Session: From the Ground Up!

FROM THE GROUND UP!

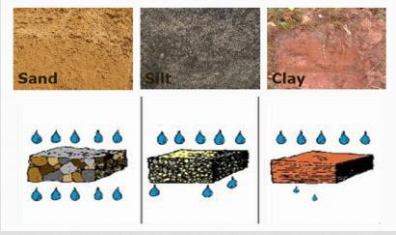
UNDERSTANDING RESIDENTIAL CONSTRUCTION

CLASS OBJECTIVES

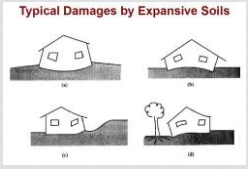
- Understand residential construction processes and sequences for:
  - Frame
  - Masonry
- Learn construction terminology
- Recognize construction materials and their proper application

SOILS

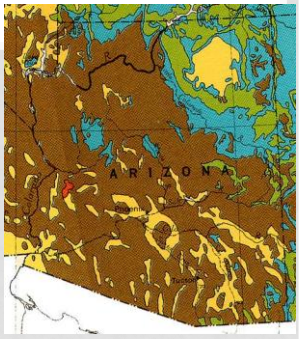
- Water moves thru soil differently



EXPANSIVE SOIL



Red–high swelling potential
Blue–high swelling potential
Orange–abundant clay - moderate swelling potential
Green–slight to moderate swelling potential
Brown–little or no swelling
Yellow – Data insufficient



PAD

SOIL COMPACTION

FOOTING

- That portion of the foundation system which provides a supporting base or grounding of the structure to the soil.

FOOTING

- Depth
  - Frost line
- Width
  - 12" min.
- Rebar
  - Horizontal
  - Vertical
  - Spacing
  - Overlap

REINFORCING STEEL

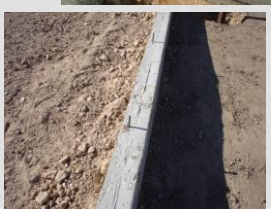
- Size is #/8"

- #4 = ½"diameter
- #5 = 5/8"diameter
- # 12= 1 ½"diameter

FORMING THE FOOTING

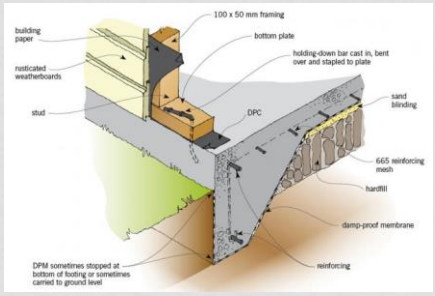
STEM WALL

- The vertical portion of the foundation which provides the connection between the exterior walls and the footing



BASEMENT WALL

MONOLITHIC POUR



UNDERGROUND PLUMBING

SHADING

POST TENSIONED SLAB

- A fully engineered foundation which 'floats' on the soil
- Good for seismic and expansive soil conditions

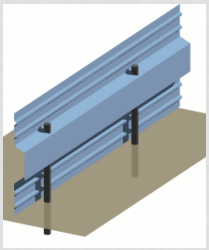
TENSIONING THE CABLES

Post Tensioned Slab

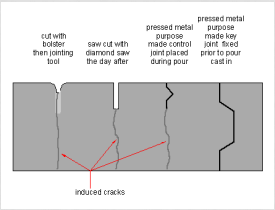
EXPANSION JOINTS

Every 8-10 feet on exterior / 20-25 feet on interior

CONTROL JOINTS



Every 200 sq. ft. of slab

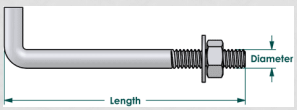


BEFORE CONCRETE- PRESLAB

PRETREAT SOIL

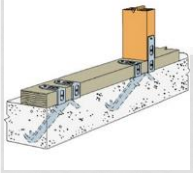
ANCHOR BOLTS

- A threaded steel bolt set into the foundation
- Projects above the slab
- Holds the bottom plate to the slab by using a washer and nut.



