

GREATER SAN ANTONIO BUILDERS ASSOCIATION

WEBINAR WEDNESDAYS

Nailing the Frame Inspection the 1st Time Around!

Presented by Roy Fredrick, APA Engineered Wood Specialist

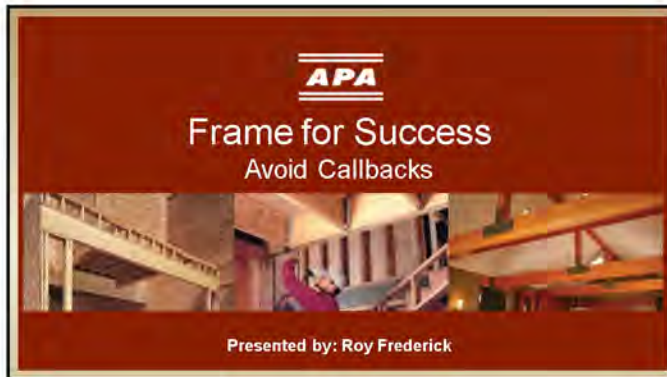
Wednesday, September 2, 2020 • 1:00pm

Thank You Event Partner



Anna Vega-Walters, Field Marketing Representative | Texas

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This course is registered with AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.




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Learning Objectives

- Understand how the material properties of wood can affect construction in order to resolve common framing challenges.
- Understand how the consistency of design and building practices can impact the quality of wood structures and how to use consistency to improve construction.
- Learn how moisture affects wood products and how to prevent some common challenges arising from moisture exposure.
- Understand how wind or seismic forces impact the roof, walls, floors, foundation, and connections of a structure; the concept of a continuous load path; and its importance in structural integrity.



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The Main Ideas

1. Wood has a strong and weak direction
2. Wood moves
3. Strive for consistency
4. Load path continuity
5. Protect construction from moisture



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Wood in Compression

Parallel



Compression



6

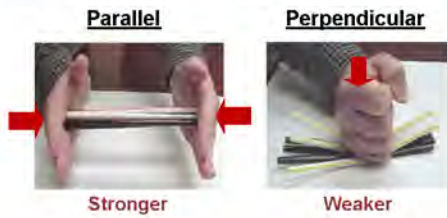
Wood in Tension



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Wood in Compression

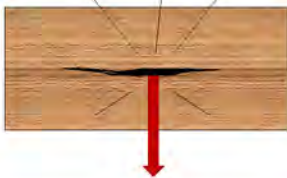


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Connecting Wood

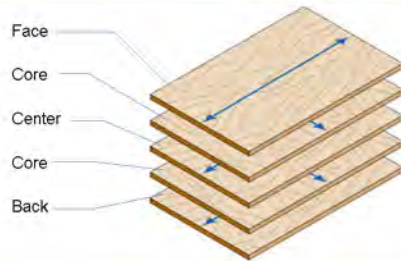
Tension perpendicular to grain



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Plywood Layup



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Oriented Strand Board Layup



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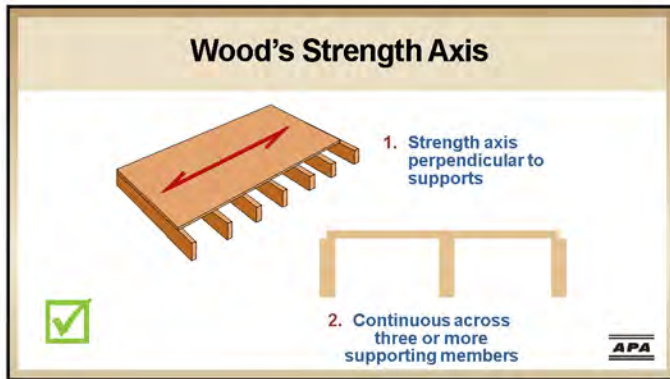
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Span Rating Design Criteria

