STRUCTURE

structural principles, elements, systems

Design Studio One

ARCH5112: School of Architecture: 2023

STRUCTURAL PRINCIPLES

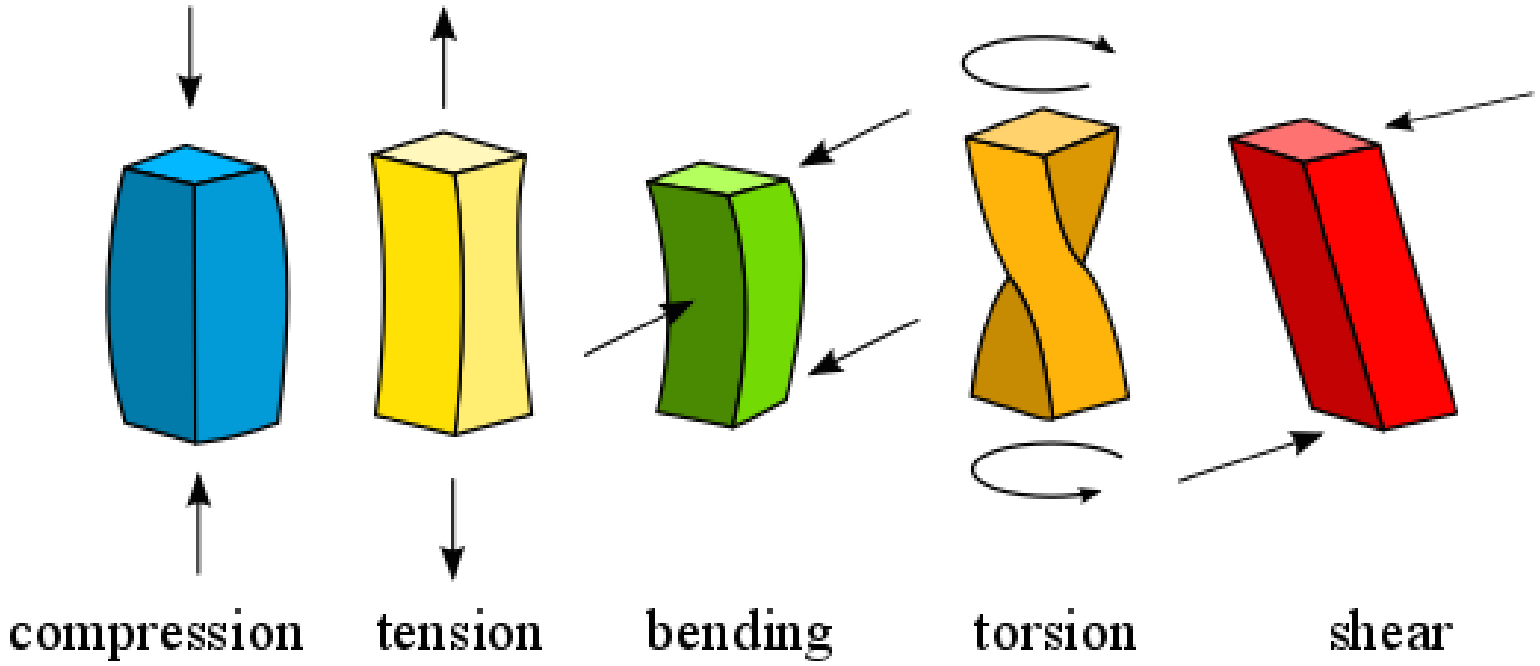
Tension – the act of stretching or state of being pulled apart, resulting in an elongation of an elastic body

Compression – the act of shortening or the state of being pushed together, resulting in a reduction in size or volume of an elastic body

Shear – the lateral deformation produced in a body by an external force that causes one part of the body to slide relative to an adjacent part in a direction parallel to their plane of contact

