Habitat for Humanity® of Minnesota

Climate resilient construction

Preservation of affordability through design

Molly Berg, Habitat for Humanity of Minnesota

Disaster Preparedness & Energy Solutions | June 22nd, 2026


THANK YOU
Habitat Builders!!

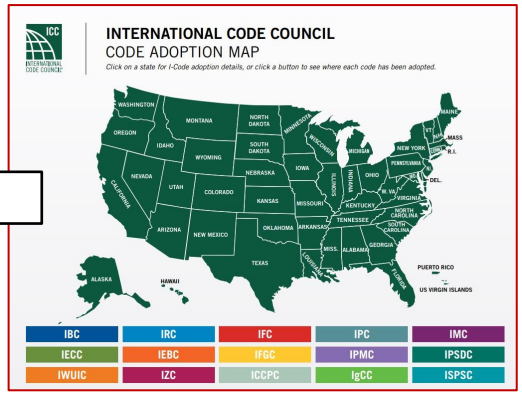
Habitat's common *working definitions*

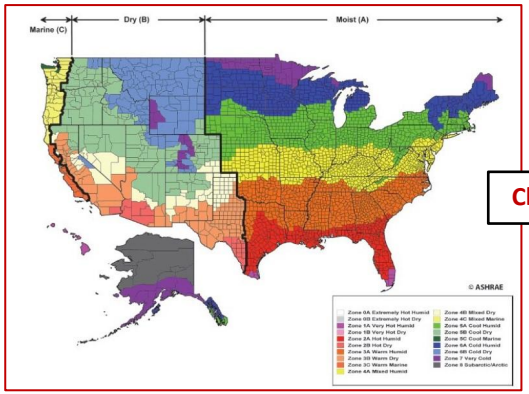
climate-resilient construction: *building homes responsive to both changing norms and increasing hazards, preserving affordability through lower utility costs and reduced repairs/replacements.*

code-plus construction: *construction practices or materials that exceed building code minimum requirements. The "code" used for reference (sometimes referred to as a "code-built" home) is usually the 2012 International Energy Conservation Code (IECC) and the most recent International Residential Code (IRC).*

your code and climate: *use the maps below to find your state minimum code and climate building conditions.*

