

# Framing & Building Basics

Architectural Drawing & Interior Design

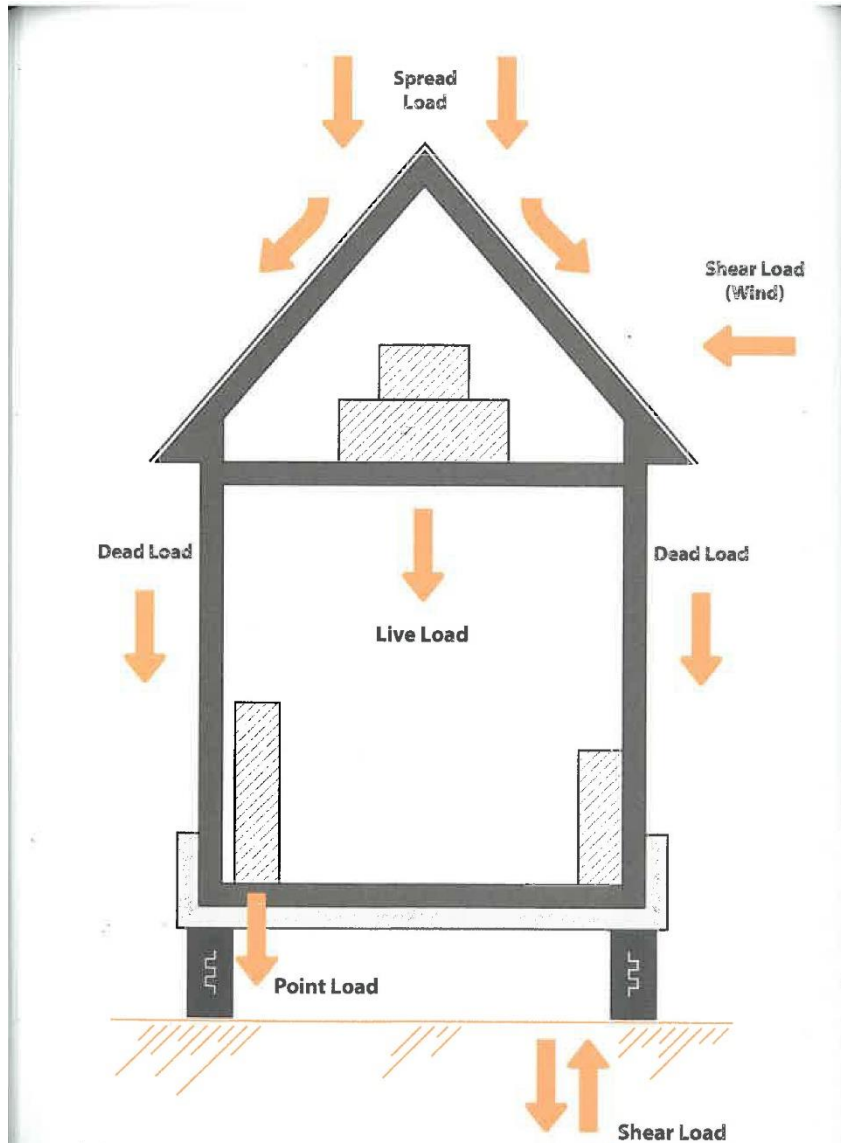
# Introduction to Framing

- Once you have your floor plan design, you are now ready to plan for **building**.
- In order to accomplish this, you must know the correct methods needed to properly frame a house.
- While this can get extremely daunting in larger homes, if you take it bit by bit it's manageable.
- Framing is an interdependent structural system where one piece depends on another.

# Structural Loads

- Before we get started with framing we understand structural loads.
- Structural loads are forces that get to applied to structures, **e.g.** *wind, gravity, snow, earthquakes, people etc.*
- If your house cannot handle such loads it will collapse.
- **Structural Loads** include dead loads, live loads, environmental loads.