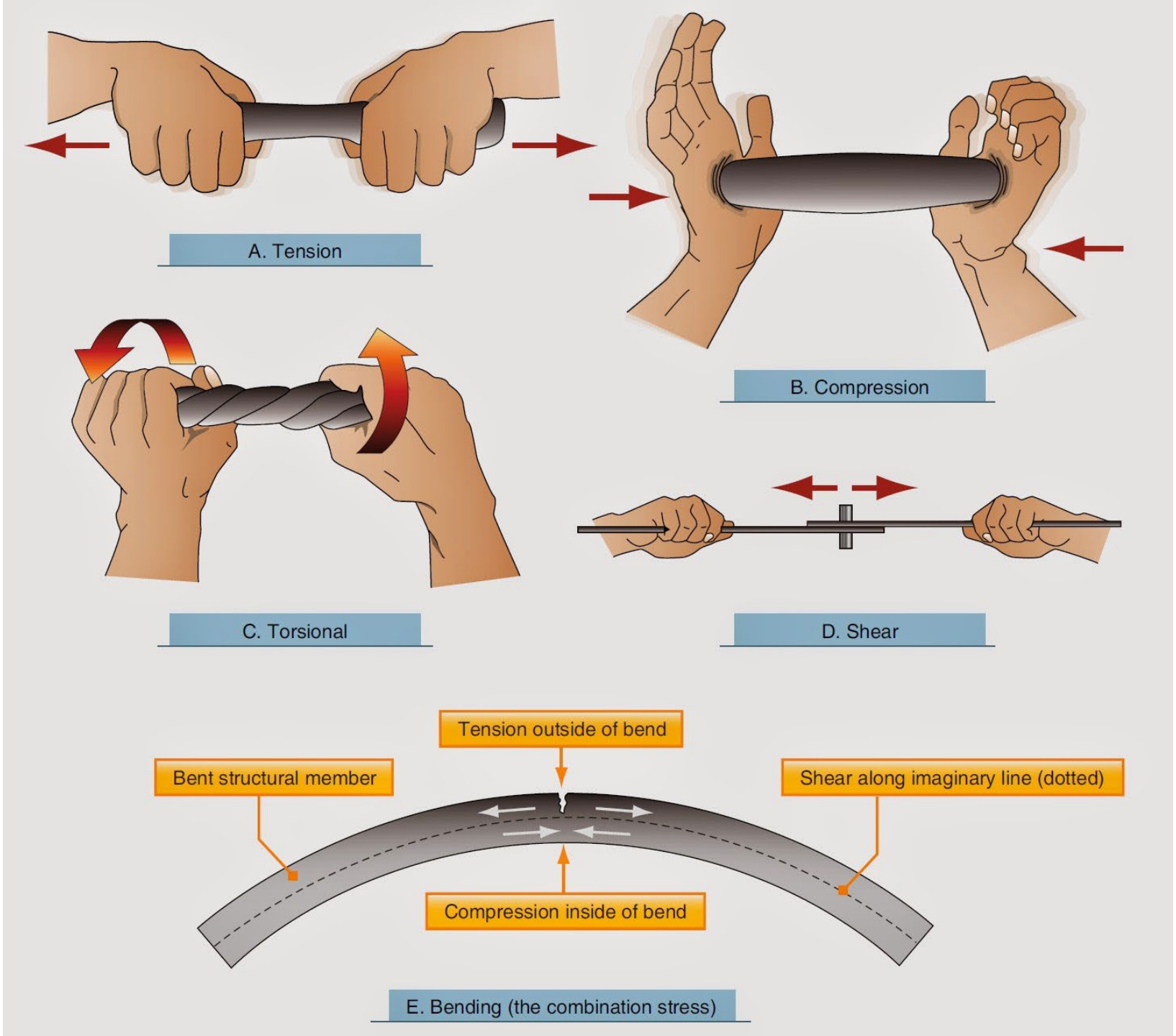
Torsion – the twisting of an elastic body about its longitudinal axis caused by two equal and opposite forces, producing shearing stresses in the body

