Welcome to the 2019 Annual Conference Educational Sessions

Session: From the Ground Up!
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

Typical Damages by Expansive Soils

- Red: high swelling potential
- Blue: high shrinking potential
- Orange: moderate swelling and potential
downside
- Yellow: little or no swelling
- Green: slight and moderate swelling

Legend: Data insufficient
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
POST TENSIONED SLAB

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

EXPANSION JOINTS

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

TENSIONING THE CABLES

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

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

Pressure treated or redwood.

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

<table>
<thead>
<tr>
<th>Thickness (inches)</th>
<th>studs</th>
<th>plate</th>
<th>anchor bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>7</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>7</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2&quot;</td>
<td>7</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2 1/2&quot;</td>
<td>7</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>3&quot;</td>
<td>7</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>3 1/2&quot;</td>
<td>7</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>4&quot;</td>
<td>7</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>4 1/2&quot;</td>
<td>7</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

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
**ALTERNATE MATERIALS**

Market Share of Building Systems, Single-Family Homes

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

---

**FLOOR JOISTS**

- I Joists
- Rough Lumber

---

**SILL PLATE**

---

**BOND BEAMS**

HORZ. WIRE
**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

Interim bracing members of ridge + trussed rafter roofs

These longitudinal braces may be sized on either side of the node points
**BEARING WALLS**

- Load-bearing walls are exterior walls, and walls typically above the center beam of a home.

**NON-LOAD BEARING WALLS**

- Non-load bearing walls allow for flexibility in design and support loads other than their own weight.

**BEAMS**

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

**GIRDERS**

- Non-load bearing walls are typically not girders.
FIRE BLOCKING

- Fire foam or rock wool works well
- Fire blocking helps in your top plates made for wiring.
- Fire blocking drywall plates or prevent a fire from spreading.

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
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
INSULATION - BATT

FURRED OUT WALLS
Provides depth for:
• Electrical
• Plumbing
• Insulation

What other advantages?

MOISTURE PROTECTION

VAPOR BARRIER
CHIMNEYS AND FLUES

- Specified in structural calculations

DRYWALL/GYP. BD./ SHEETROCK

- ½”, 3/8” or 5/8” thick
- Nailing pattern can be as close as 3” o/c

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
FLASHING

UNDERLAYMENT

DRIP EDGE

TRIM & FINISH WORK
DOORS

Solid Core
Hollow Core
Metal clad/ Insulated

GRADING
Thank You For Attending