ANCHORING

HOLDDOWNS



SILL OR BOTTOM PLATE

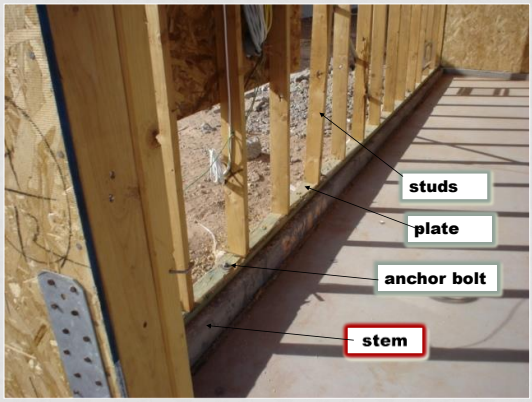
- The horizontal timber at the base of a wood structure which rests directly on the foundation or floor.
- Pressure treated or redwood.

STUDS

- Vertical lumber in the framework of a wall which provides support for drywall or other finish material
- Spaced at 16" o/c at exterior walls
- Spaced 24" o/c at interior walls

LUMBER SIZING & FINISH

thickness (inches)		width (inches)	
nominal	actual	nominal	actual
1	3/4	2	1 1/2
1 1/4	1	3	2 1/2
1 1/2	1 1/4	4	3 1/2
2	1 1/2	5	4 1/2
2 1/2	2	6	5 1/2
3	2 1/2	7	6 1/2
3 1/2	3	8	7 1/4
4	3 1/2	9	8 1/4
4 1/2	4	10	9 1/4
5+	1/2" less	11-16	3/4" less



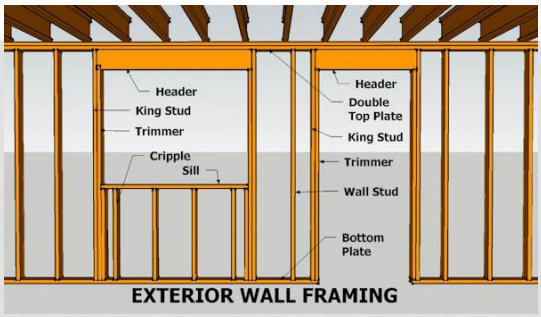
TOP PLATE

- The horizontal member at the top of a wall at the ceiling line.

Building Codes usually require the top plate to be doubled.

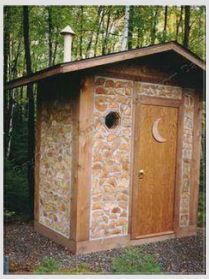
HEADER

- A framing member which spans an opening in a wall, such as a door or window.
- This member supports the load (weight) from above and transfers it to the wall on either side.



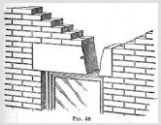
MASONRY

- Block versus Brick

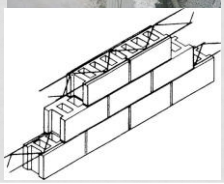


MORTAR & MORTAR JOINTS

MASONRY LINTELS



BOND BEAMS HORZ. WIRE



ALTERNATE MATERIALS

Market Share of Building Systems, Single-Family Homes

- Site-Built Stick Frame: 82.4%
- Panelized Stick Frame: 8.3%
- Conc. Masonry Units: 5.5%
- Modular: 1.1%
- Structural Insulated Panels: Less than 1%
- Insulated Concrete Forms: Less than 1%
- Timber Frame: Less than 1%