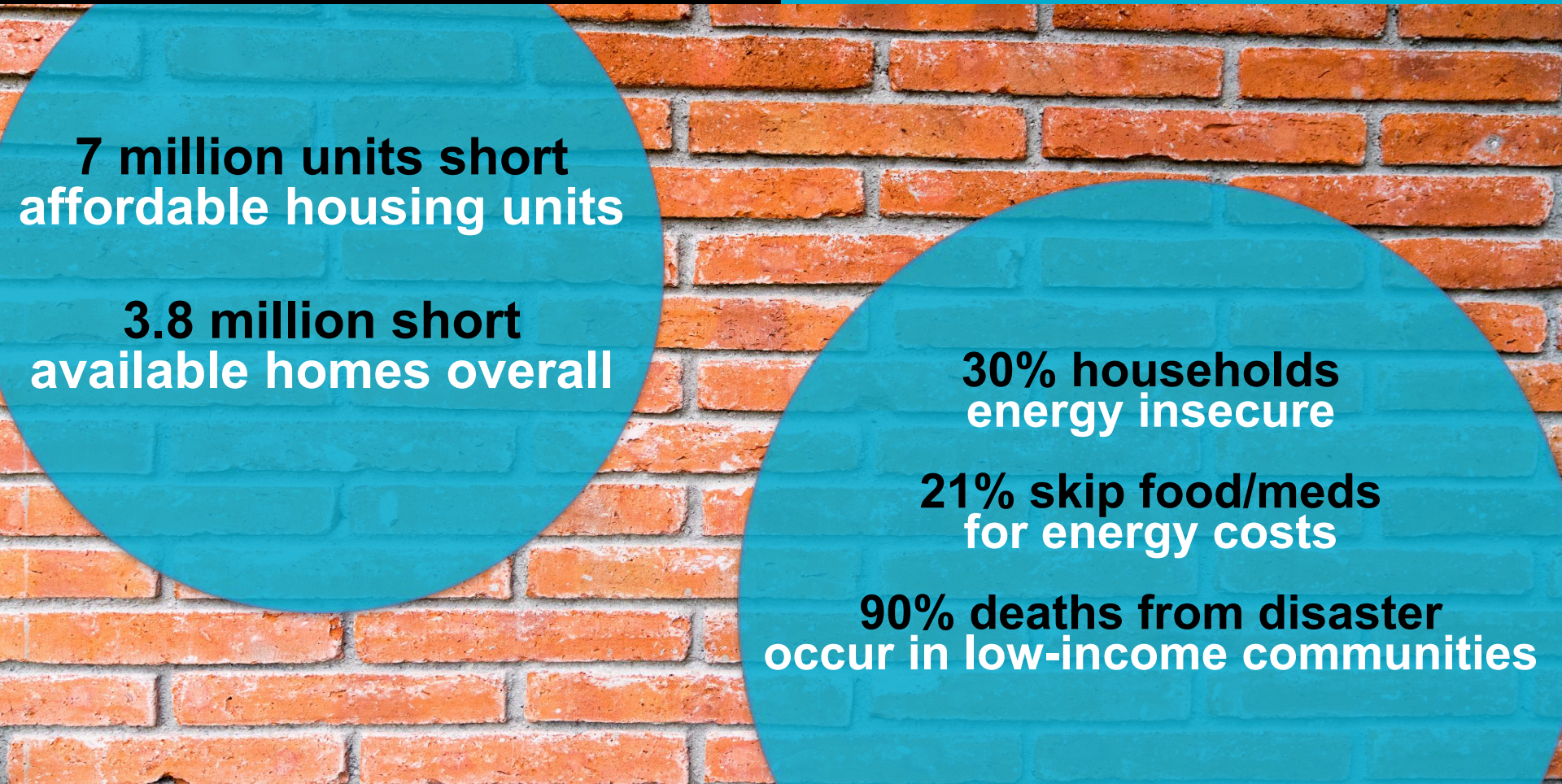
Click map for ICC



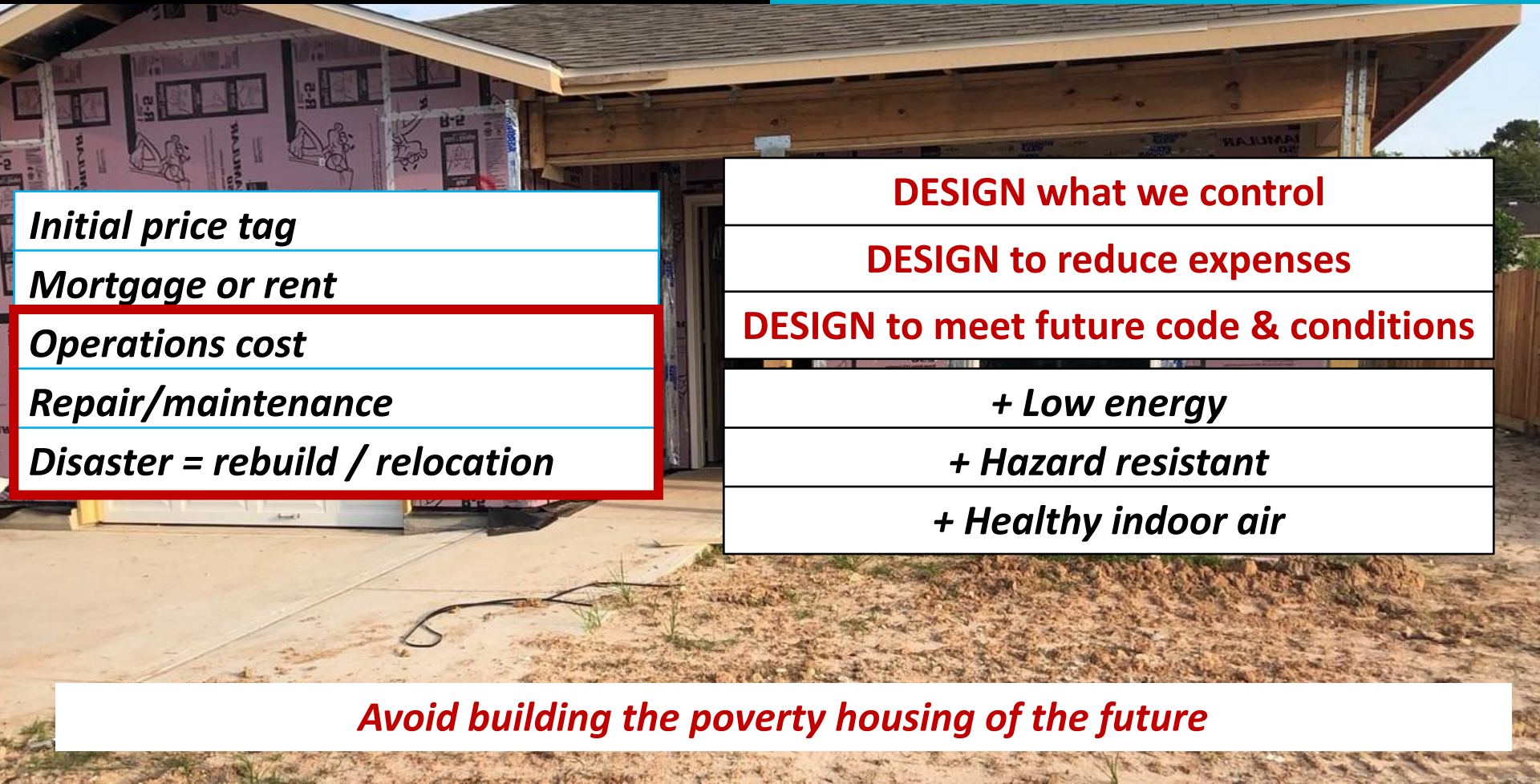


Click map for climate zone

Challenges


7 million units short
affordable housing units
3.8 million short
available homes overall
30% households
energy insecure
21% skip food/meds
for energy costs
90% deaths from disaster
occur in low-income communities

Affordability includes…



Initial price tag

Mortgage or rent

Operations cost

Repair/maintenance

Disaster = rebuild / relocation

DESIGN what we control

DESIGN to reduce expenses

DESIGN to meet future code & conditions

+ Low energy

+ Hazard resistant

+ Healthy indoor air

Avoid building the poverty housing of the future

Single family hazard resilience

Panama City (FL)

www.habitatbay.org

Roof deck:

ring-shank nails

nailed 4” on center

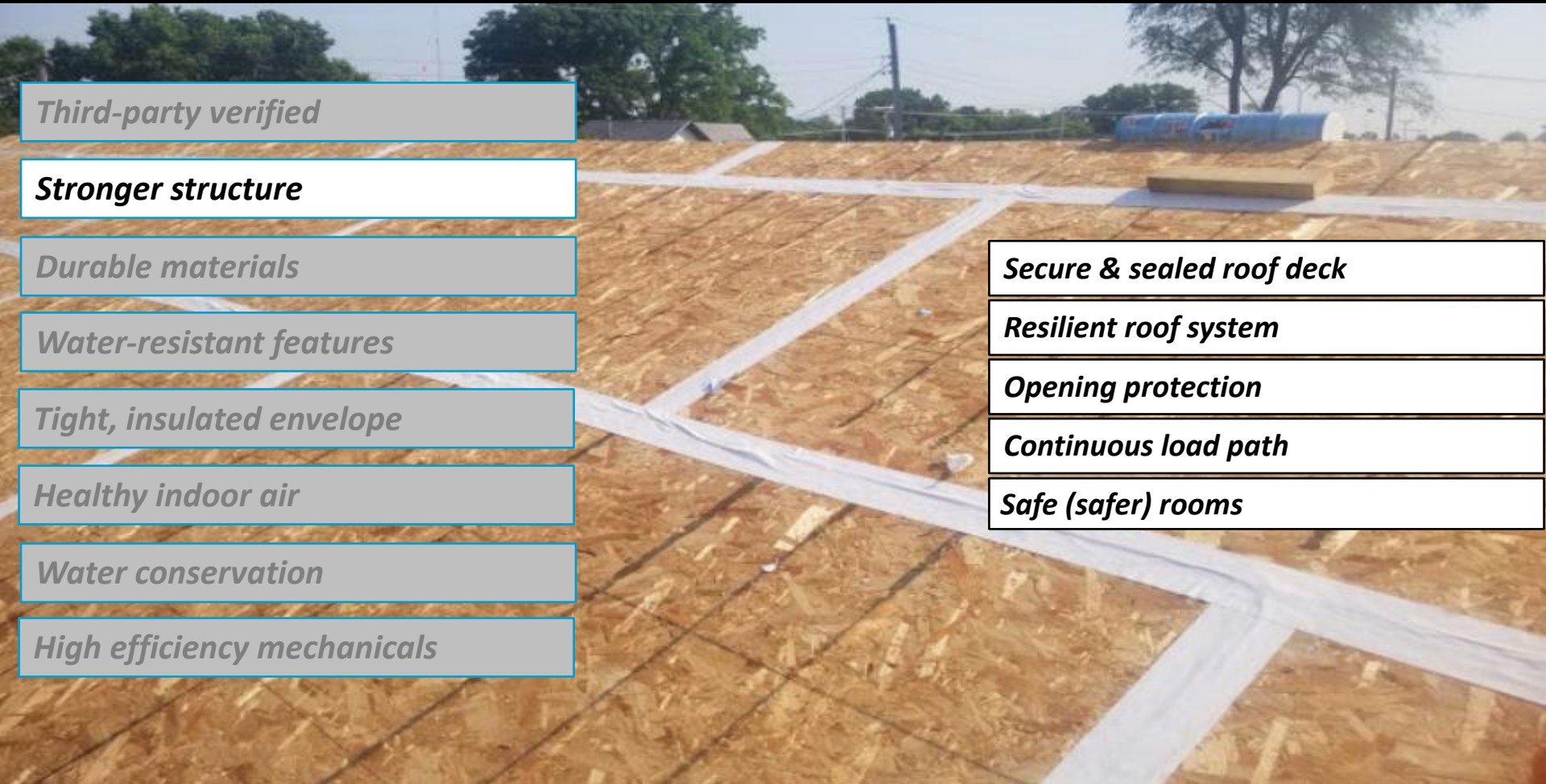
sealed deck seams

continuous load path

Climate Resilience Fundamentals

- *Third-party verified*
- *Stronger structure*
- *Durable materials*
- *Water-resistant features*
- *Tight, insulated envelope*
- *Healthy indoor air*
- *Water conservation*
- *High efficiency mechanicals*

Stronger Structure



- Third-party verified
- **Stronger structure**
- Durable materials
- Water-resistant features
- Tight, insulated envelope
- Healthy indoor air
- Water conservation
- High efficiency mechanicals

- **Secure & sealed roof deck**
- **Resilient roof system**
- **Opening protection**
- **Continuous load path**
- **Safe (safer) rooms**