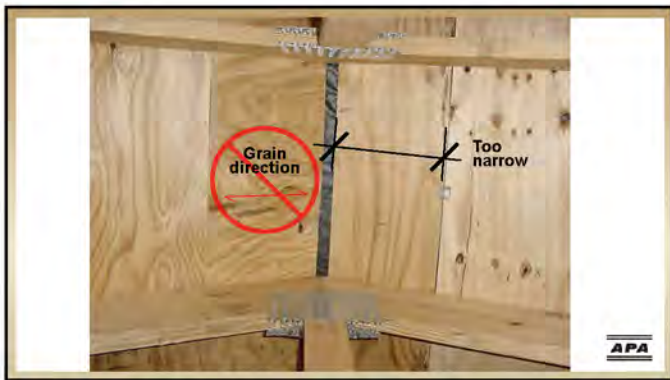


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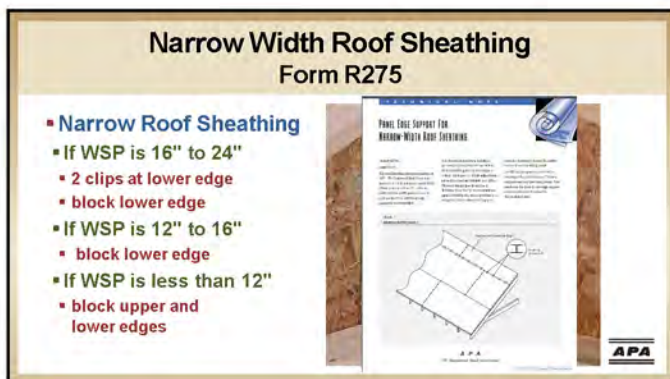
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I-Joist



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Wood's Strength Direction

I-joist

- Used for floor & roof framing
- Long lengths available

Flange
(LVL or lumber)

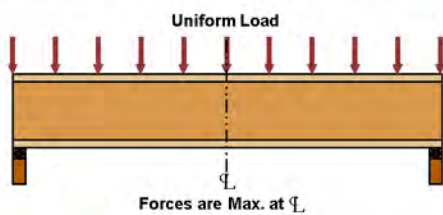
Web
(OSB)



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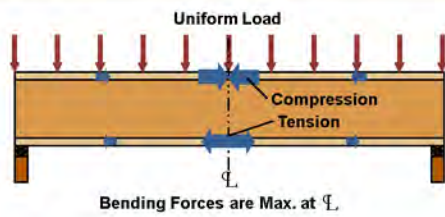
Bending Force in Flanges



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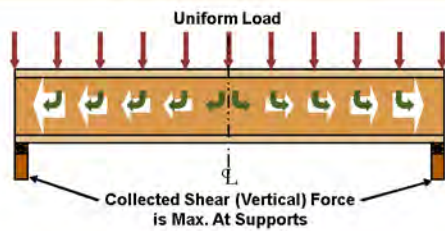
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Bending Force in Flanges



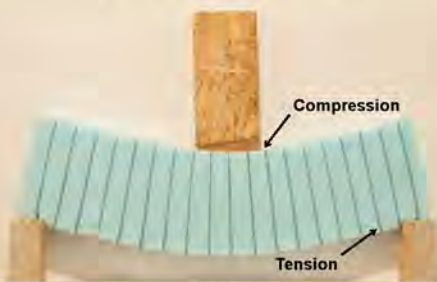
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Shear Force in Web



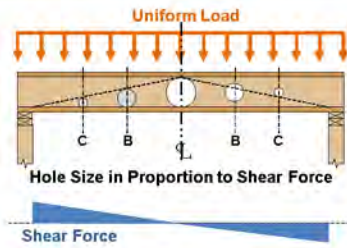
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Wood in Bending



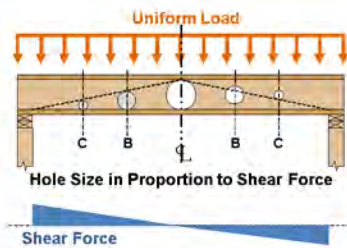
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Cutting Holes in I-Joists



