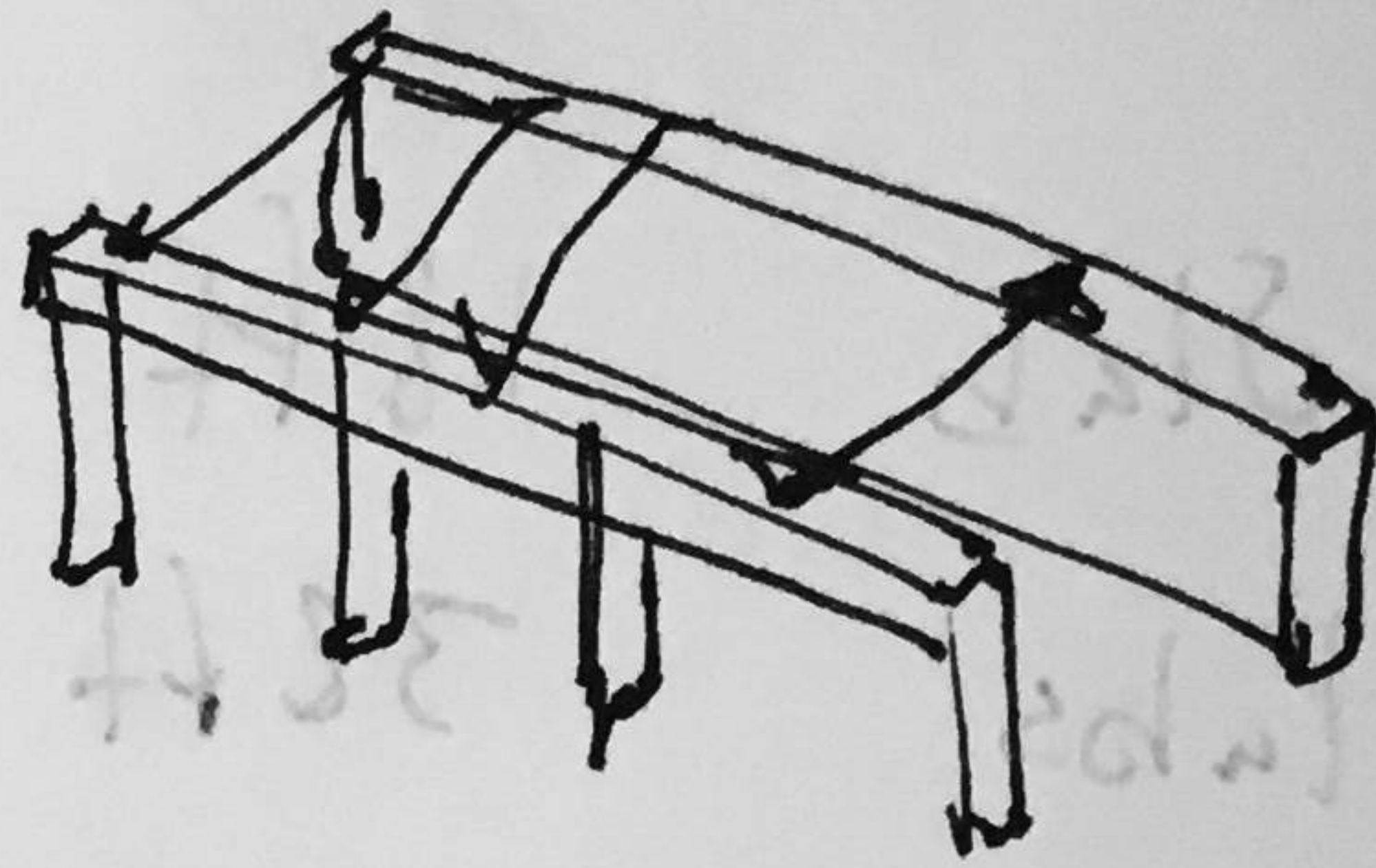


- A plate can be envisioned