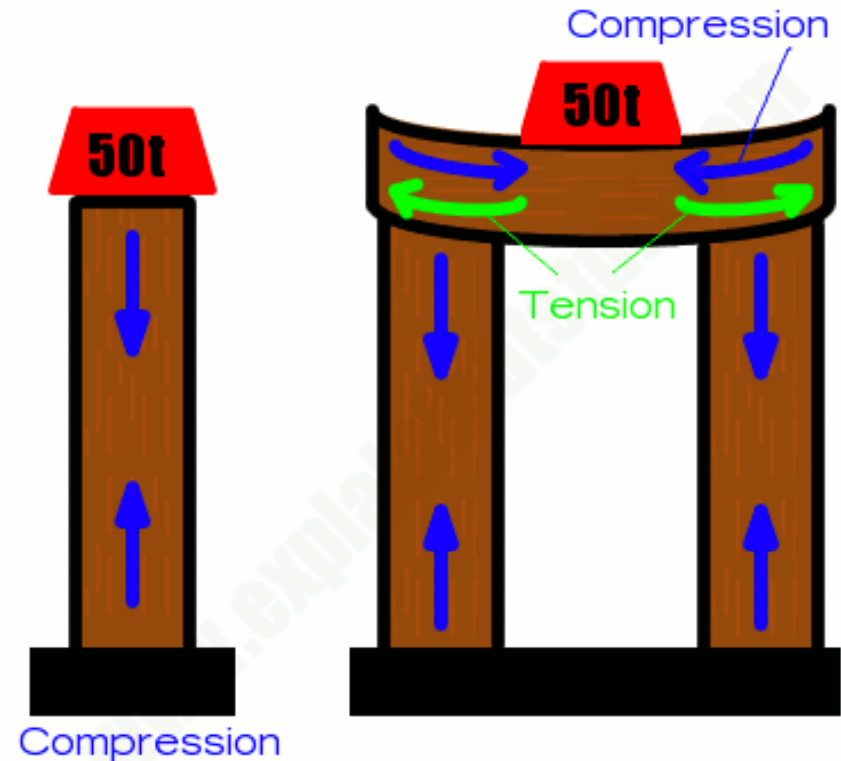
# Structural Loads



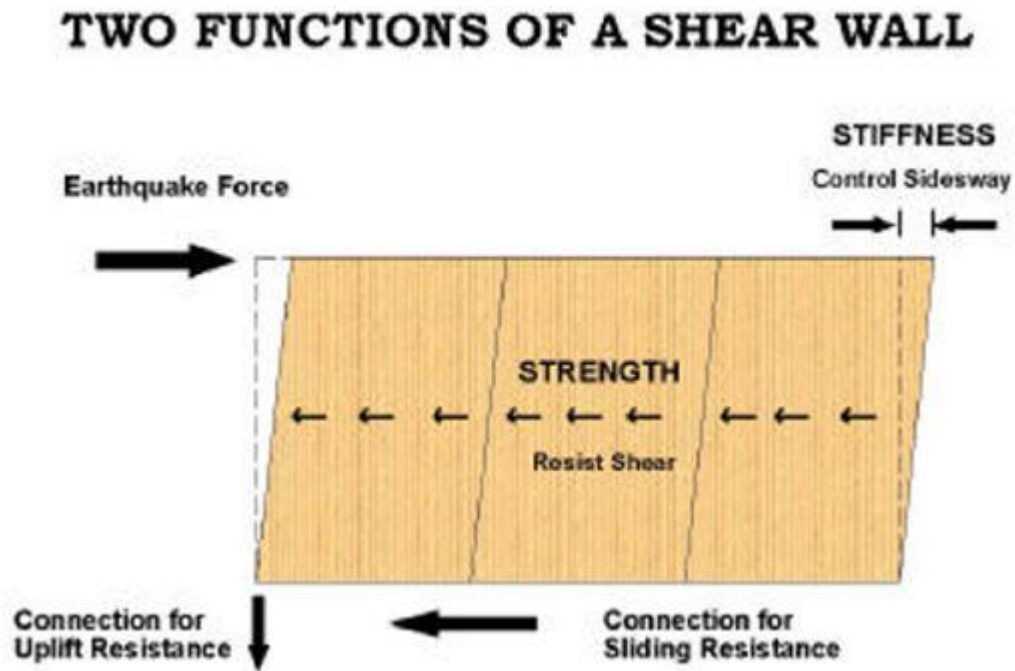
- A **dead load** is the actual weight of the materials used in the construction of the house, *e.g. walls, floors, roofs*. Fixed and considered permanent.
- **Live load's** are produced by the use and the occupancy of the building, *e.g. people and furnishings*. Variable and temporary.
- **Deflection** is the *bounce* or *give* in a floor system as a person walks across a room. The stiffer the material the less deflection

# Tension

- A force applied to an object that has a pulling affect.



# Shear



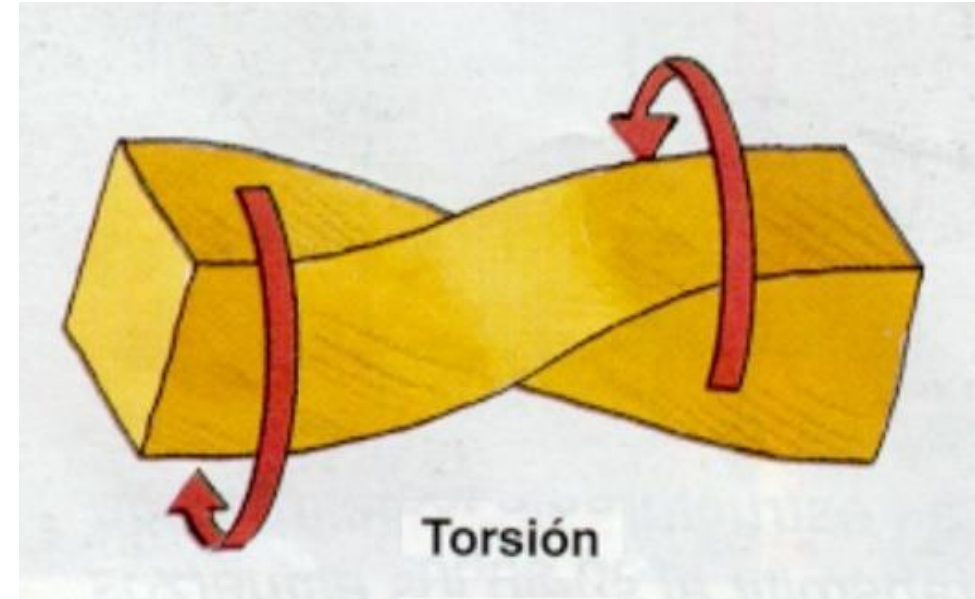
- A force that pushes part of an object (building) in one direction while the other goes an opposite way.

