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.
Sheer

- 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! Ooowweeeeee!!!!
Wind Load

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