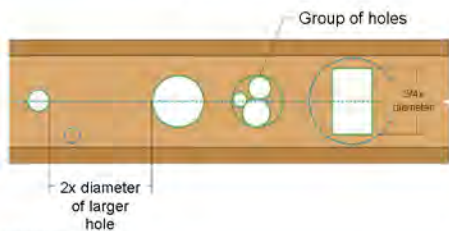
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Cutting Holes in I-Joists

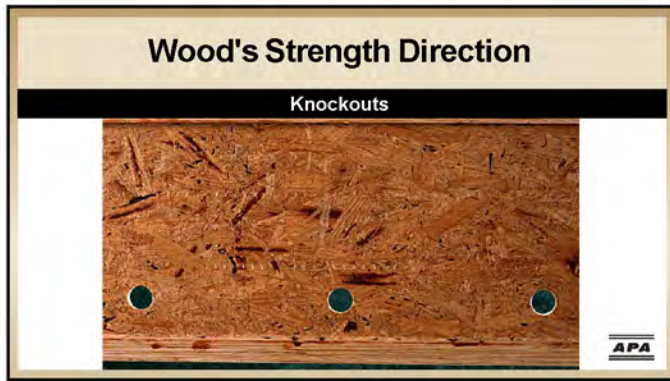


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Cutting Holes in I-Joists Form Z725



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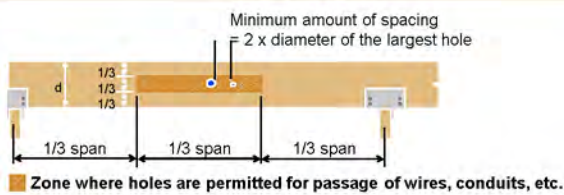
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Laminated Veneer Lumber



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Permissible Holes for LVL Form G535



- No holes greater than 2" in diameter. No more than 3 holes per span.
- APA Technical Note V900 has guidance for large diameter holes in LVL

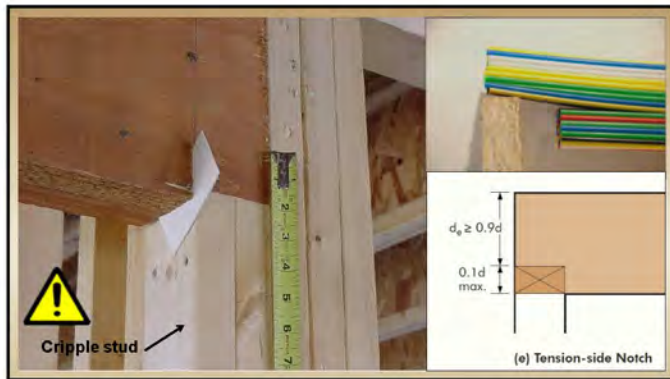
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Field Notching and Drilling of Laminated Veneer Lumber



APA Field Notching and Drilling of Laminated Veneer Lumber – Form G535

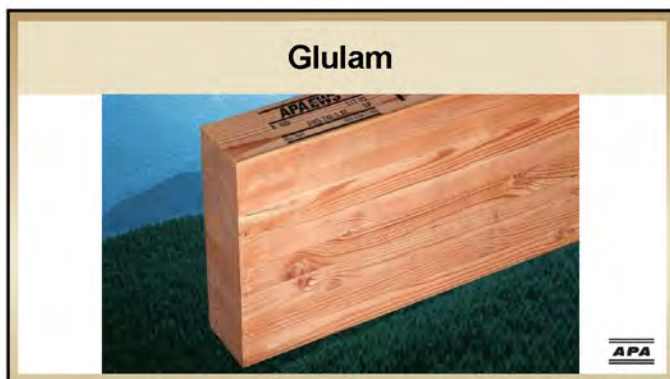
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I-Joist Compatible (IJC) Glulam



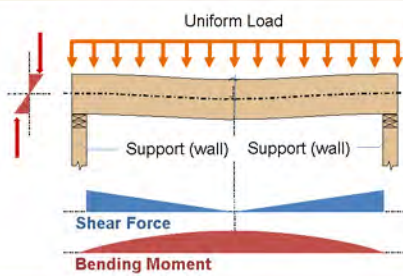
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Dispersal of Strength Reducing Characteristics