# Torsion

- The twisting of an object due to an applied torque.
- Torque is rotational force.

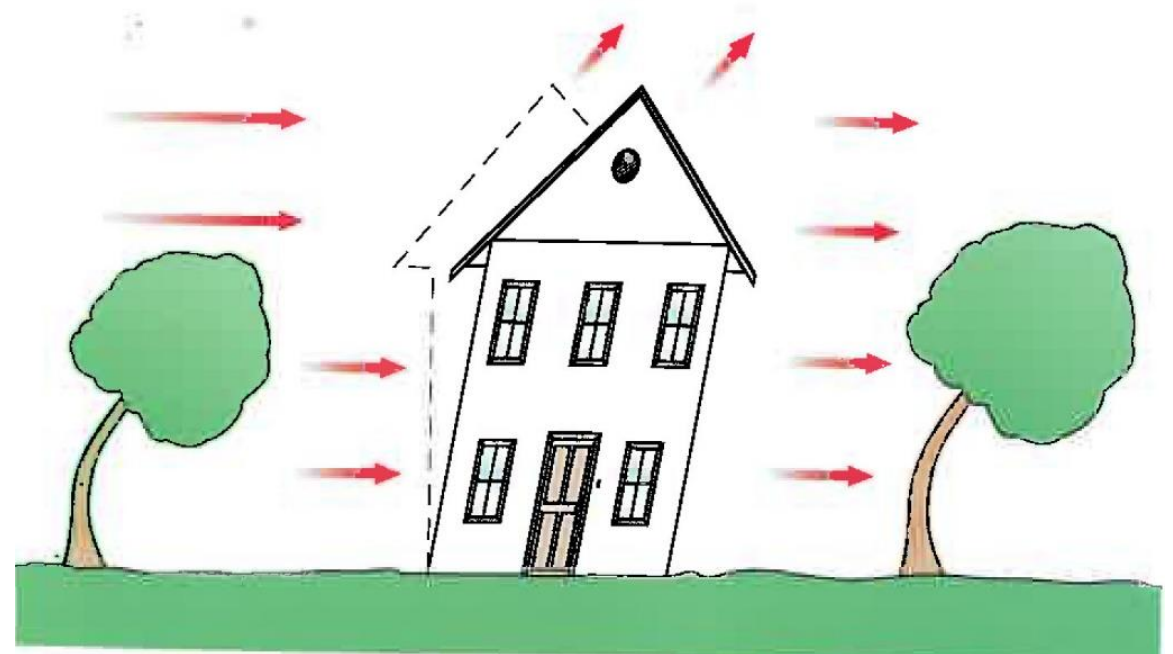


Indian Sunburn! Ooowweeee!!!!