Structural Principles - FORCES

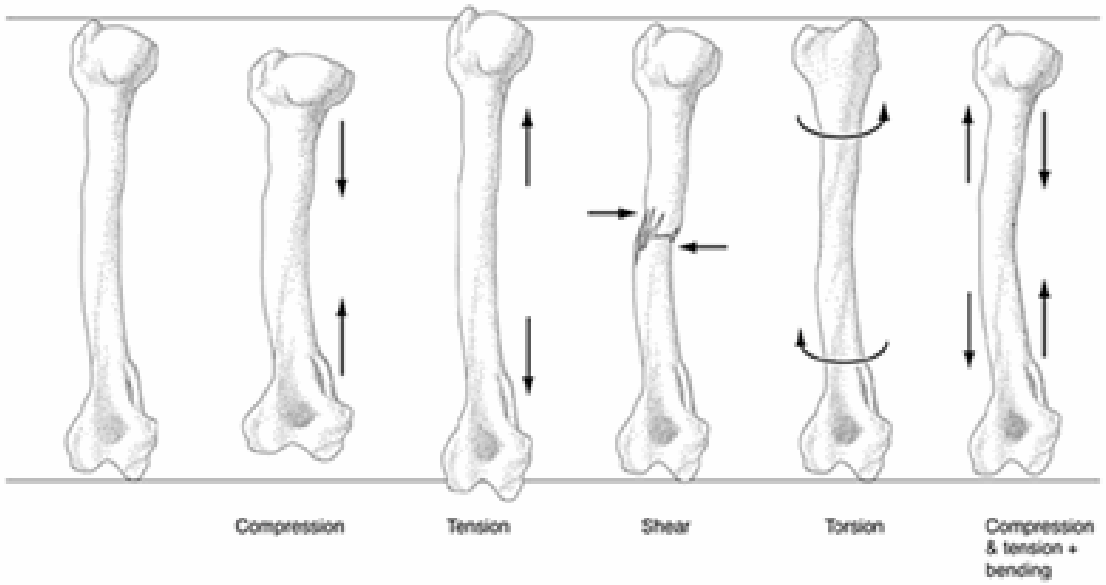


https://steemit.com/education/@ghostgtr/how-stuff-works-structures

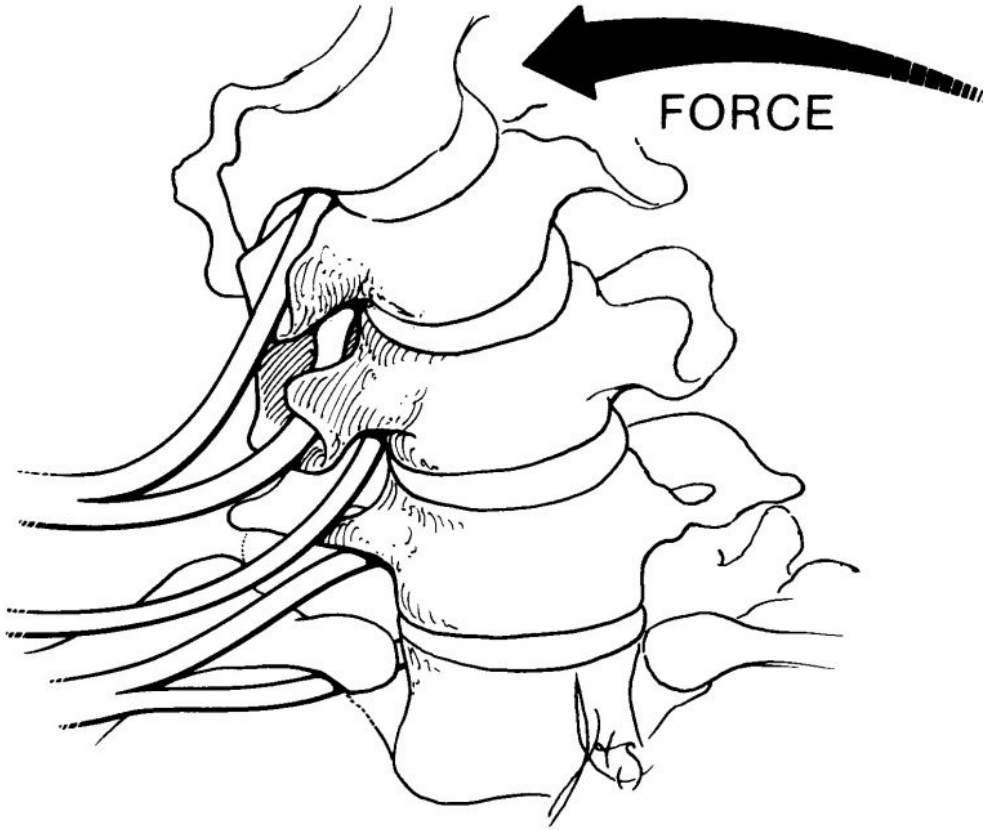
https://media1.shmoop.com/images/physics/forces/physicsbook_forces_graphik_35.png



https://www.aircraftsystemstech.com/p/major-structural-stresses.html



The structure of your body is under load. So, there are always various types of stresses acting on it, such as tension, compression, and shear stress, all of which affect the body's internal structure.