Structural Insulated Panels- SIPS

Insulated Concrete Forms- ICF

SILL PLATE

FLOOR JOISTS

I Joists

Rough Lumber

FLOOR TRUSSES

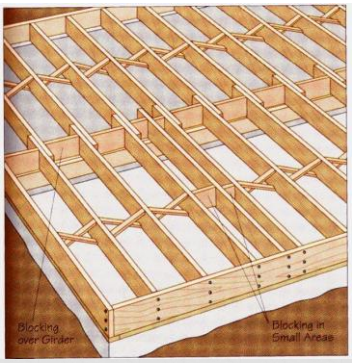
- Serves the same purpose as a joist but supports greater loads
- Engineered specifically for its' placement in the framing of a structure.
- Open webs allow wires and ductwork to run unobstructed

JOISTS OR RAFTERS

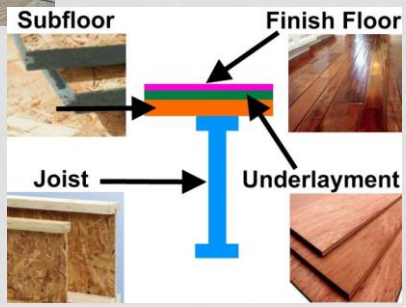
- A series of horizontal, parallel framing lumber which supports a floor or ceiling
- Can be 2x lumber or engineered structural members

LEDGER

BRIDGING OR BLOCKING



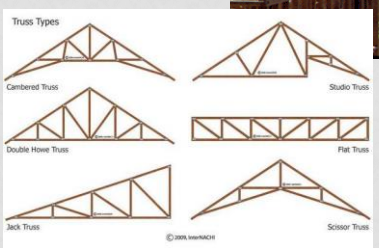
SUB-FLOORING



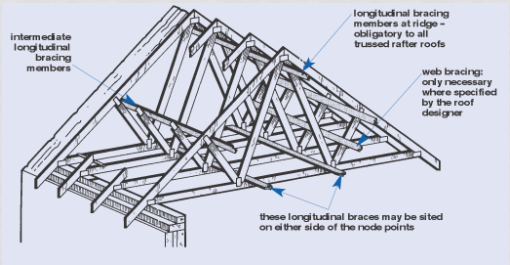
ROOF FRAMING- TRUSSES

- Engineered components which completes the top of the structure.
- Open webs provide for placement of mechanical, electrical, plumbing and insulation.