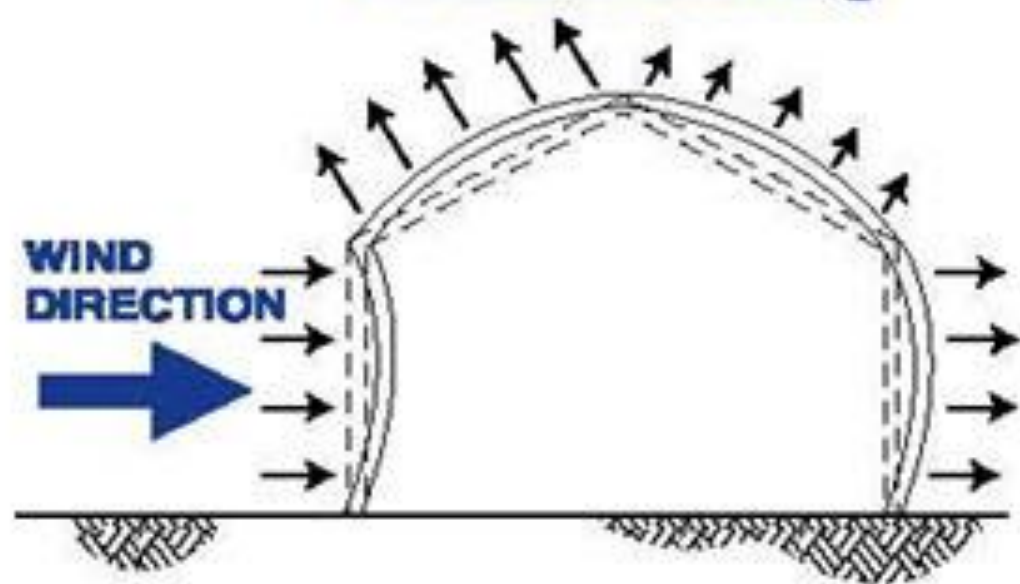


# Wind Load

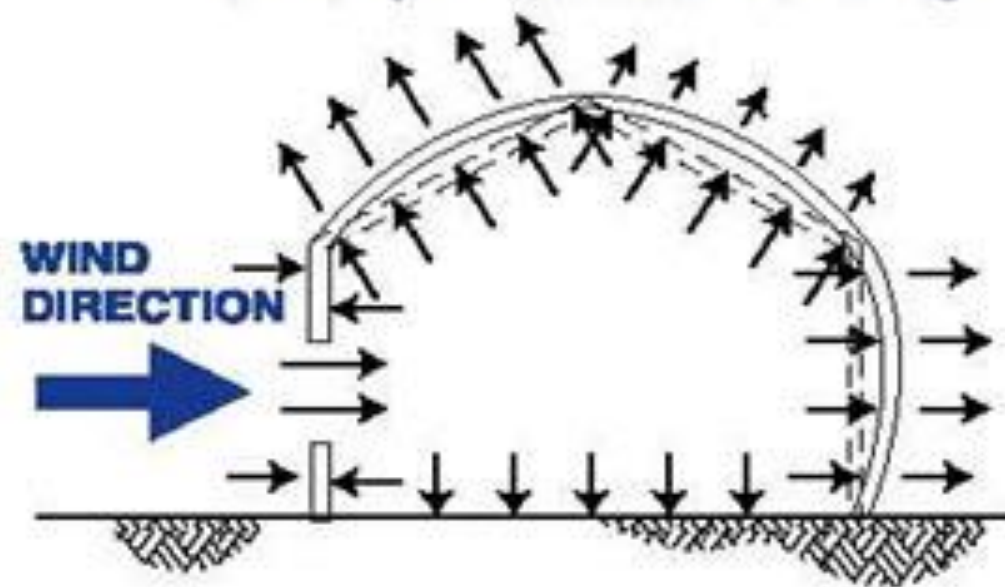
- Lateral pressure may be positive (pushing) or negative (suction forces on the leeward side).
- Wind pressure can also produce *uplift*.



**Enclosed Building**



**Partially Enclosed Building**



# Hurricanes



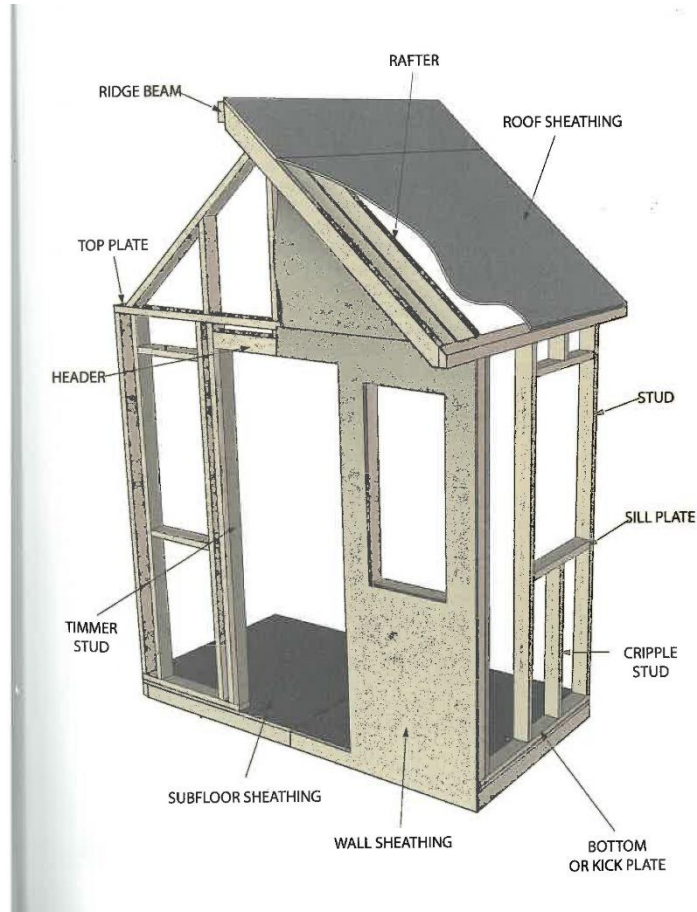
- Hurricane prone areas are the coastal areas of the **Atlantic Ocean** and the Gulf of Mexico where wind speed exceeds **90 mph**.
- Additional protection is required for exterior glazing where wind blown debris might be a problem.

# Snow Load

- The IRC (International Residential Code) specifies that the snow load for the roof of a house must support 70 psf.
- Amount of snow accumulating on roof.