When the spine flexes, the intervertebral discs undergo compressive stress on the anterior side and tension on the posterior side.

https://www.strengthminded.com/tension-compression-shear-and-torsion/

STRUCTURAL ELEMENTS

Beams: Horizontal members which transfer loads to supports

Columns: Vertical members which transfer compressive loads to the ground

Bracing: Members that interconnect and stiffen columns and beams

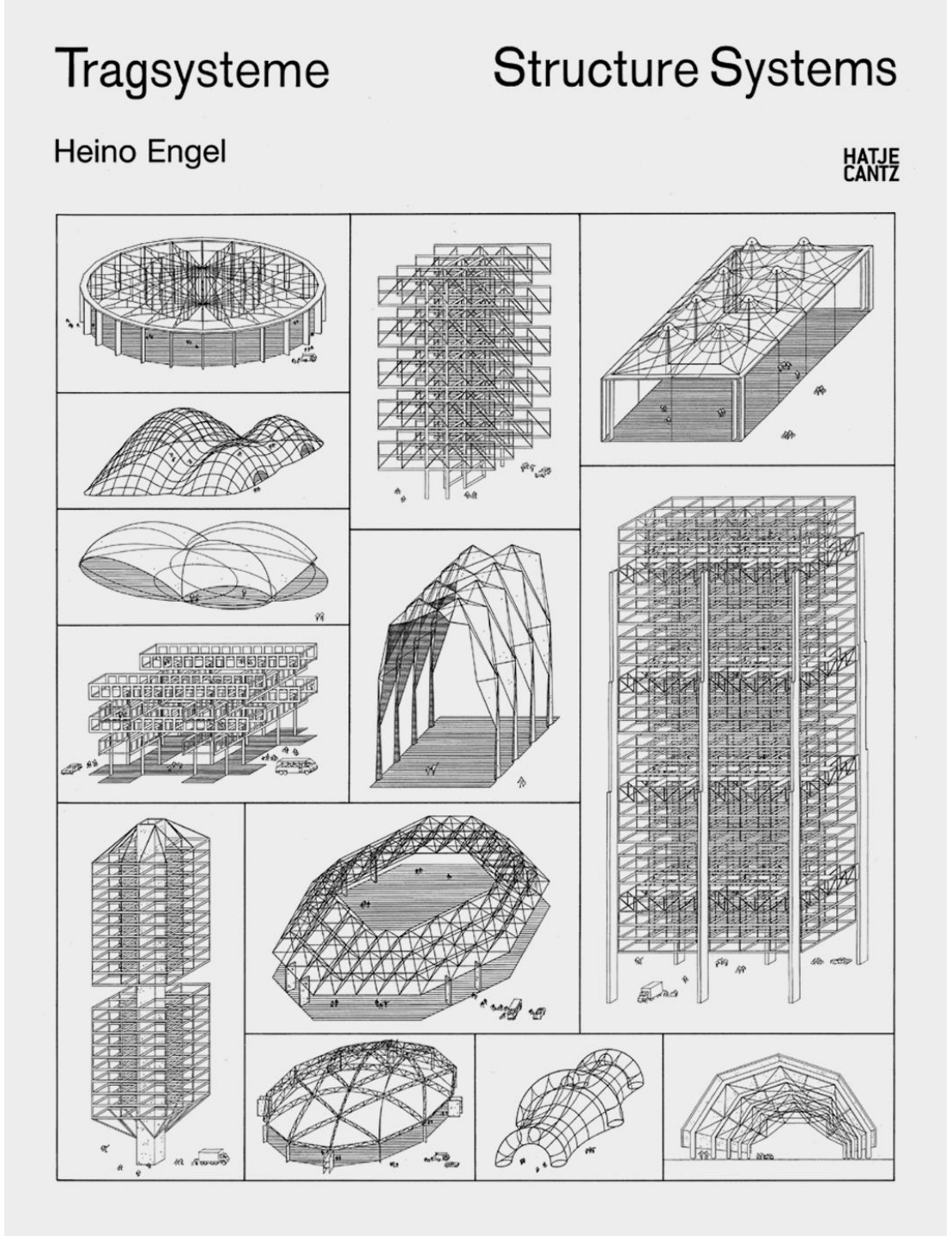
https://www.designingbuildings.co.uk/wiki/Structural_principles