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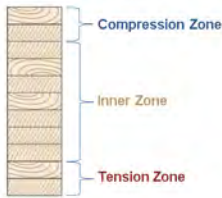
Glulam Anatomy



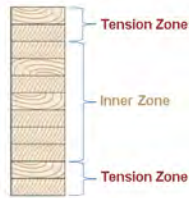
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Balanced and Unbalanced Glulam

Unbalanced Beam



Balanced Beam



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Wood's Strength Direction



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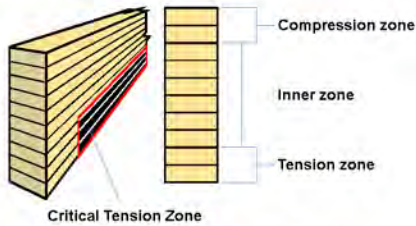
Wood's Strength Direction



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Engineered Lay-ups



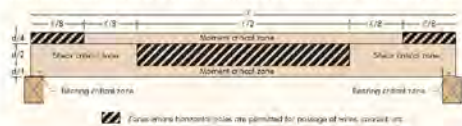
APA Field Notching and Drilling of Glued Laminated Timber Beams - Form S660



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Wood's Strength Direction

FIGURE 3
ZONES WHERE SMALL HORIZONTAL HOLES ARE PERMITTED IN A UNIFORMLY LOADED, SIMPLY SUPPORTED BEAM



APA Field Notching and Drilling of Glued Laminated Timber Beams - Form S660



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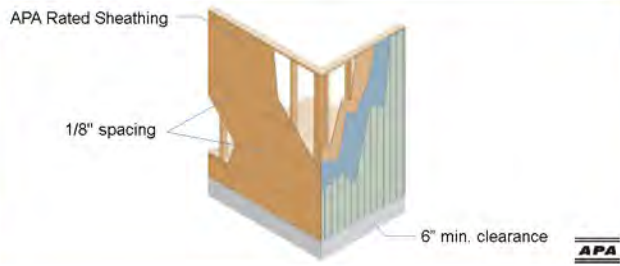
The Main Ideas

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4. Load path continuity
5. Protect construction from moisture



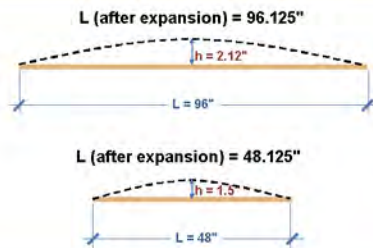
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Sheathing Panels Expand



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Wood Structural Panel Buckling



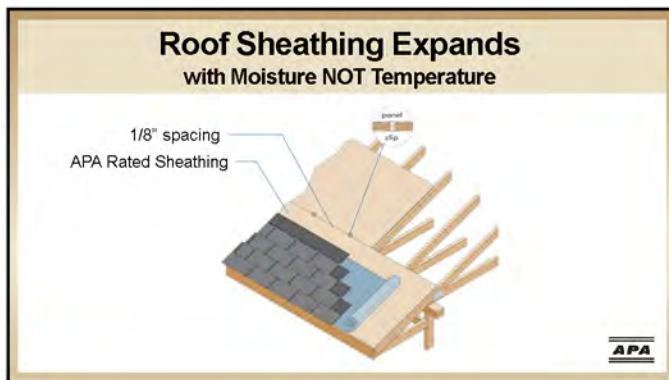
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Wood Structural Panel Buckling Form D481

- **High Risk Application**
- Panels parallel to supports
- Edge nailing 4" o.c. or closer
- Excessive exposure to rain



High risk because the conditions may reduce edge gap's effectiveness in absorbing panel expansion.