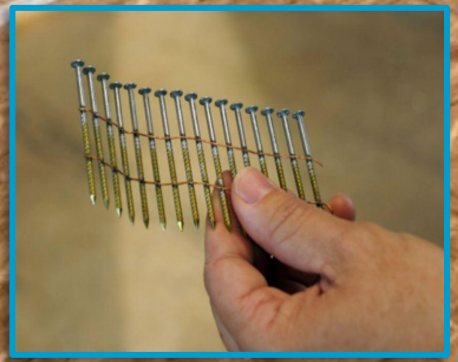
Secure and sealed roof deck

A PROGRAM OF IBHS
FORTIFIED HOME™

SEALED DECK SEAMS

RING SHANK NAILS

4”- 6” NAILING PATTERN



Insurance Institute for Business & Home Safety®

Sealed roof deck damage estimate

$5,408.59

Unsealed roof deck damage estimate

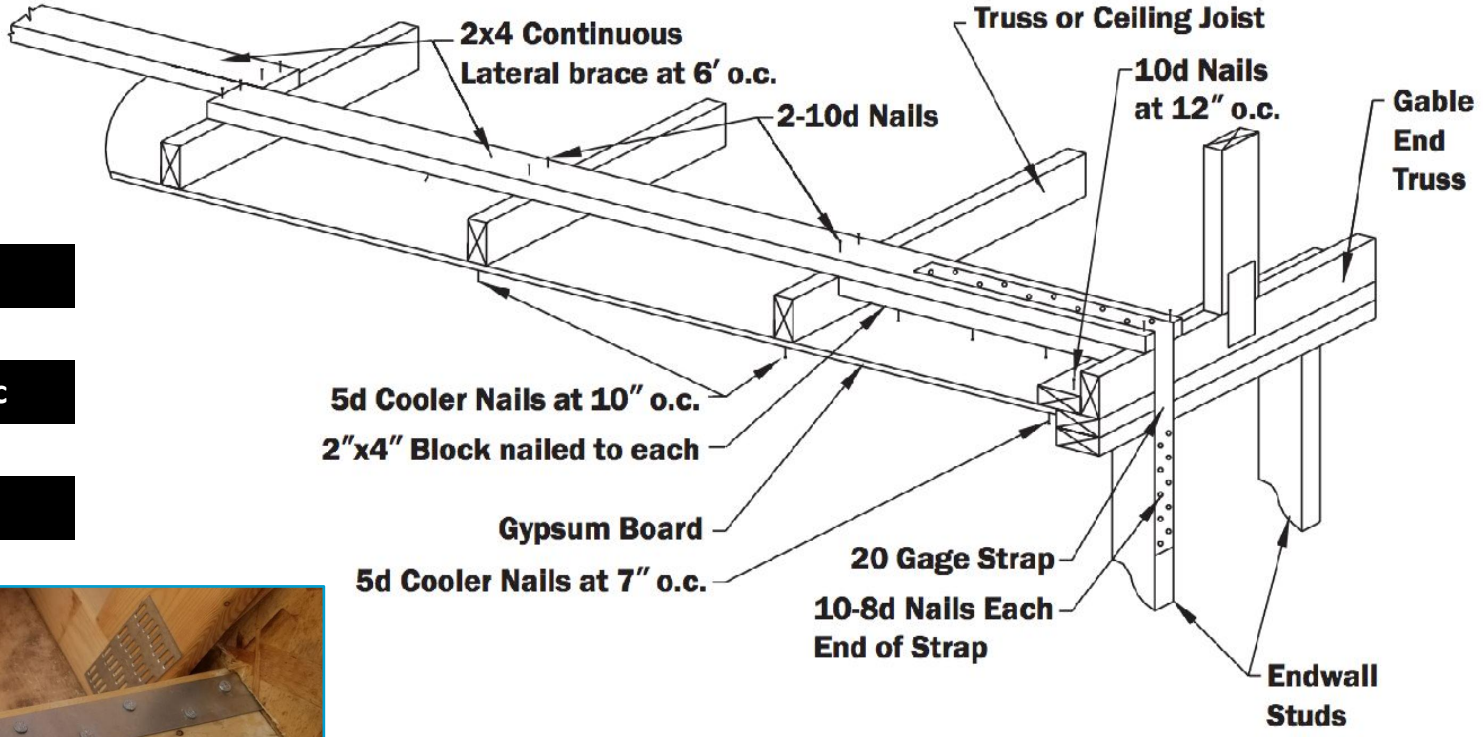
$16,935.23

Gable end bracing

3/8” SHEATHING

LATERAL BRACING 6’oc

GABLE STRAP

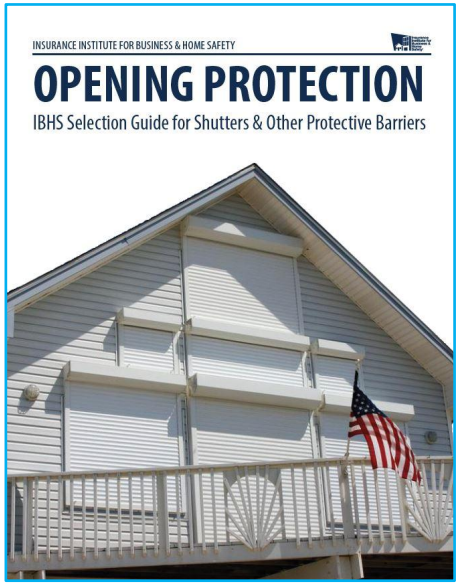


Opening protection

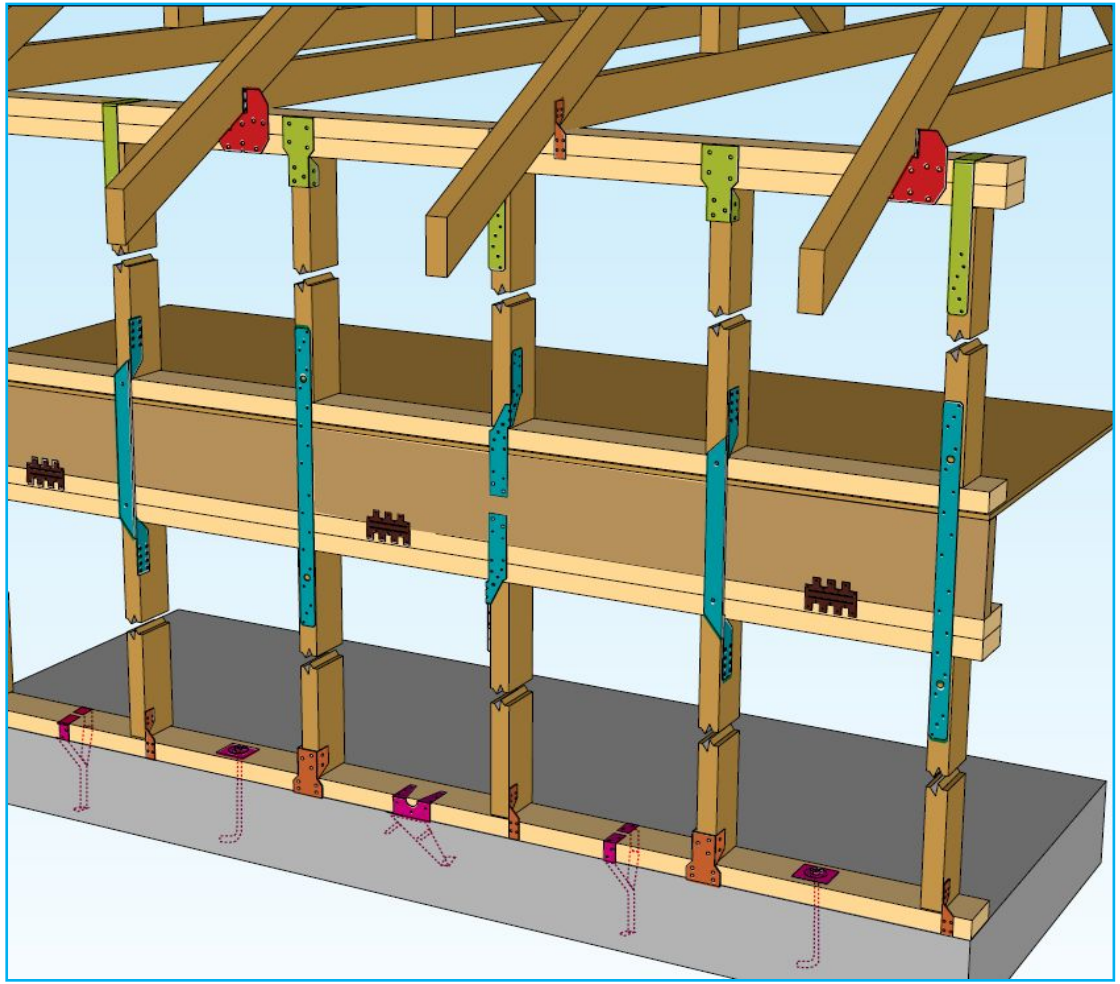