STRUCTURAL SYSTEMS

- column and beam
- cantilevered beam
- bracing system
- truss
- arch
- gothic structure

https://www.designingbuildings.co.uk/wiki/Structural_principles

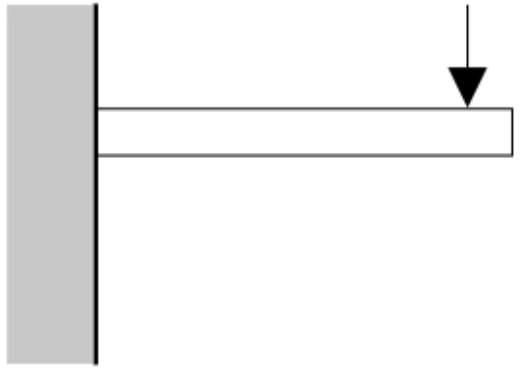
https://www.hatjecantz.de/files/00001876.jpg



https://www.designingbuildings.co.uk/wiki/File:Columns_and_beams.jpg

https://www.designingbuildings.co.uk/wiki/Types_of_beam

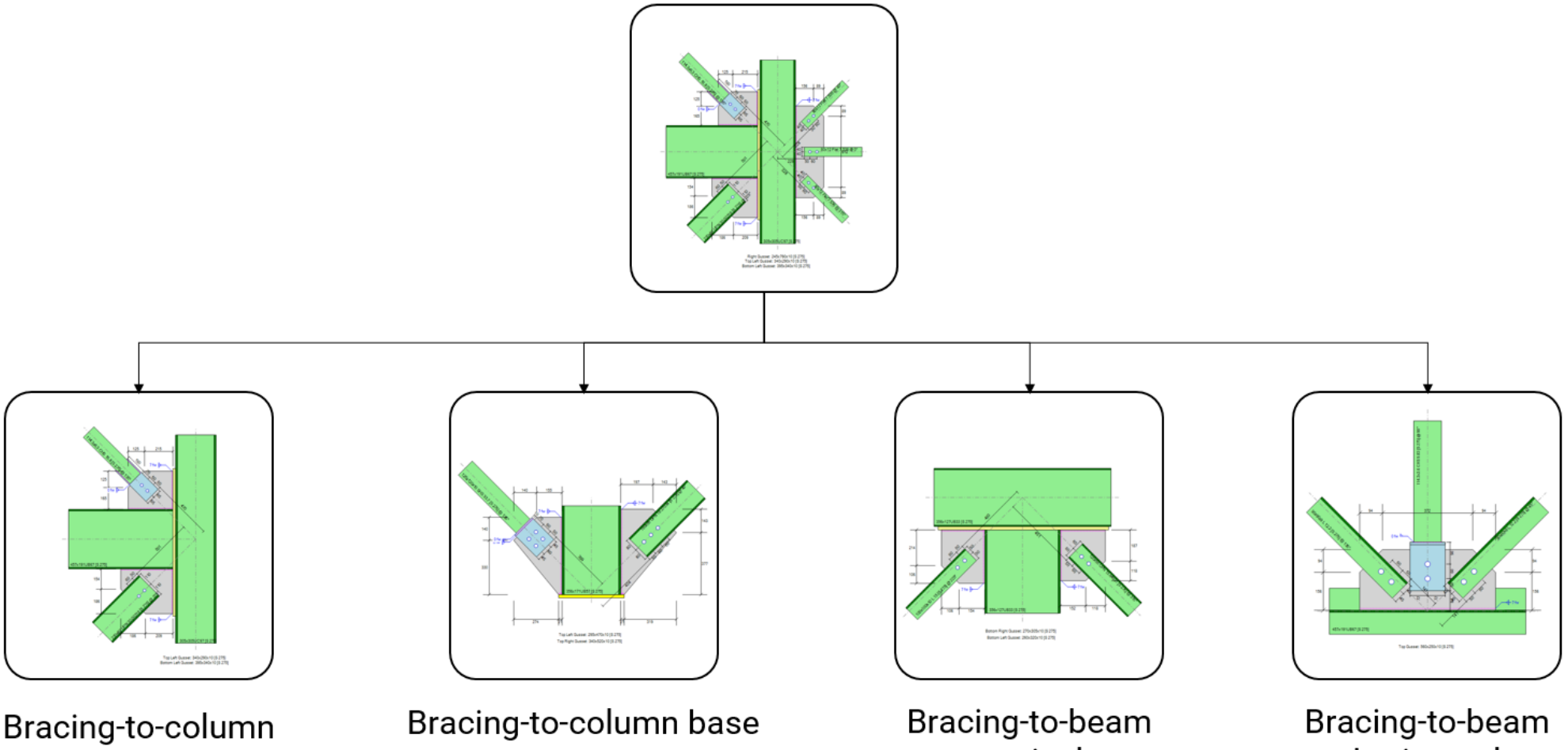
A cantilever is a beam supported only at one end, with load carried over the overhanging. This is in contrast to a simply-supported beam, which is supported at both ends.