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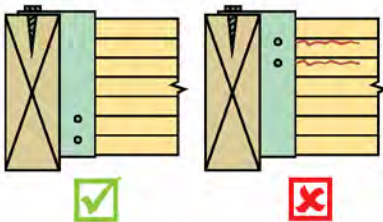
Wood Moves



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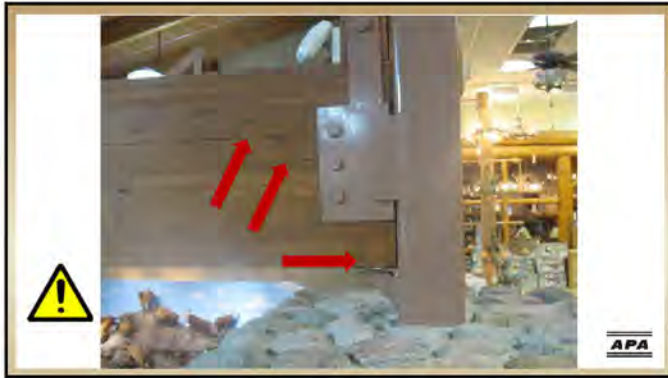
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Wood Moves

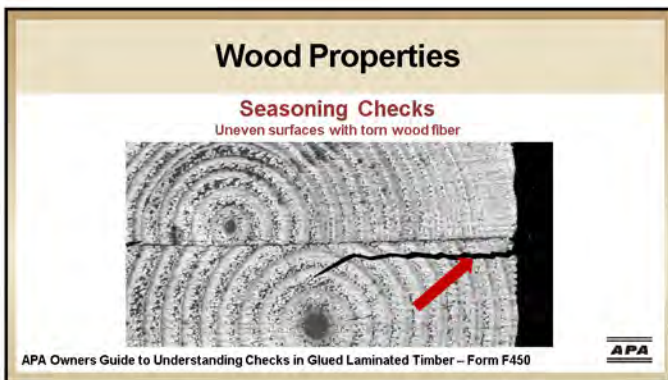


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Poor Framing Alignment



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Roof Cosmetics



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63



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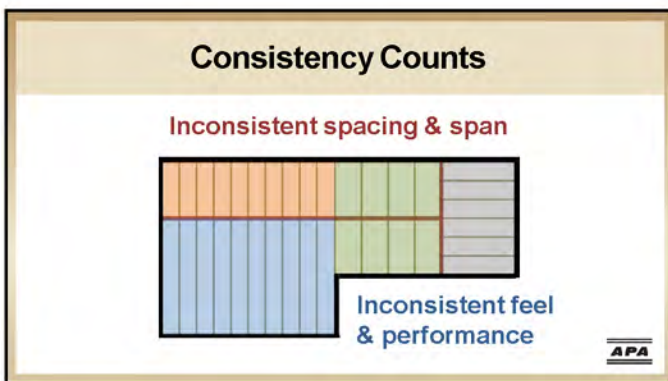
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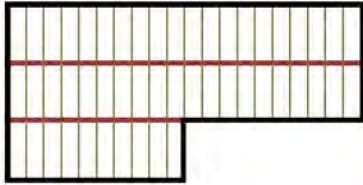
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Consistency Counts

Consistent Spacing & Span



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The Main Ideas

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Load Path

IBC 2018 1604.4

- "Any system or method of construction to be used shall be based on a rational analysis in accordance with well established principles of mechanics. Such analysis shall result in a system that provides a complete load path capable of transferring loads from their point of origin to the load-resisting elements."



Vertical Load Path

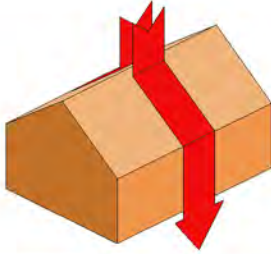


Lateral Load Path

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Vertical Load Path

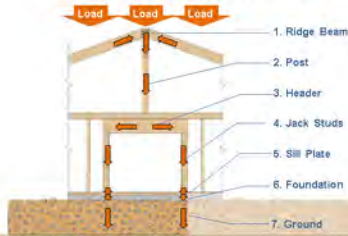


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Load Path

Vertical (Gravity) Load Path



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Load Path Continuity



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Load Path Continuity



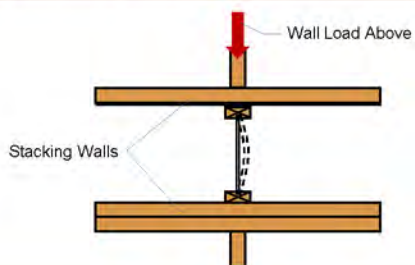
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Pre-engineered Connectors