IMPACT RESISTANT WINDOWS

WIND / IMPACT DOORS

SHUTTERS



Continuous Load Path

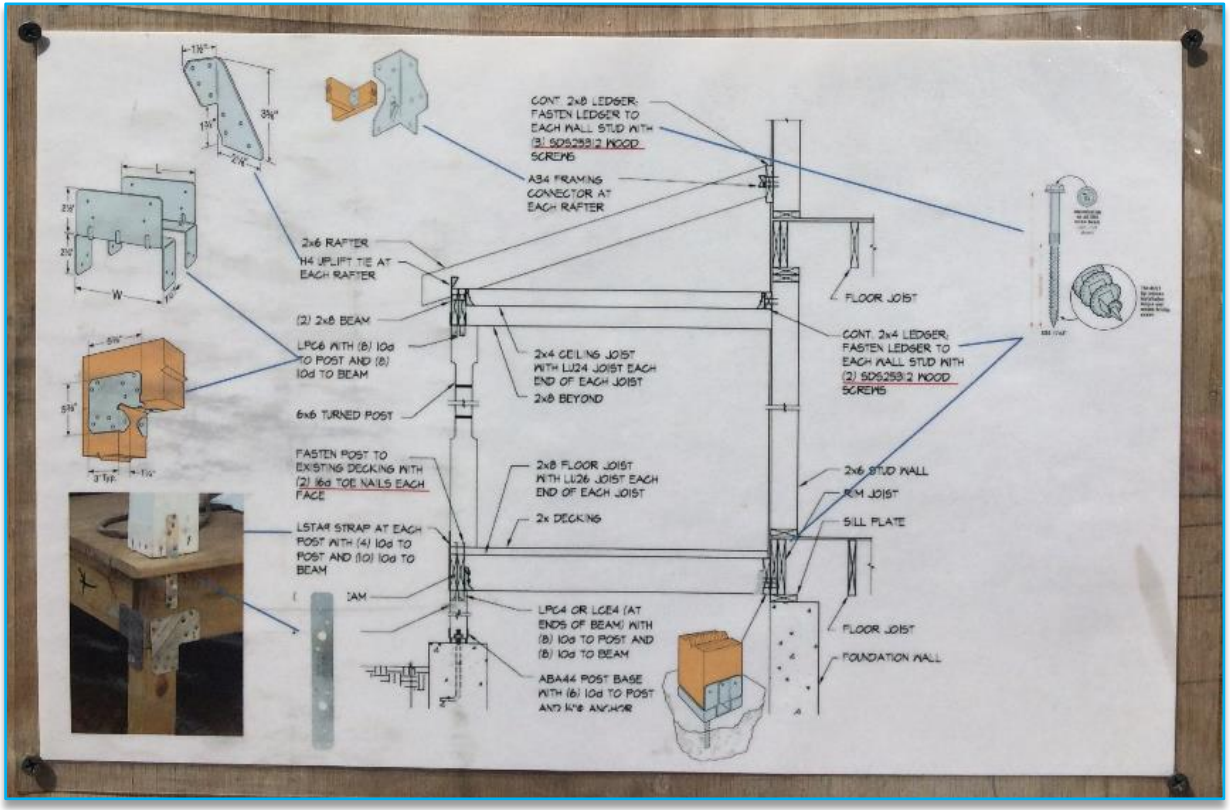


ROOF TO WALL

WALL TO WALL

WALL TO FOUNDATION

Continuous Load Path



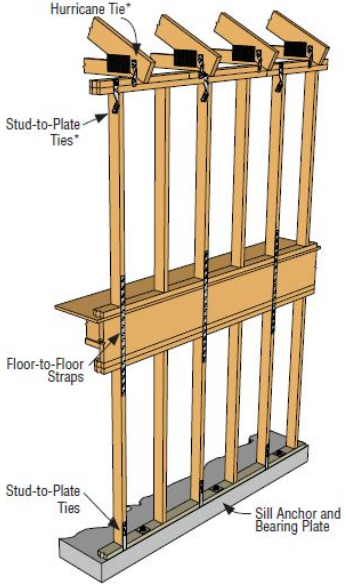
ROOF TO BEAM

BEAM TO COLUMN

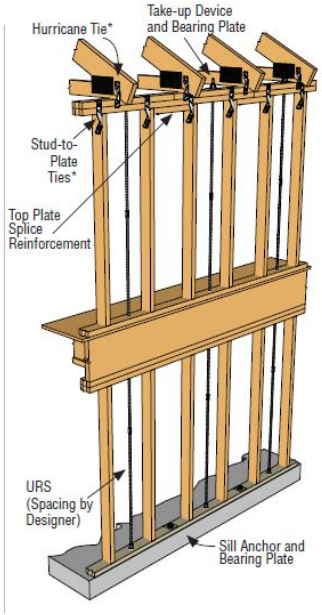
COLUMN TO FOUNDATION

Continuous Load Path

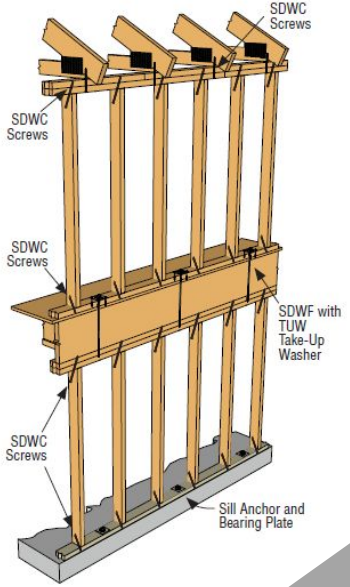
Connectors



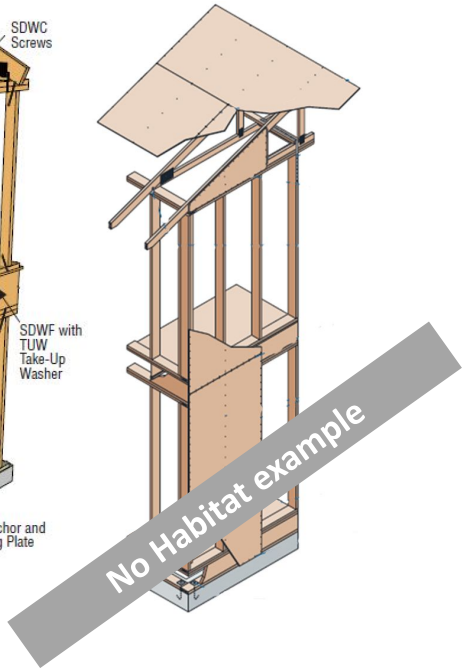
Continuous Tiedowns



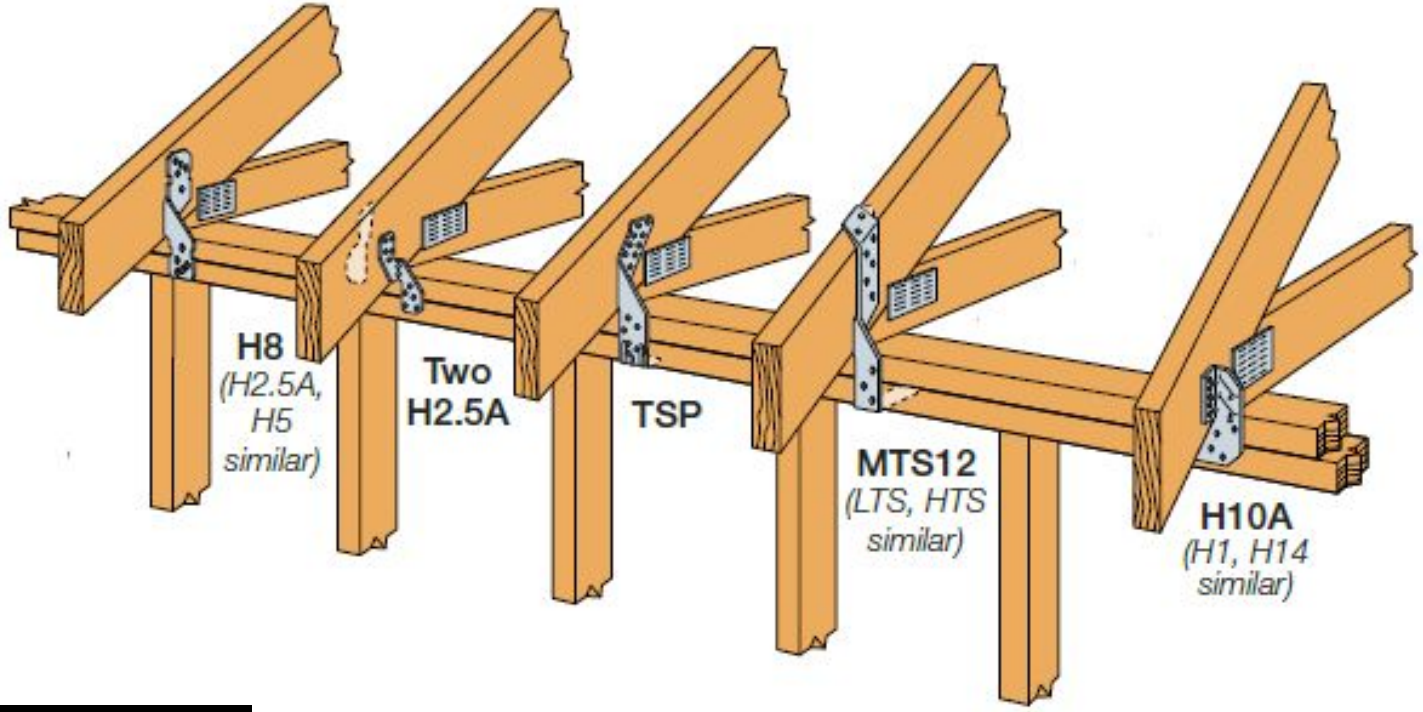
Fasteners



Sheathing