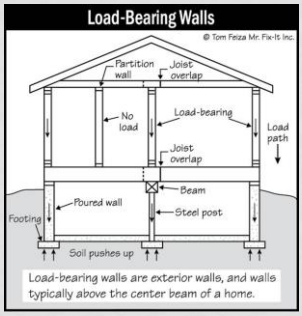
TRUSSES



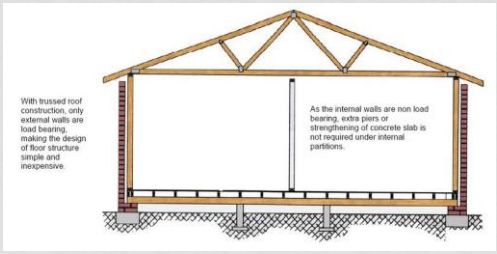
ROOF TRUSS BRACING



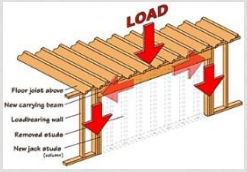
BEARING WALLS



NON-LOAD BEARING WALLS



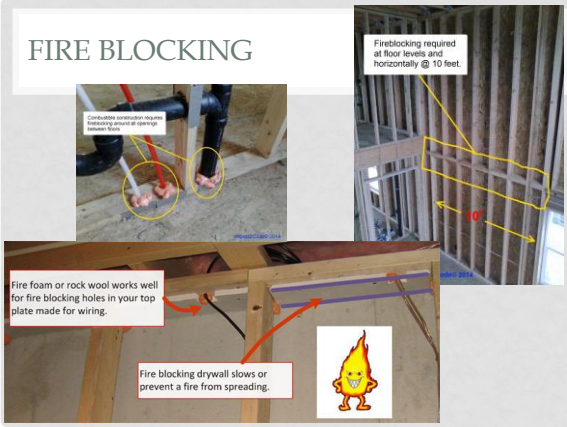
BEAMS

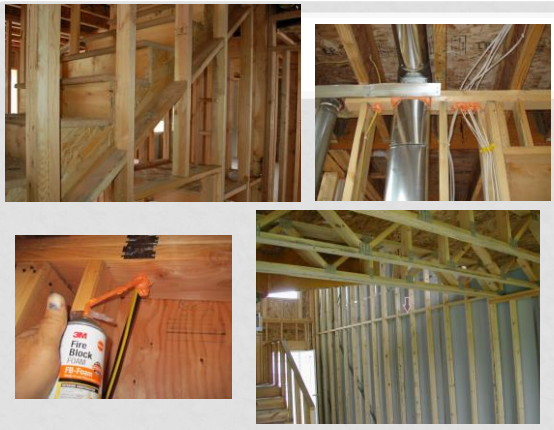


GIRDERS

- all girders are beams, but not all beams are girders

FIRE BLOCKING





OSB VERSUS PLYWOOD

- Oriented Strands Board

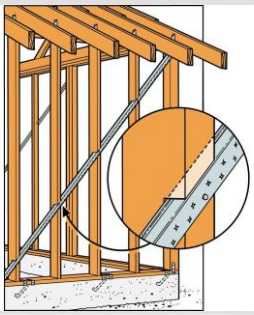
- Plywood

BRACING AND SHEAR WALLS

- Shear Panels
  - OSB or Plywood Panels
- Diagonal Bracing
  - Metal or wood
- Drywall Shear Panels