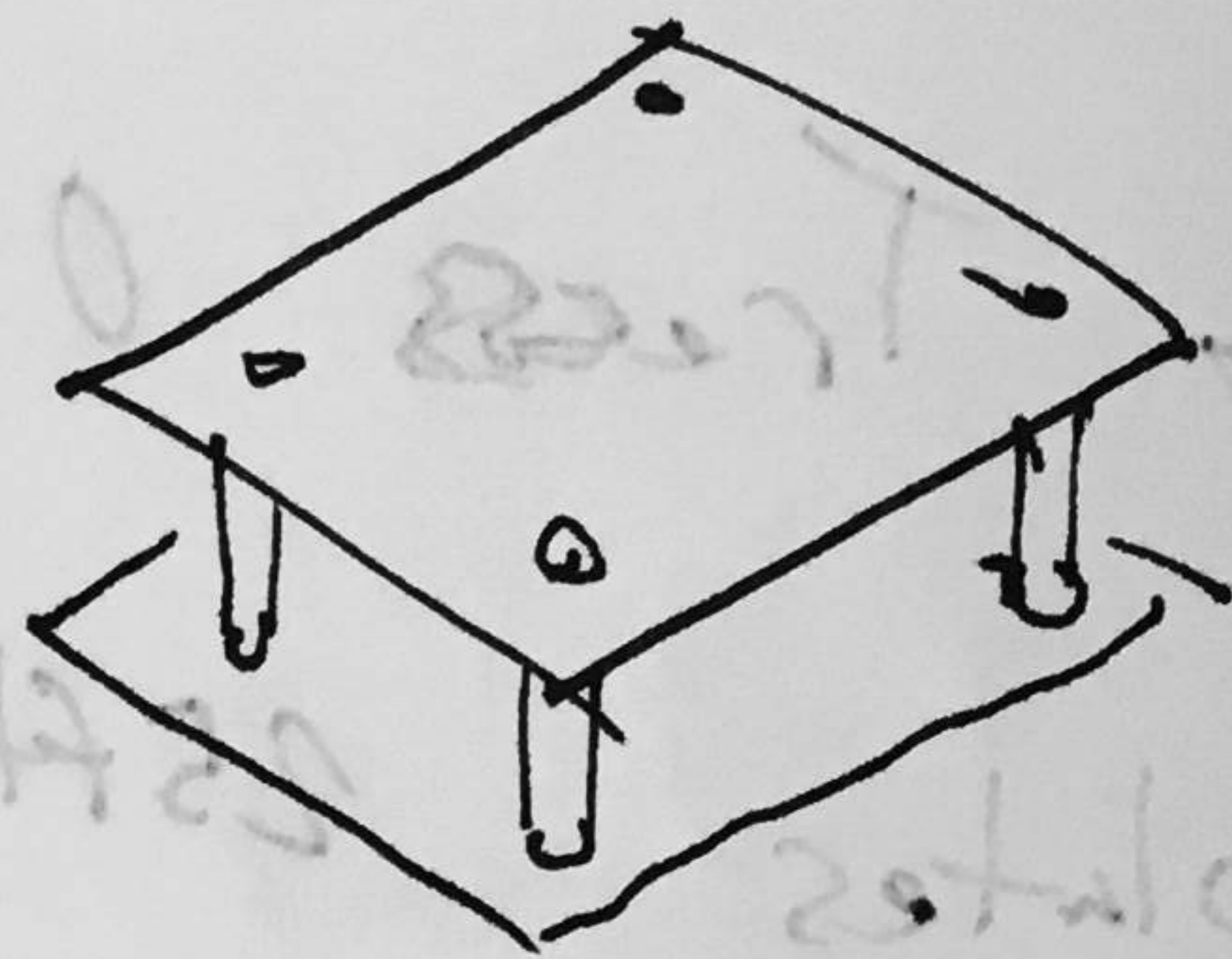


2.19 STRUCTURAL UNITS

