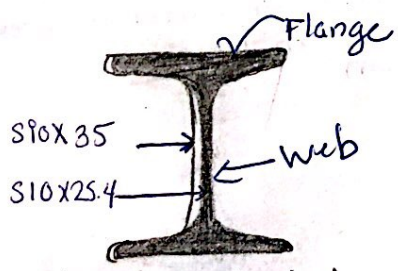
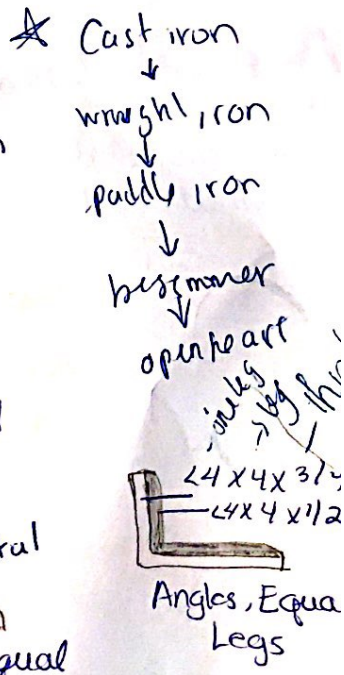


300 pounds per square inch

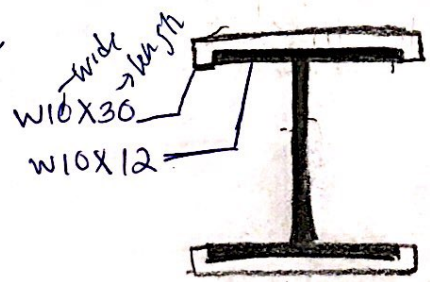
Steel Frame Construction

- Variable
- steel, strong, and stiff; material of slender towers and soaring spans; light in proportion, well w/ rapid construction; uniquely plentiful and inexpensive.
 - ↳ weakness = fire
 - ↳ strong in both compression + tension
- before - expensive for weapons and artillery.
 - ↳ masonry vs steel
 - ↳ walls are thinner
 - ↳ bigger windows (more lights)
- > contain less than 2% carbon; ordinary called "mild steel".
 - ↳ manganese, silicon, phosphorus, sulfur-, oxygen, + nitrogen
- * "cast iron" - contains 3-4% carbon and greater quantities of impurities than steel. → good with compression
 - ↳ transparency
 - ↳ ex: Eiffel tower
- > "wrought iron" contains less carbon than most steel alloys.
 - i beam
 - ↳ it is thinner
 - ↳ well proportionate
- > Too much carbon makes hard but brittle metal (like cast iron) vs > Too little make malleable which is weak material (wrought iron).
 - * carbon would soon replace steel
- > iron ore (oxides of iron) → coke (coal whose volatile constituents have been distilled out, leaving only carbon), → crushed limestone = Cast iron
- > Most steel is converted from iron is manufactured by the basic oxygen process



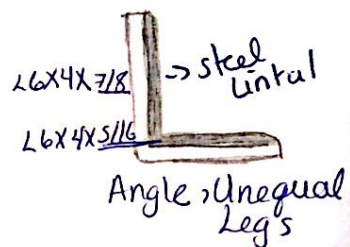
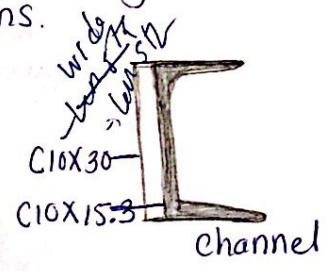
American standard

> shapes are less efficient structurally than wide angles because the roller arrangement that produces them is incapable of increasing the amount of steel in the angles w/o also adding steel to the web



wide flange

> are used for most beams and columns



* the tension is on both flange (top + bottom) the web is neutral

* Brooklyn Bridge was built by an important engineer named

Cast Steel

- structural steel produced by pouring molten steel directly into molds and steel cool down.
- casts parts are produced by in small quantities; can economically.
- cast steel parts can be nonuniform in section, can readily incorporate curves or complex geometries.
- shape = tailored to particular requirements of the part.
- well for production of custom shaped connections for steel structures stronger, lighter, + more attractive.

Cold-Worked steel

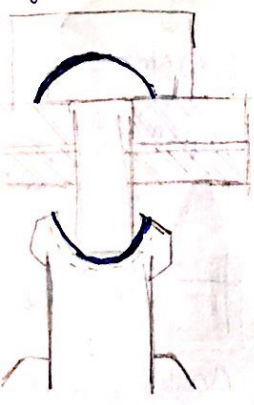
- rolled or bent at room temperature
- causes steel gain considerable strength through a realignment of its crystalline structure.
- steel sheet can roll into corrugated as oor et roof
- heavier sheet cold formed square, rectangular, round, elliptical shapes.

Open Web Steel Joists

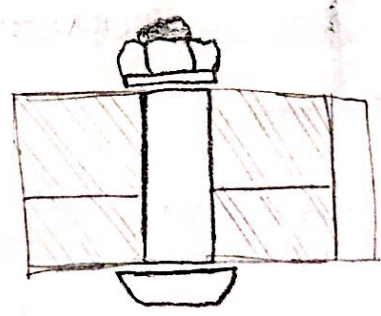
- a mass produced truss used in closely spaced arrays to support floor and roof decks
- Three series:
 - K - are for spans up to 60' and depth 8"-30"
 - LH - designated as longspan and can span 96', depth 18"-48"
 - DH - 52'-72" depth and can span up to 144'
- Joists girders are prefabricated steel trusses designed to carry heavy loads, bays of steel
- are invariably made of high-strength steel.

Joining Steel Members

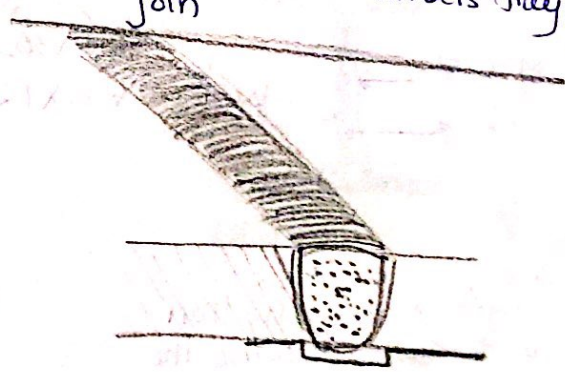
A. Rivets: is a steel fastener consisting of a cylindrical body and a formed head.



B. Bolts: are heat treated during manufacturing to develop their greater strength, or lower strength.



C. Welds: it can join the members of a steel frame as if they were a monolithic whole. ^{more money, time and depends on the weather}
 > Properly designed and executed.
 > stronger than the members they join



Vocabulary:

- moment connection - a moment force makes something rotate, rotate down
 ↳ lateral resistance - (brac brace, shear, + moment frame)
- shop drawings - for cabinets, steel like sketches, draw each piece of steel
- plumbing up - make sure its either vertical or horizontal

The Construction Process

For every large column the heavy baseplates are installed separately in advance of the columns

Holes through the baseplate may be provided on each of the side of the column as a way of introducing a cut under the middle of the baseplate

Three leveling screws support the plate before grouting

Thin steel plate is leveled on a bed of grout prior to erection of the column.

Leveling nuts on the anchor bolts support the baseplate and column before grouting

A pair of angles and two bolts support the column before it is welded to the baseplate.