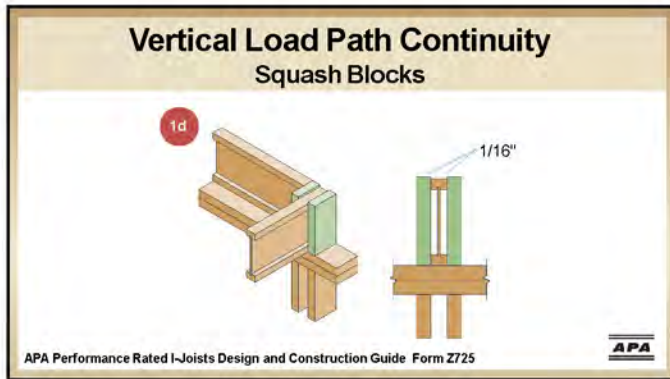


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Vertical Load Path Continuity



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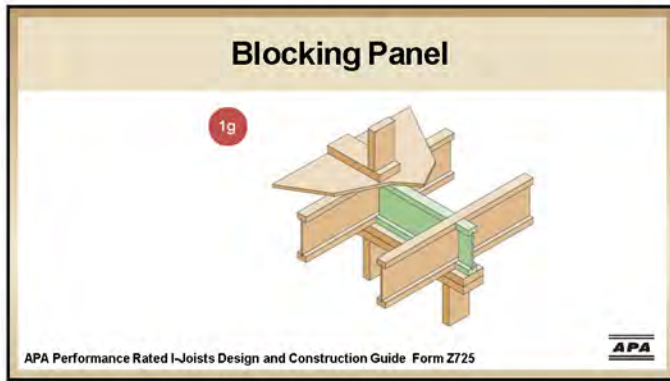
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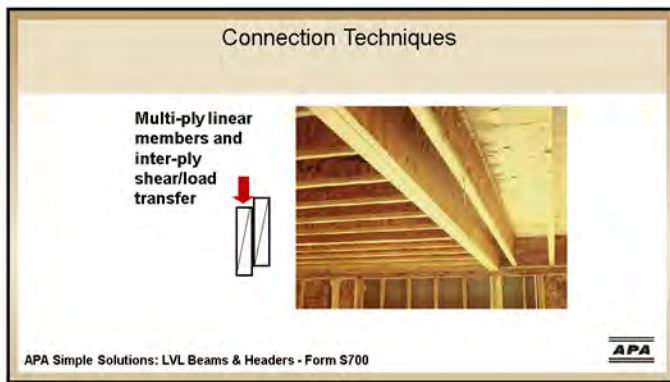
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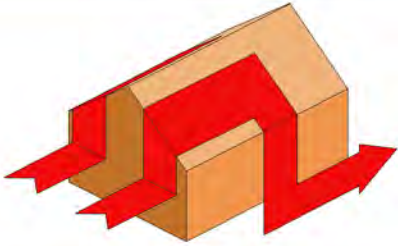


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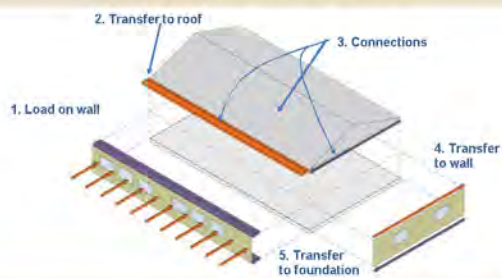
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Lateral Load Path



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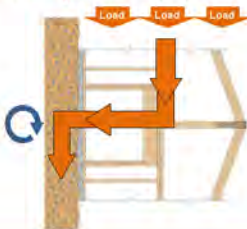
Lateral Load Path