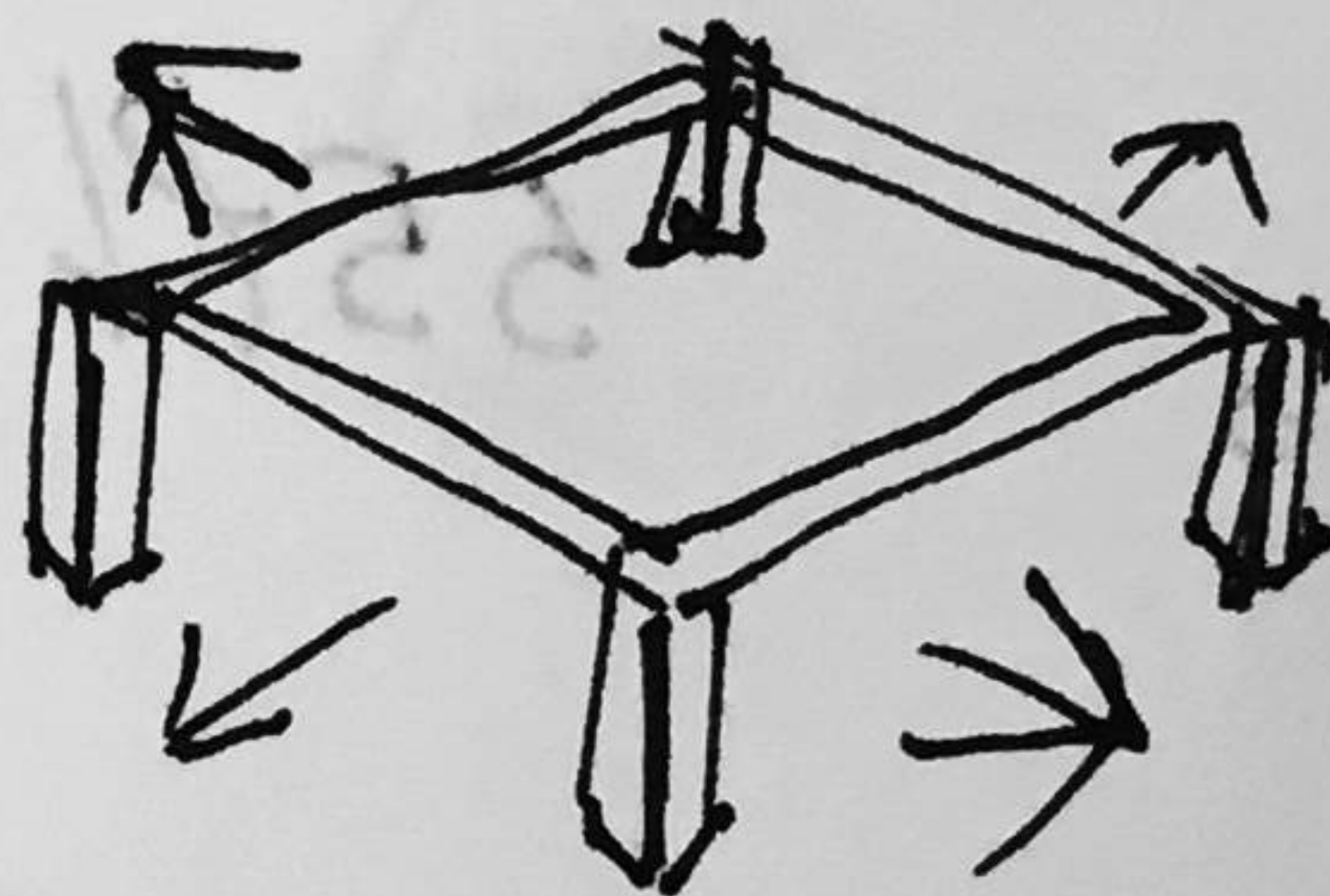
One way ~~slab~~ system
of joist planks or slabs



