NextGen Advanced Framing for High Performance Homes

Integrated System Solutions

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High Performance Home

- Efficient
- Comfortable
- Durable
  - Structural performance
  - Moisture performance
  - Other (UV, etc)
- Cost-effective as a system
A System’s Approach

- Don’t simply add the new to the old
- Find efficiencies in the new system
  - Offset cost increases
- Combine tried-and-true with new
- A system solution = find derivative benefits

**Result:** Performance and added value
NextGen Advanced Framing

- High heel truss
- Integrated rim header
- Continuous drywall at interior partitions
Performance Goals

- Improve thermal performance of the building enclosure
- Reduce the cost of energy efficient construction
- Simplify construction process
Roof Heel Joint (Eave)

Conventional

Low Heel H ≤9.25”

High Heel

High Heel H >9.25”

Insulation
Air sealing
Ventilation
Wind washing
Raised Heel Truss

- Reduced thermal bridging
- Improved durability

BUT

- Reduced structural stability
- 2009/2012 IRC blocking provisions
- Labor intensive
- Diminishes value
Roof Testing at Home Innovation Research Labs

- Low heel - *benchmark*
- High heel unblocked
- High heel blocked - *code*
- OSB sheathing - *simple*
Test Results

<table>
<thead>
<tr>
<th>Condition</th>
<th>Capacity, lb/ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Blocking</td>
<td>260</td>
</tr>
<tr>
<td>OSB</td>
<td>175</td>
</tr>
<tr>
<td>Blocking</td>
<td>190</td>
</tr>
<tr>
<td>High Heel w/ 2.5T</td>
<td>220</td>
</tr>
<tr>
<td>High Heel w/ Low Slope</td>
<td>240</td>
</tr>
<tr>
<td>High Heel w/ OSB</td>
<td>200</td>
</tr>
<tr>
<td>High Heel w/ Top Plate</td>
<td>225</td>
</tr>
<tr>
<td>High Heel w/ 50% Blocking</td>
<td>180</td>
</tr>
<tr>
<td>High Heel w/ Web Brace</td>
<td>340</td>
</tr>
</tbody>
</table>

Wind speeds:
- 130 mph
- 90 mph

Dimensions: 36'x50
Extended Wall Sheathing

Ensure correct fastening of sheathing to top plate per shear wall, wall bracing, or combined shear and uplift requirements.

Energy heel truss

Fastening per design

TallWall / Windstorm wall sheathing

Arrow indicating wind pressure
Extended Wall Sheathing

Test Results: Interaction Curve

- Results can be used for any building configuration
- Evaluation based on wind speed and house size
- IRC code change
- Prescriptive solutions and Product Reports (APA)
Extended Wall Sheathing

- Simplified and optimized
- Multiple functions
  - High heel bracing
  - Roof-to-wall connection
  - No blocking
  - No thermal bridging
  - No wind washing
  - Simplified air sealing
  - Attic ventilation
- System solution across several performance attributes
- Tested
Integrated Rim Header

**Goal:** Increase Wall System R-value

- Part of 2x6 package
- Eliminates header
- Minimize jack/king studs

**Features:**
- Double rim member at openings
- Joist hangers at openings
- King studs carry gravity load and wind loading
- Engineered wood rim or solid sawn lumber or trusses
Lab Tested & Field Evaluated
Field Installation
2015 International Residential Code

- Rim Board Headers (Section R602.7.2)
- Solid sawn lumber
- Header size/opening size
- Number of king studs
  - Not less than the number of studs displaced by half of the header span based on the maximum allowed stud spacing
Engineered Rim Header Options

- Engineered Wood Lumber
  - Design or product manufacturers’ specs
  - New Wall Construction Guide (2015 pub.)
  - Wider openings
  - Unrated rim board – up to 48” in single-ply applications

- Trusses
  - Engineered design
  - Top-mount hangers
  - 2x6 walls only (bearing)
Continuous Drywall at Intersections

**Problem:** Interior intersections cause interruption in thermal and air barrier

**Solution:** Install drywall continuously across the intersection

**Details:**
- Metal strap to tie top plates together
- 1” gap between framing
Continuous Drywall at Intersections
Continuous Drywall at Intersections
Summary

- Optimized Solutions for HPH:
  - Structural performance
  - Find system efficiencies (system effects)
  - Do no harm and prove new approaches
  - Interactions between performance attributes
  - Build on tried-and-true
  - Provide value
THANK YOU

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