https://www.designingbuildings.co.uk/wiki/Cantilever

http://bloomingrock.com/wp-content/uploads/2011/08/7th-Avenue.jpg

MasterKey: Simple Connections – Bracing Connections



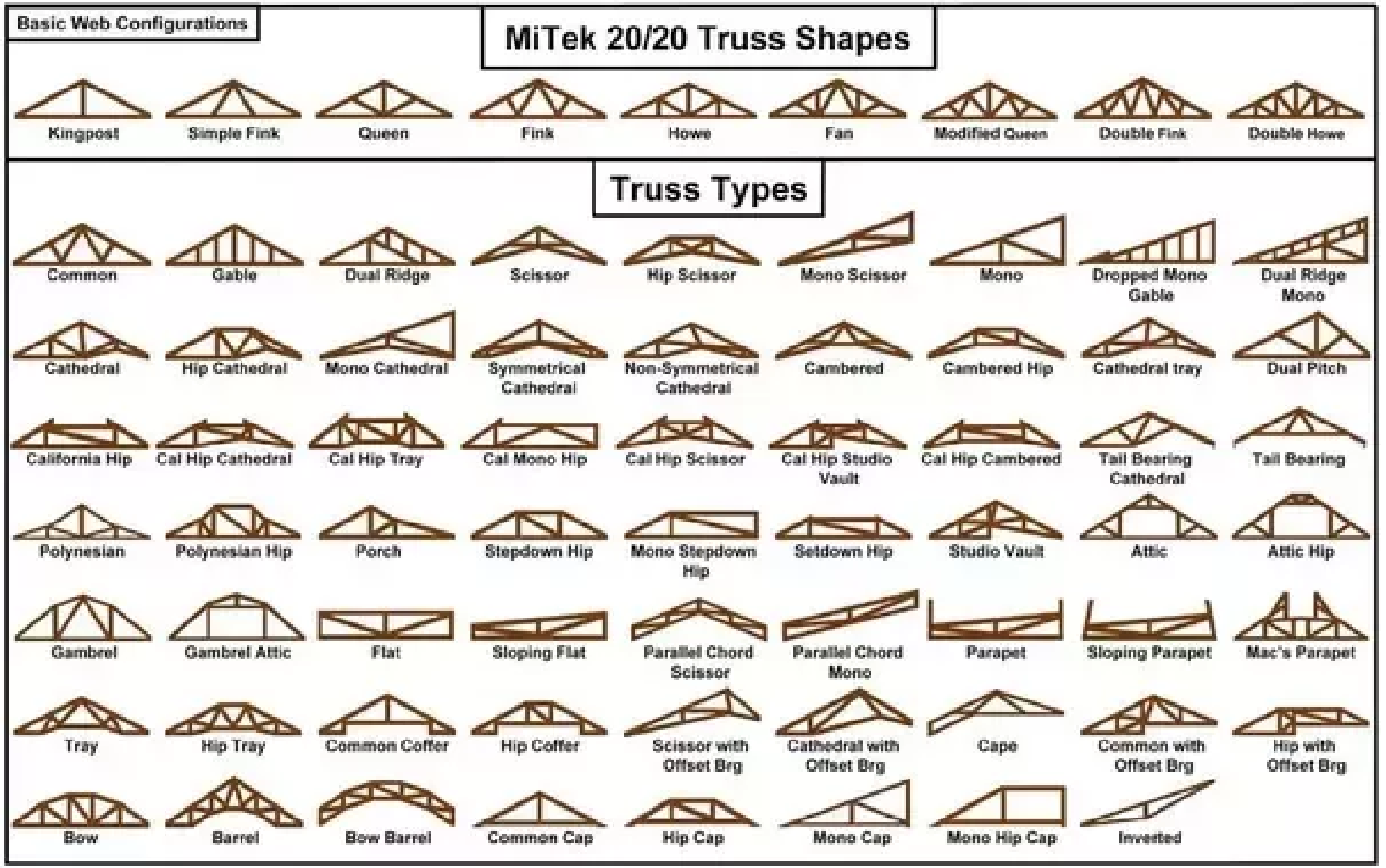
Bracing-to-column

Bracing-to-column base

Bracing-to-beam vertical

Bracing-to-beam horizontal

https://www.masterseries.com/blog/2019/masterseries-2019-sneak-preview-bracing-connection



Truss - Load-bearing frames constructed of connected triangular shapes