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Load Path

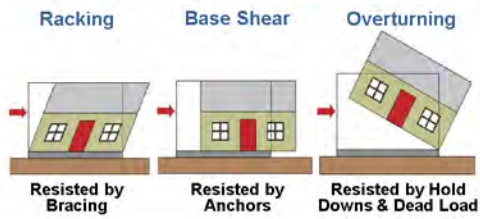
Lateral (Sideways) Load Path



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Load Path Continuity

Effects of Forces



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Racking

Garland, Texas – 2015



89

APA Narrow Wall Bracing Method



APA Narrow Walls that Work - Form D420

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Base Shear

91

Overturning

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Load Path Continuity

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Rim Board Connections

Garland, Texas – 2015



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Full Height Studs

Wall framing with glulam columns



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Building for High Wind Resistance Form E310



1. The wall framing system should be designed to resist the full design wind load.
2. The wall framing system should be designed to resist the full design wind load.
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5. The wall framing system should be designed to resist the full design wind load.
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9. The wall framing system should be designed to resist the full design wind load.
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Prevent Moisture Intrusion

Four D's of Wall Design

1. Deflection
2. Drainage
3. Drying
4. Durable

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Prevent Moisture Intrusion



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Durability

■ Treated Beams and Columns



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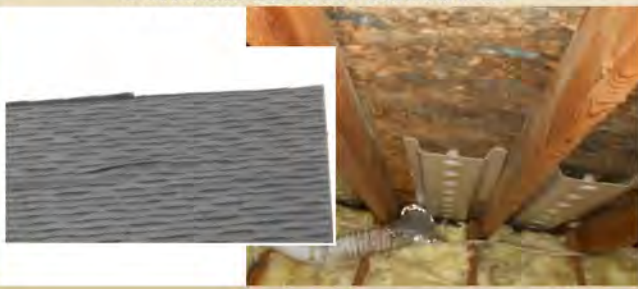
Prevent Elevated Moisture and Condensation in Attic Areas



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Prevent Elevated Moisture and Condensation in Attic Areas



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Prevent Moisture Intrusion in Subfloors



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Prevent Moisture Intrusion Drying of Subfloor



Fans



Dehumidification

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Prevent Moisture Intrusion

EXPOSURE 1



Exposure due to construction delays

OR

EXTERIOR



Long term weather exposure

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RATED SHEATHING
32/16
SIZED FOR SPACING
EXPOSURE 1
THICKNESS 0.451 IN.
000
PS 2-10 SHEATHING
PREP-108 WUD-08-40
10/20 CATEGORY

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Prevent Moisture Intrusion

Improper Storage



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APA Update Newsletter (www.apawood.org)

April 2020

APA UPDATE

PUBLICATIONS, VIDEOS, CAD DETAILS AND MORE



Now, you can download all the resources you need in one place. Visit www.apawood.org today. Please don't forget to sign up for our newsletter!

UPDATES

APA Practice Manual, Revised 6.2019

This manual addresses the design, construction, and maintenance of wood framing systems. It includes information on design, construction, and maintenance of wood framing systems. It is a valuable resource for wood framing professionals.



RESEARCH REPORTS

APA Research Report RR-122: APA Simplified Wall Bracing Method

This report provides a simplified method for determining the required bracing for wood framing systems.



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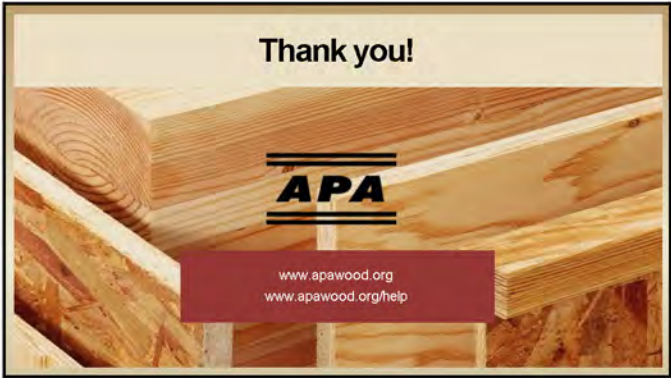
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