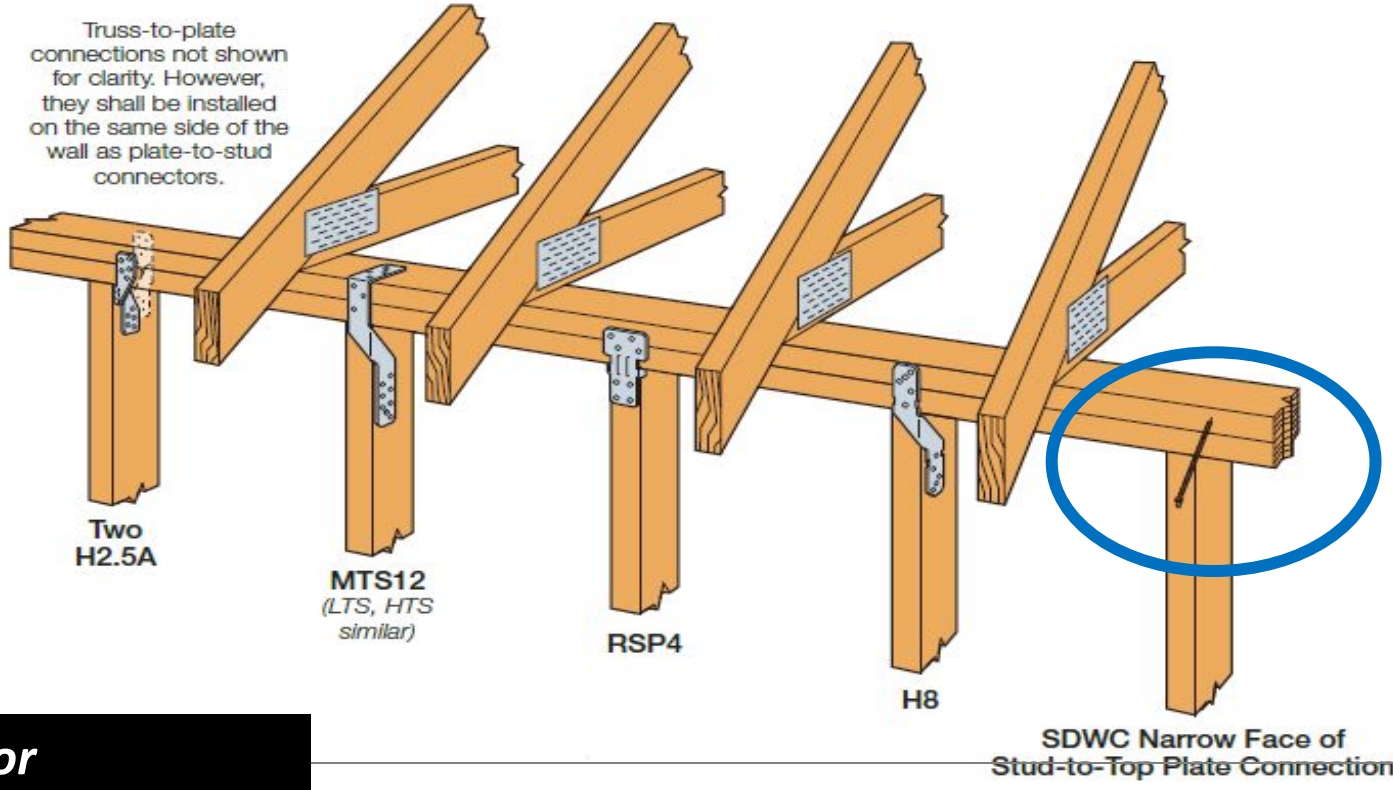


Roof to wall



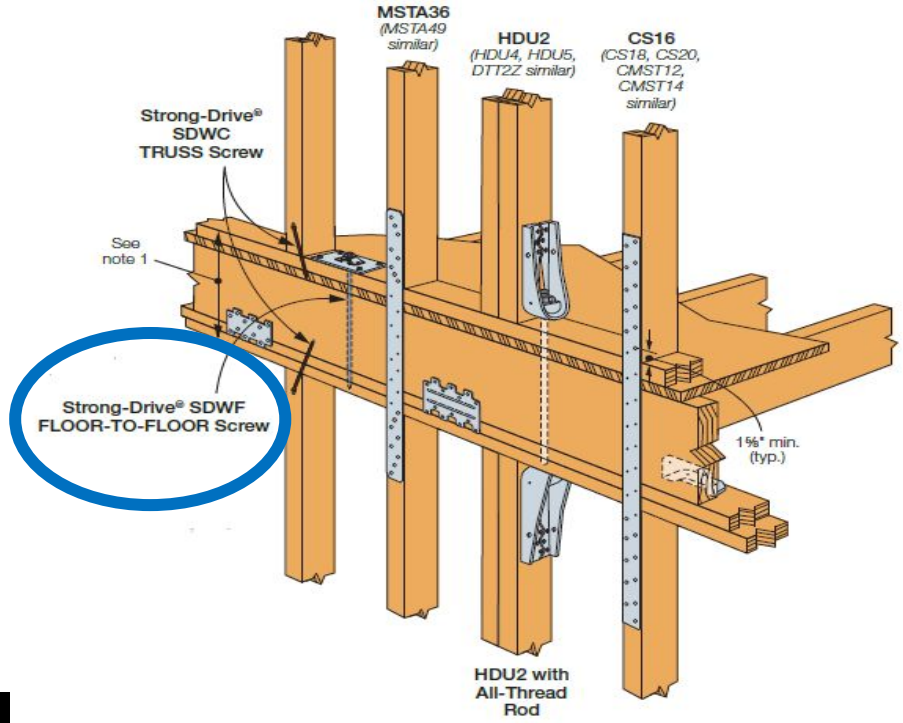
Connector

Top plate to stud



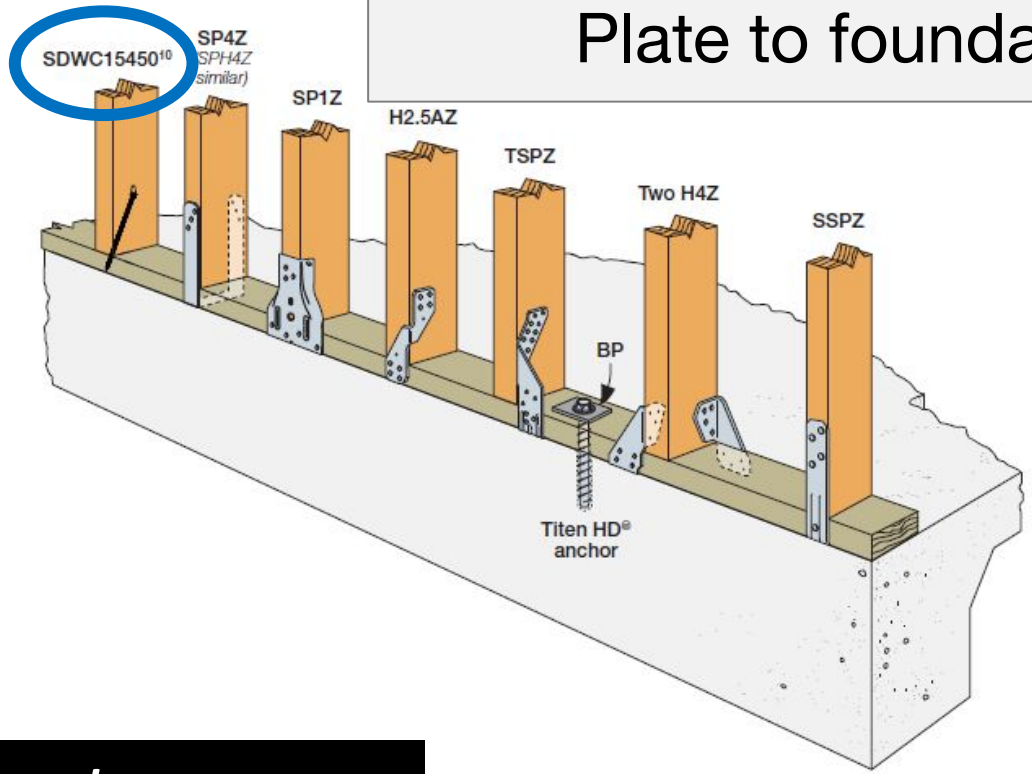
Connector

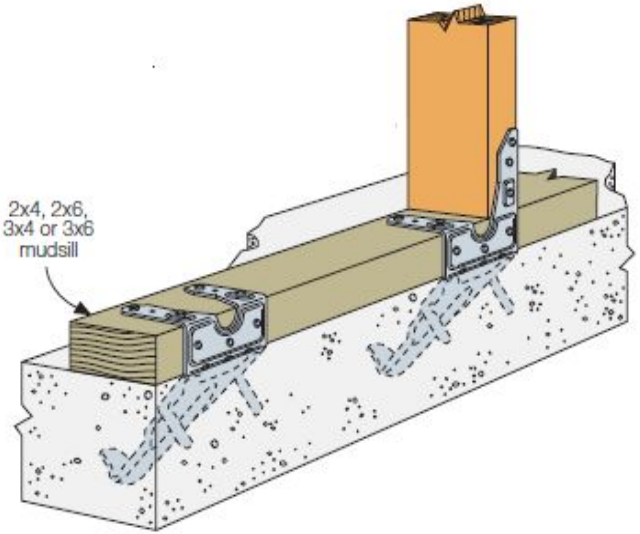
Story to story



Connector

Wall to plate
Plate to foundation





Connector


Connector

Connector

AWC WFCM

SST Catalogue

Tie-down

Fastener

Safe room

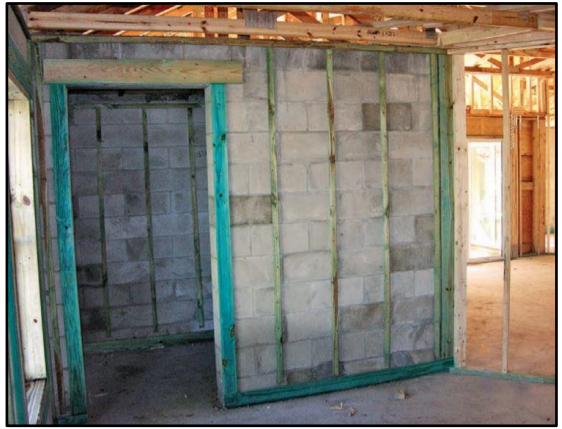
Constructed for FEMA by the
College of Engineering
University of Alabama
THE UNIVERSITY OF
ALABAMA