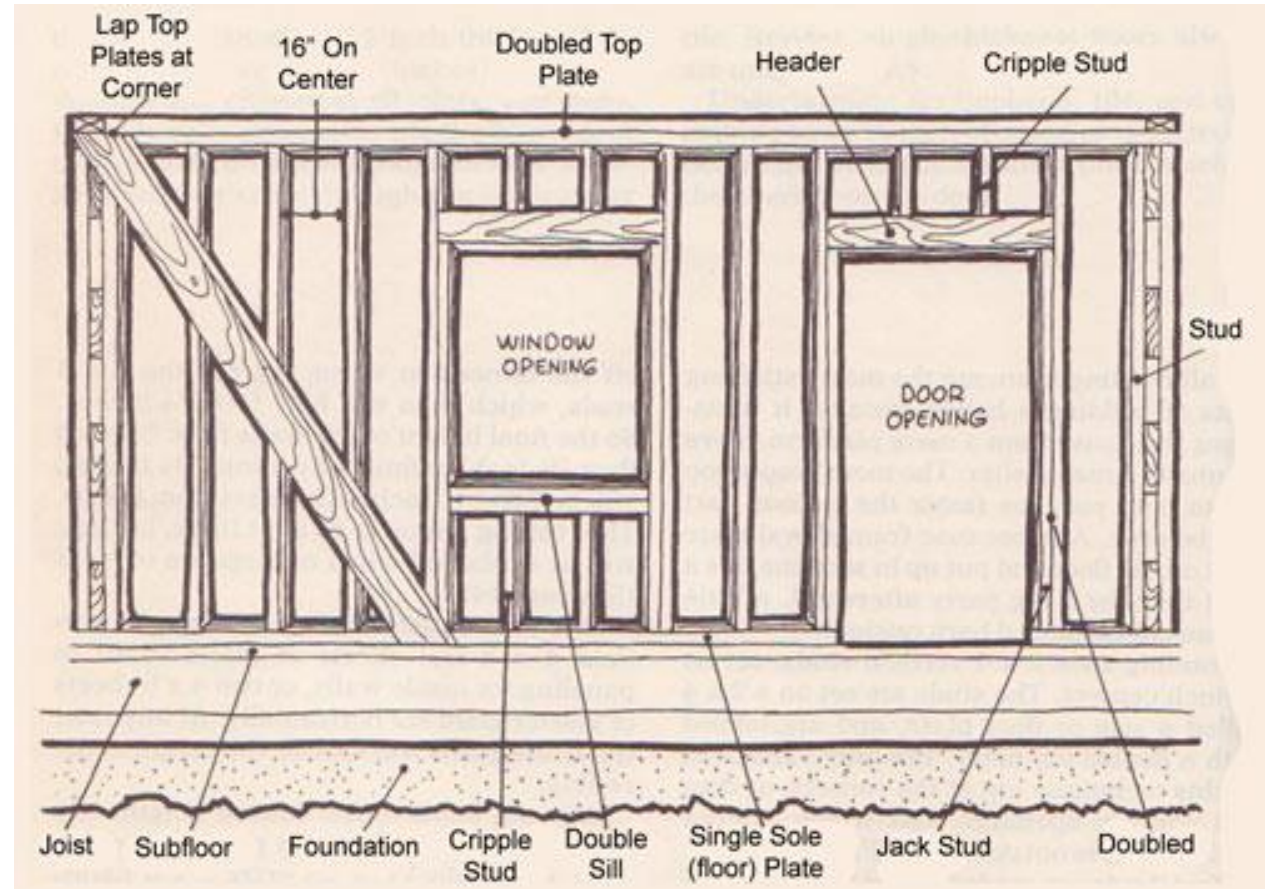
# Framing Your House



- Framing is the process of attaching building materials together to create a structure.
- A system used to attach members together that makes it strong and energy efficient.
- There are terms used to describe the each member of a house.