EXTERIOR SHEAR WALLS

DIAGONAL BRACING



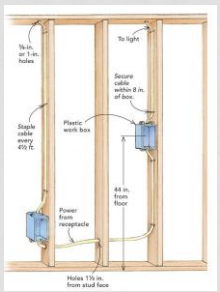
SHEAR TRANSFER / DRAG STRUT

ROOF SHEATHING & NAILING

OVERHANG...EAVE…SOFFIT

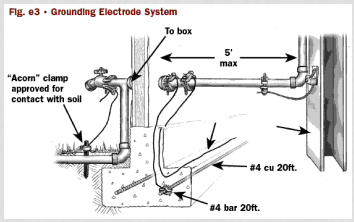
ELECTRICAL WIRING

SECURE THE WIRES

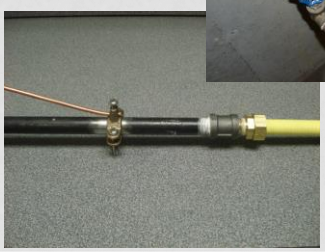


PANEL BOXES

UFER



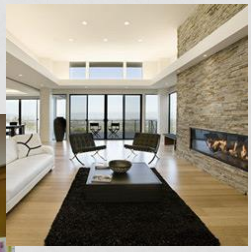
BONDING



HVAC

DUCTWORK

INTERIOR SOFFITS



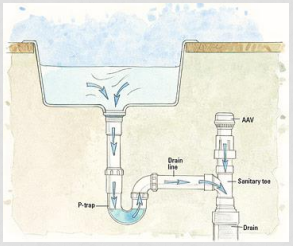
AIR HANDLER & CONDENSATE LINE

Service platform and drain pan protection

WATER LINES- COPPER AND APEX

TRAPS

AIR ADMITTANCE VALVE

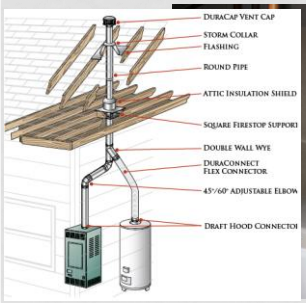


ABOVE SLAB PLUMBING
AND TOP OUT

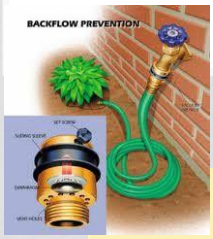
WATER HEATERS

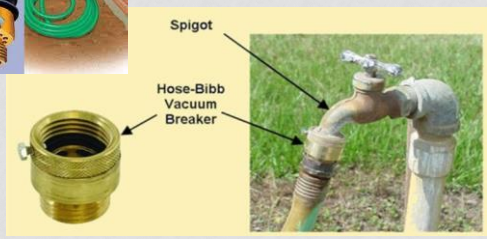
T & P RELIEF VALVE EXPANSION TANKS

B VENT- GAS VENTING



BACKFLOW PREVENTION





INSULATION- BLOWN- IN

INSULATION- BATT

FURRED OUT WALLS

Provides depth for:

- Electrical
- Plumbing
- Insulation

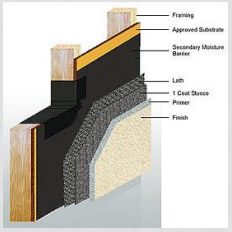
What other advantages?

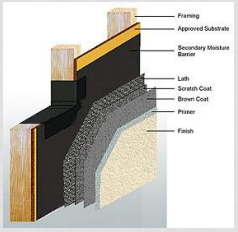
MOISTURE PROTECTION

VAPOR BARRIER

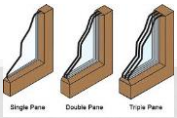
VENEERS

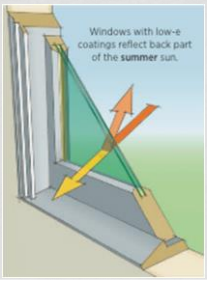
ONE & THREE COAT STUCCO

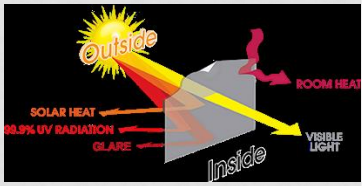




WINDOWS

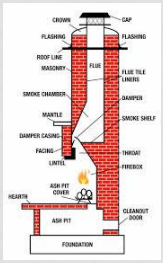


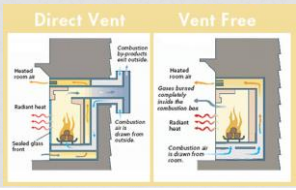




FIREPLACES

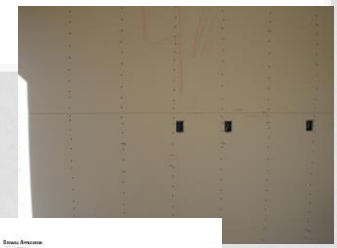
CHIMNEYS AND FLUES





DRYWALL/GYP. BD./ SHEETROCK

DRYWALL NAIL & DRYWALL SHEAR

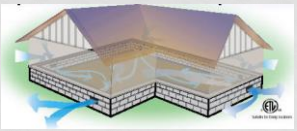


INTERIOR SHEAR

- Specified in structural calculations
- ½", 3/8" or 5/8" thick Nailing pattern can be as close as 3" o/c

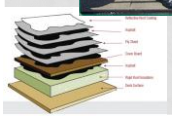
ATTIC VENTING

CRAWL SPACE VENTING



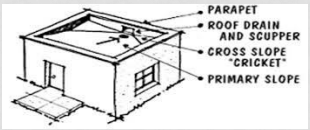
LOW SLOPED ROOFS

Built up



Roll

SCUPPERS ON FLAT ROOFS



FLASHING

UNDERLAYMENT

DRIP EDGE

TRIM & FINISH WORK

DOORS

Solid Core
Hollow Core
Metal clad/ Insulated

GRADING

ICC 2019 LAS VEGAS NEVADA

Thank You For Attending

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