https://www.docsity.com/en/trusses-engineering-mechanics-statics-lecture-slides/291805/

https://cdn.instructables.com/FHF/1Y7I/I88LMRZW/FHF1Y7II88LMRZW.LARGE.jpg?auto=webp&frame=1&width=933&fit=bounds

https://www.designingbuildings.co.uk/w/images/a/a2/Arches.jpg

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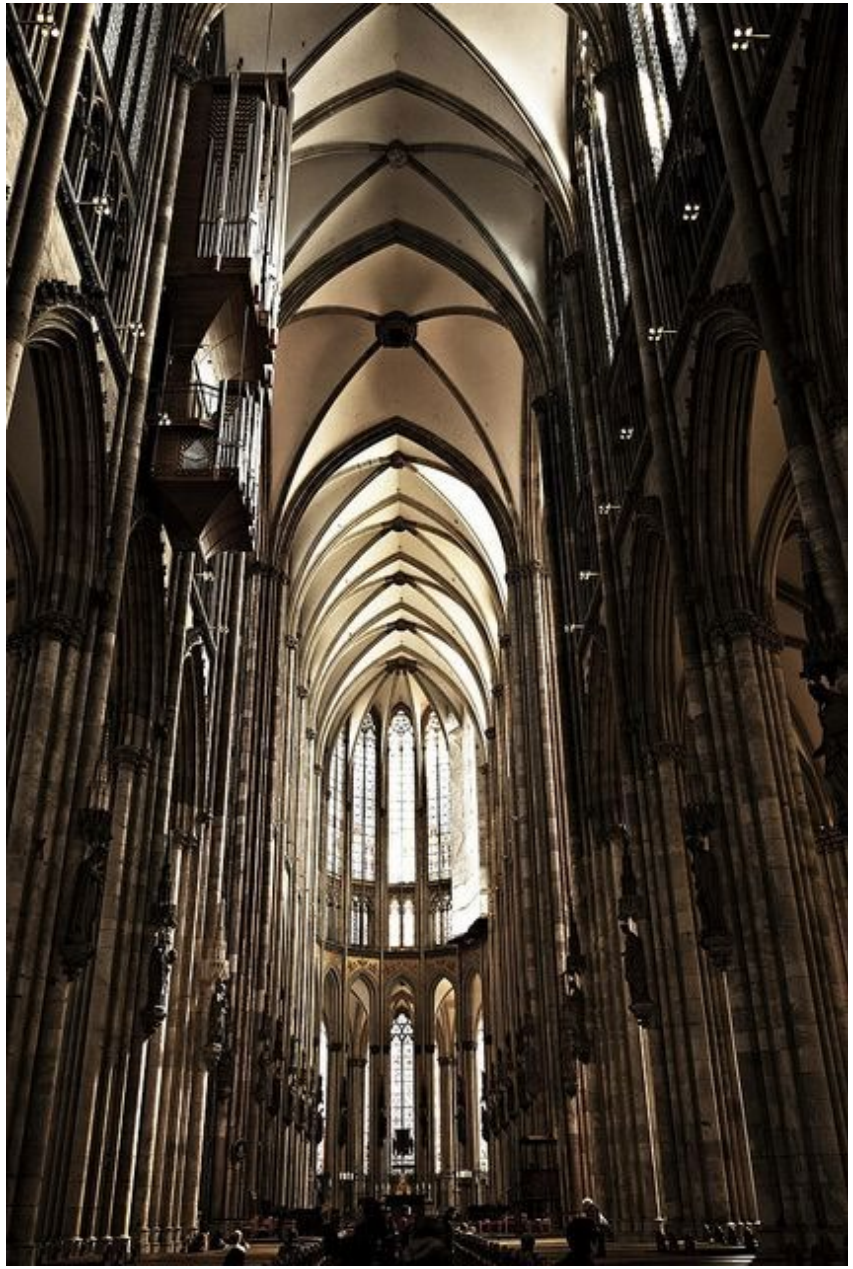
https://www.designingbuildings.co.uk/w/images/7/76/Parabolicarch.jpg