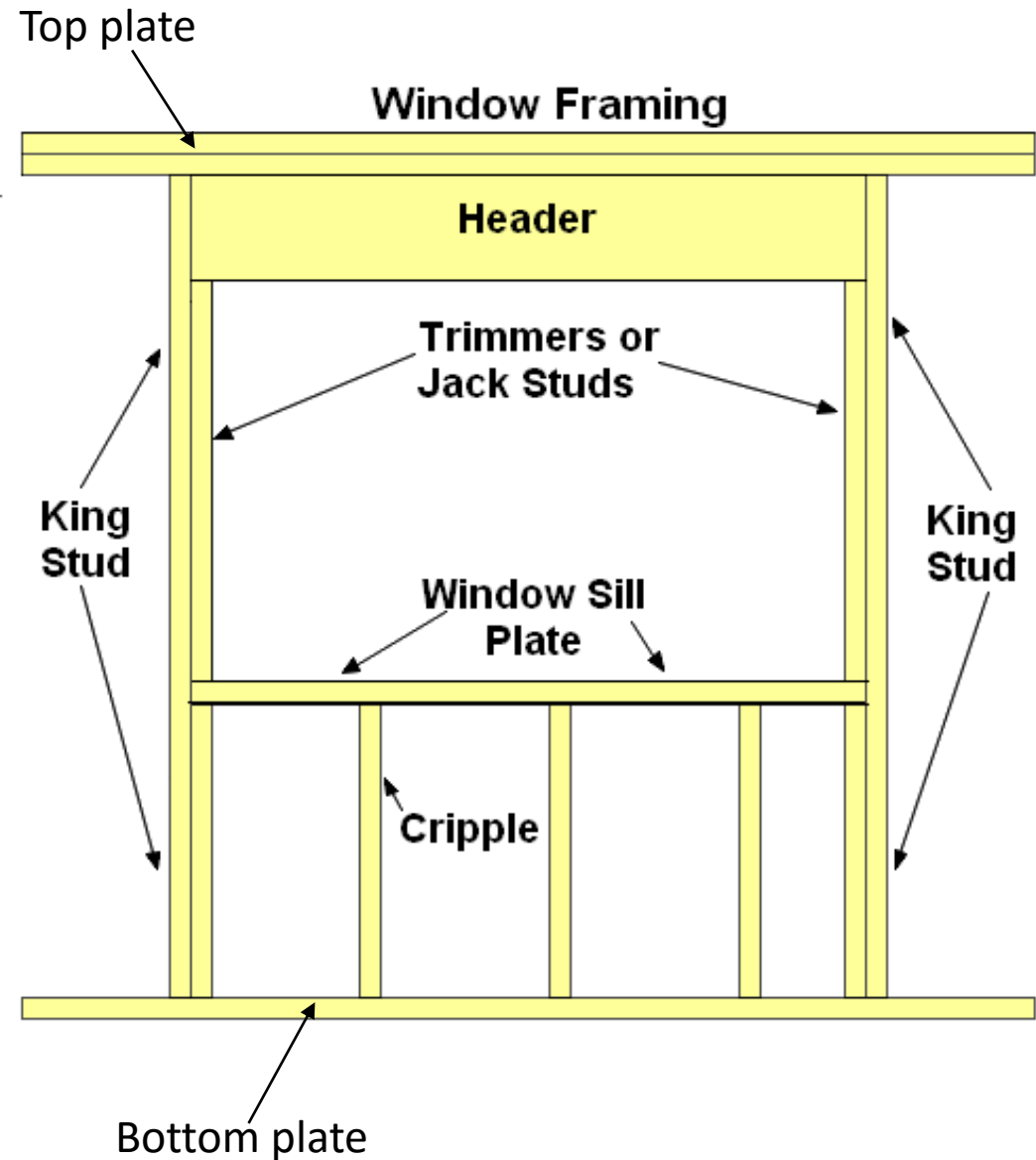
# Parts of a Wall: Studs

- Vertical members of a wall are called ***studs***.
- ***Studs*** connect the top plate with the bottom plate.
- Used in the construction of windows and doors.
- **Cripple stud** is a stud cut short to allow a window, or on top of a door.
- **Jack stud** is cut short to allow a door.