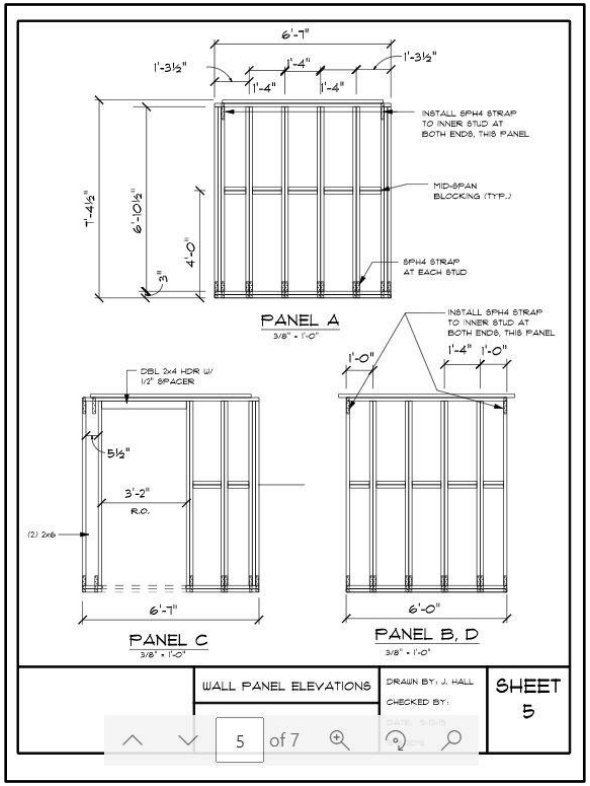
Materials donated by:
Home Depot
Simpson Strong-Tie

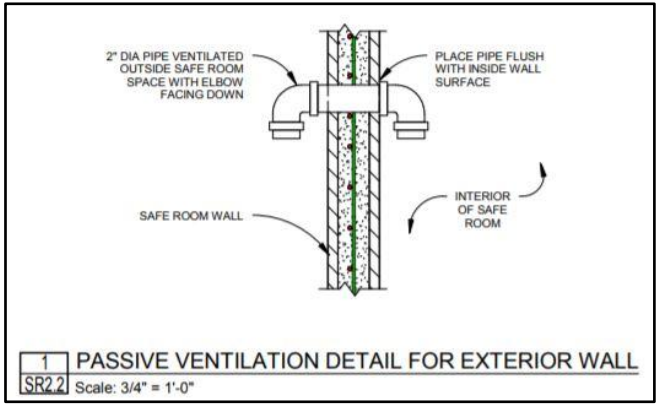
*per drawings in FEMA 320 *Taking Shelter from the Storm*
download from: http://www.fema.gov/plan/prevent/saferoom/fema320.shtm

Full-Size Connectors

Safe room




6'-7"
1'-3½"
1'-4"
1'-4"
1'-4"
1'-3½"
INSTALL SPH4 STRAP TO INNER STUD AT BOTH ENDS, THIS PANEL
MID-SPAN BLOCKING (TYP.)
SPH4 STRAP AT EACH STUD
7'-4½"
6'-10½"
4'-0"
3"
PANEL A
3/8" = 1'-0"
INSTALL SPH4 STRAP TO INNER STUD AT BOTH ENDS, THIS PANEL
1'-0"
1'-4"
1'-0"
DBL 2x4 HDR w/ 1/2" SPACER
5½"
3'-2" R.O.
(2) 2x6
6'-7"
6'-0"
PANEL C
3/8" = 1'-0"
PANEL B, D
3/8" = 1'-0"
WALL PANEL ELEVATIONS
DRAWN BY: J. HALL
CHECKED BY:
SHEET 5
5 of 7


2" DIA PIPE VENTILATED OUTSIDE SAFE ROOM SPACE WITH ELBOW FACING DOWN
PLACE PIPE FLUSH WITH INSIDE WALL SURFACE
SAFE ROOM WALL
INTERIOR OF SAFE ROOM
1
SR2.2
PASSIVE VENTILATION DETAIL FOR EXTERIOR WALL
Scale: 3/4" = 1'-0"

Questions!
Conversation!

Thank you!

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