Two-way slab



Linear framework of columns



2.20

Span Range

Timber

Planks up 15 ft

Joists 20 ft

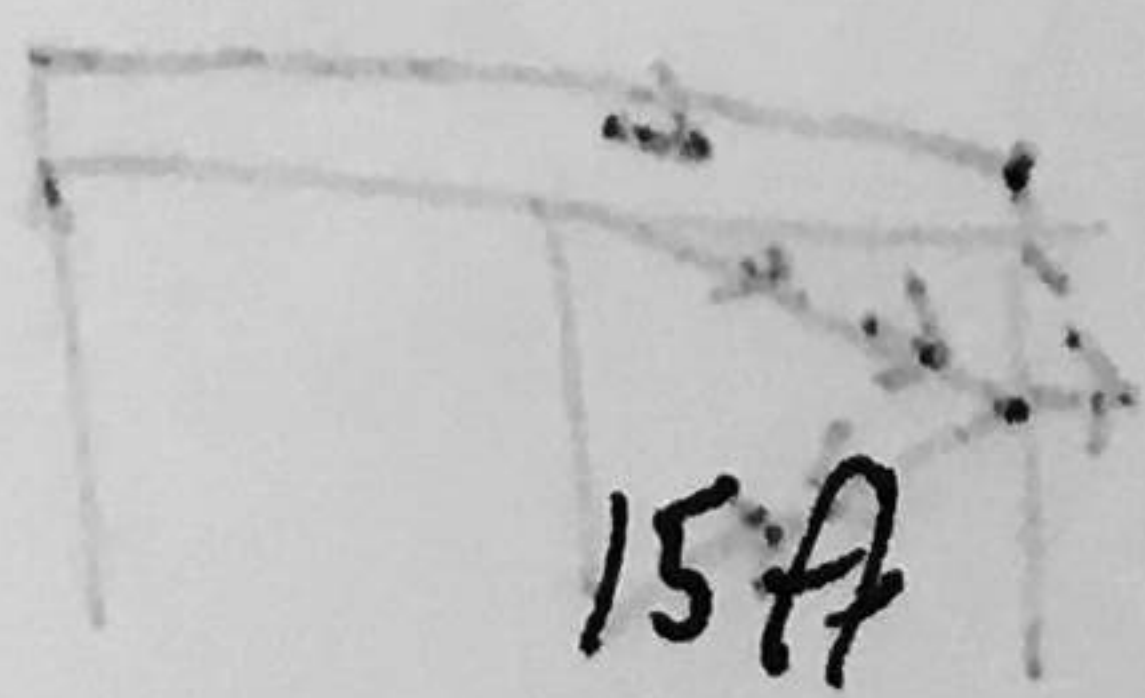
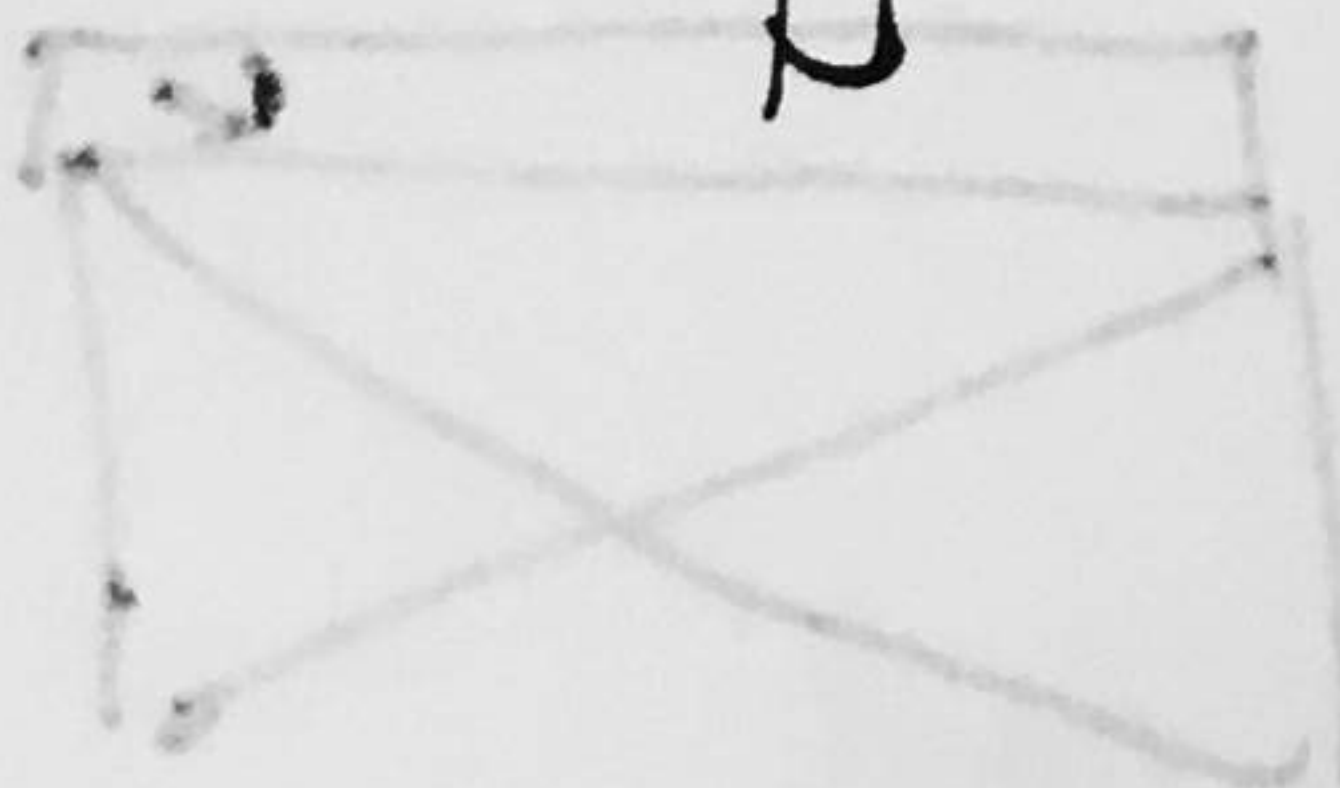
beams 80 ft

Trusses Over 100 ft

STEEL
Decking

Wide-flange beam 60 ft

Open web joist 90 ft



Reinforced Concrete

Crewy Slab 18 ft

Joint Slabs 38 ft

Precast Planks 40 ft

Precast Trusses Over 100 ft

Flat plates 25 ft

Two way slab beams 40 ft

Waffle Slab 55 ft

2.22 LATERAL STABILITY

Rigid Frame STEEL Frame

Shear Wall - wood concrete masonry

Braced Frame - Timber or steel frame braced with diagonal member