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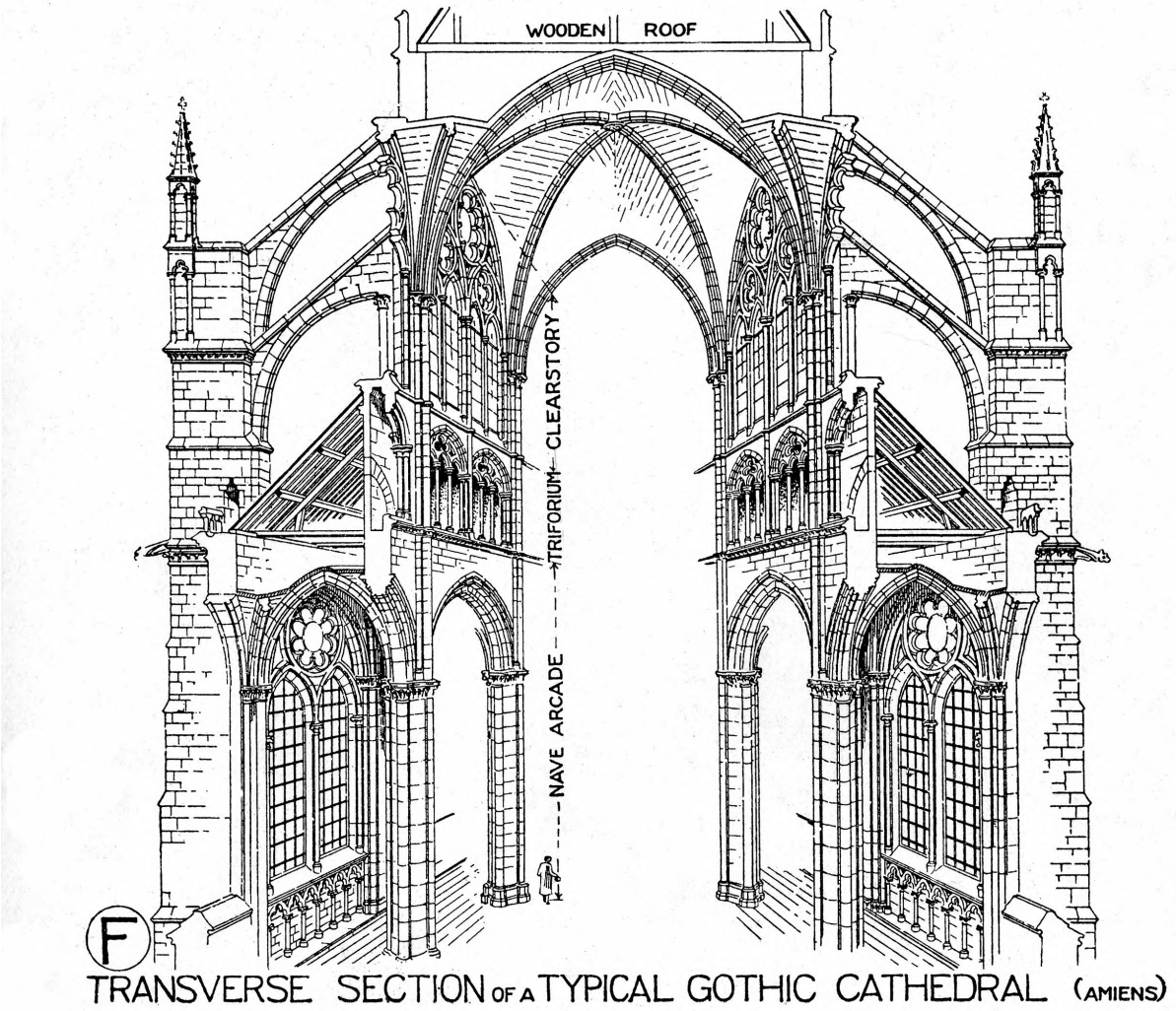

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