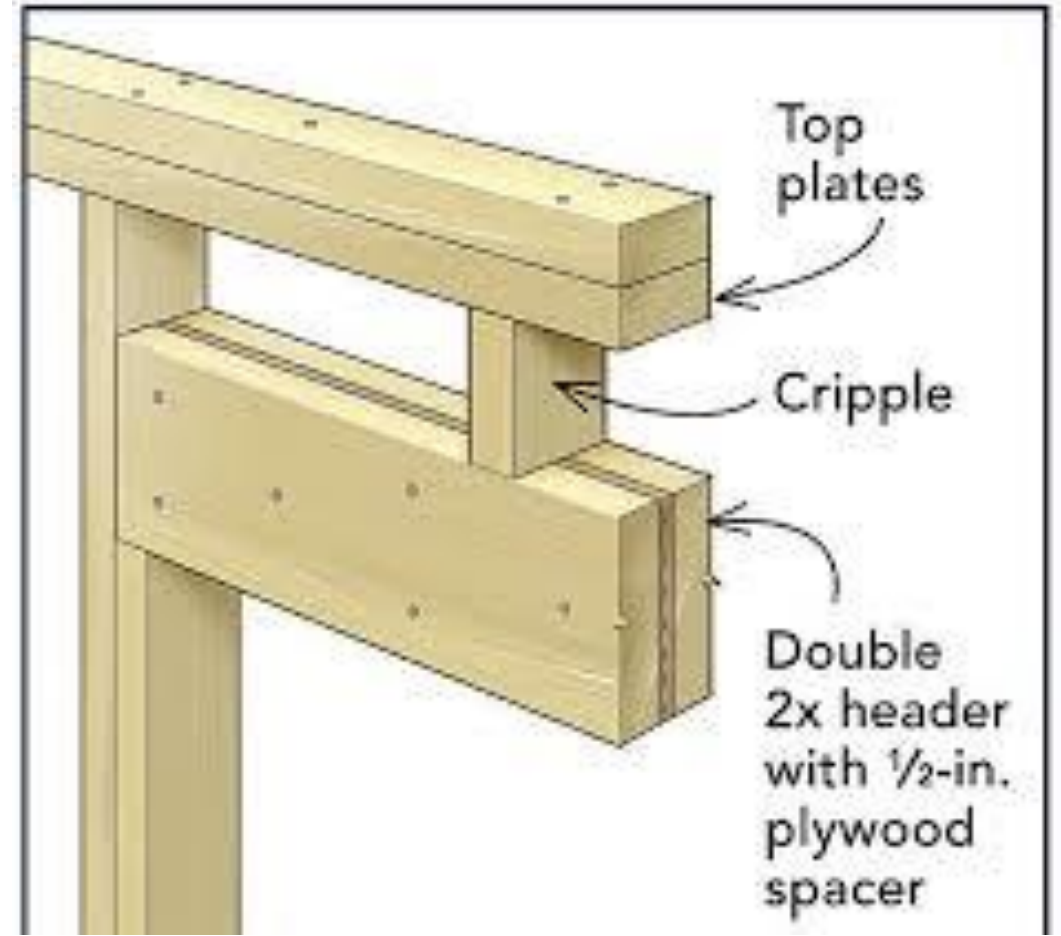
# Parts of a Wall: Plates

- **Plates** are horizontal members of the wall connected by *studs*.
- **Bottom Plates** are used to connect the wall to the floor.
- **Top Plates** support the floor above. Usually doubled up.
- **Sill Plates** support windows and sit on top of *cripple studs*.

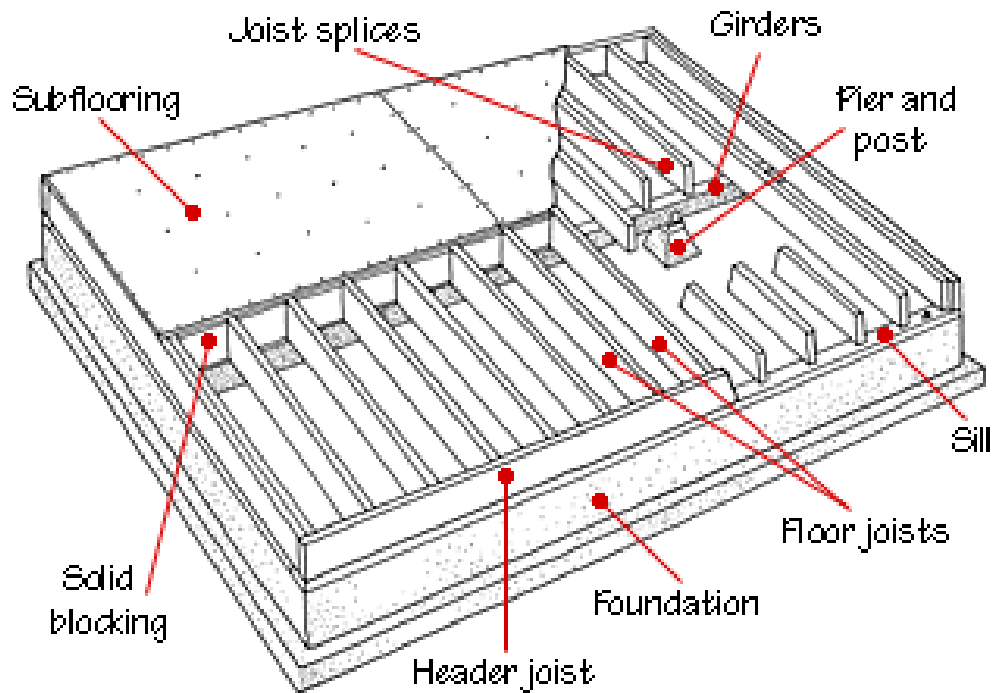


# Parts of a Wall: Headers

- **Headers** are horizontal members used to transfer loads to jack studs.
- Doubled up to match thickness of studs.
- Cripple studs inserted above the header for extra support.



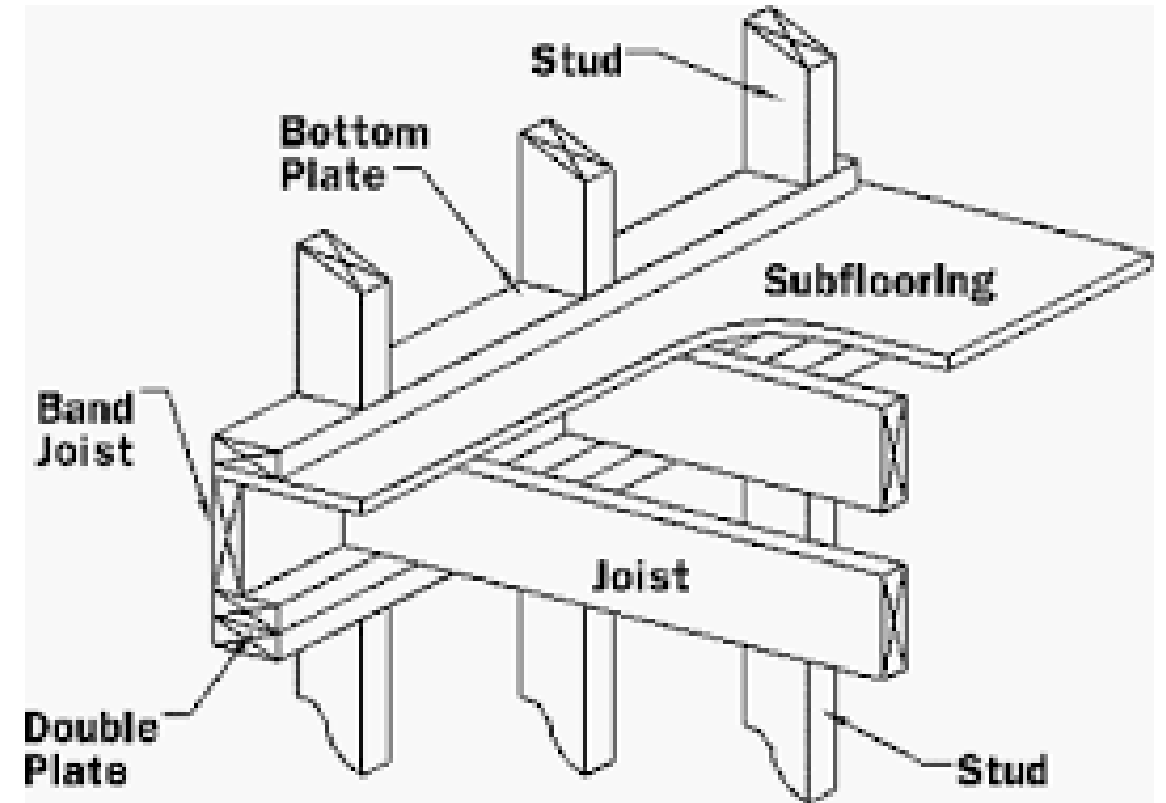
# Parts of a Floor



- **Floor framing** consists of a system of sills, beams, girders, joists, and subflooring.
- **Walls** sit on top of floors. Floors sit on top of walls.

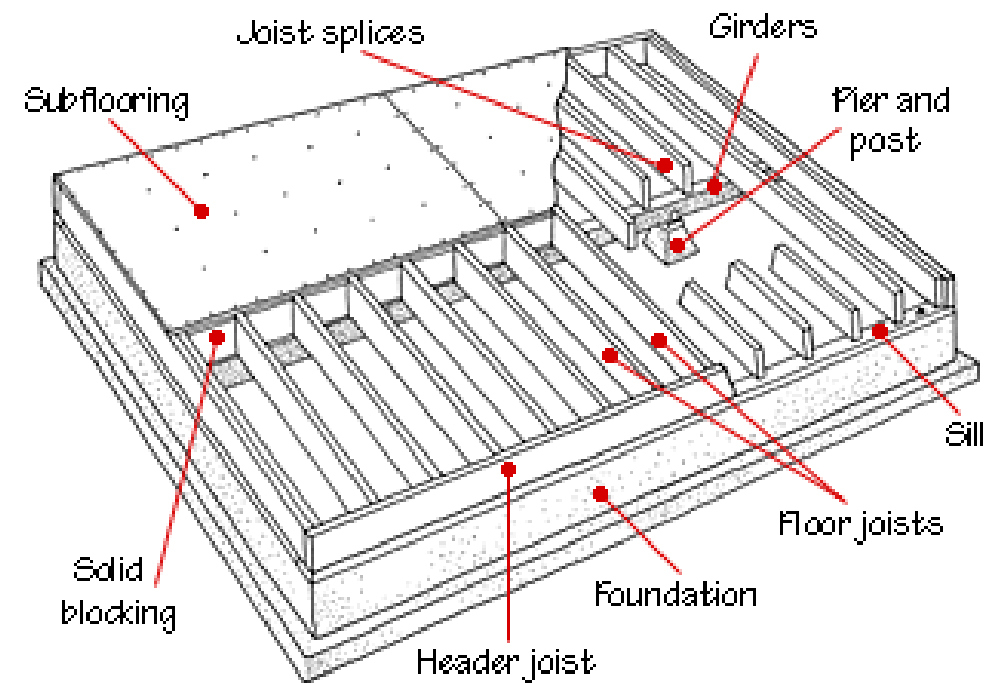
# Parts of a Floor Cont.....

- **Joists** are the horizontal members of the floor. Like studs spaced out at equal distances.
- **Header (Band) Joists** connect the joists together. They wrap around the joists. Sits on top of sill plate.
- **Subflooring** is usually plywood. Used to combat shear forces, provides safe work environment, and provides nail-able surface for the finish floor.



# Parts of a Floor

- **Girders** are beams used in construction as the main horizontal support.
- Supports the joists that sit on top of it.
- Placed mid span of the joists to resist deflection.



# In Conclusion...

- A structure must withstand a number of forces being applied to it.
- Examples of forces are...
  - Tension, shear, and torsion.
- Live loads and dead loads must be taken into account when designing a structure.
- Framing is the process of connecting building materials together to create a structure. Framing is a construction system.
  - Studs, plates, headers, rafters, girders, flooring and joists are all terms used to identify different components in framing.