
# Resiliency & Storm Preparedness for Historic Homes

*Protecting your heritage home from high winds & flood*

HISTORIC HAWAIʻI FOUNDATION

A statewide non-profit advocacy organization, Historic Hawaiʻi Foundation encourages the preservation of historic buildings, sites and communities relating to the history of Hawaiʻi.


www.librarieshawaii.org

The Hawaii State Public Library System nurtures a lifelong love of reading and learning through its staff, collections, programs, services, and physical and virtual spaces.

# Common Myths

A natural hazard can't happen to me.

If a hazard occurs, it won't be that bad.

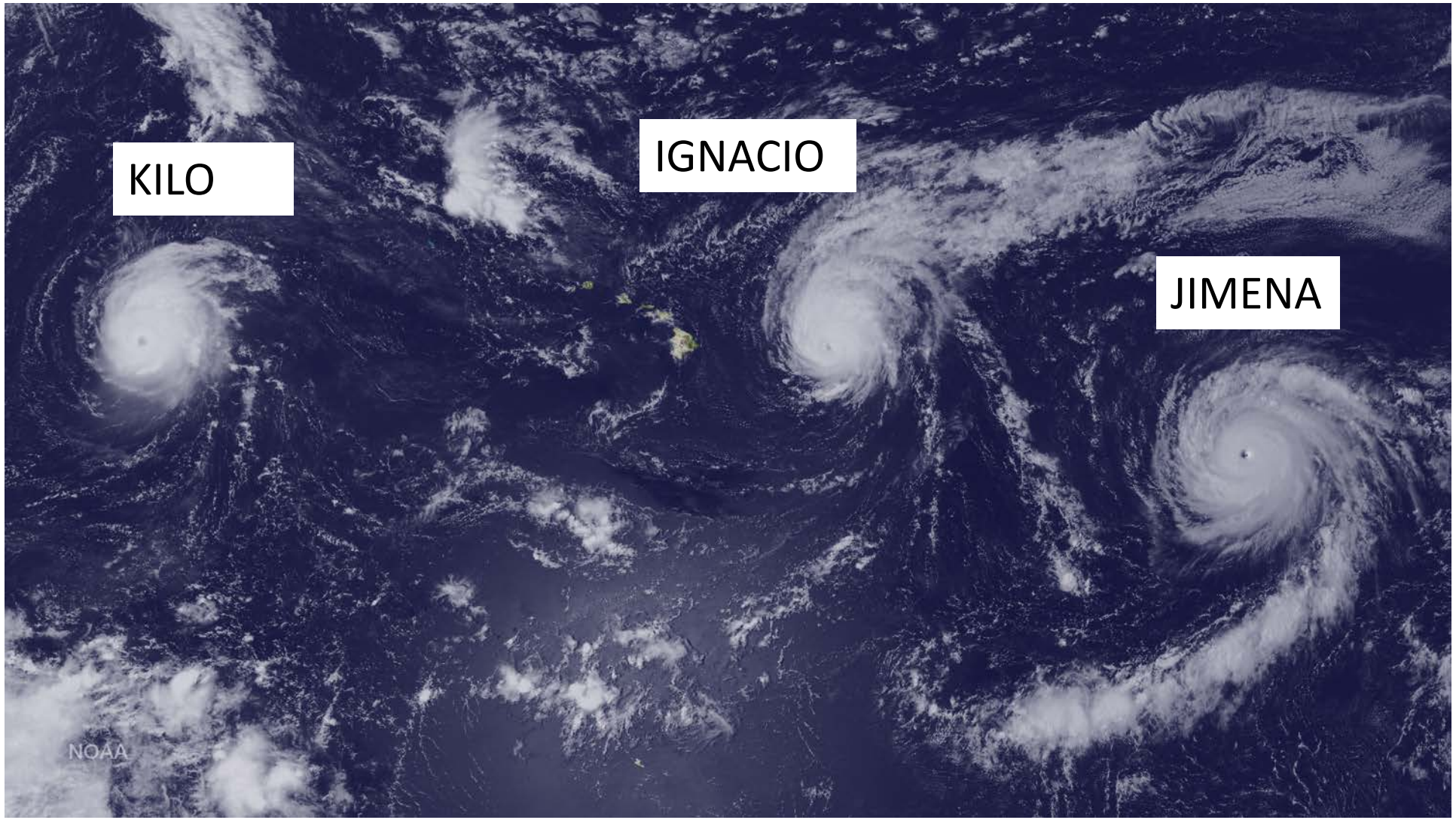
I survived Hurricane Iniki, so I am prepared.

Hurricanes only hit Kauai- those on the other islands don't need to prepare.

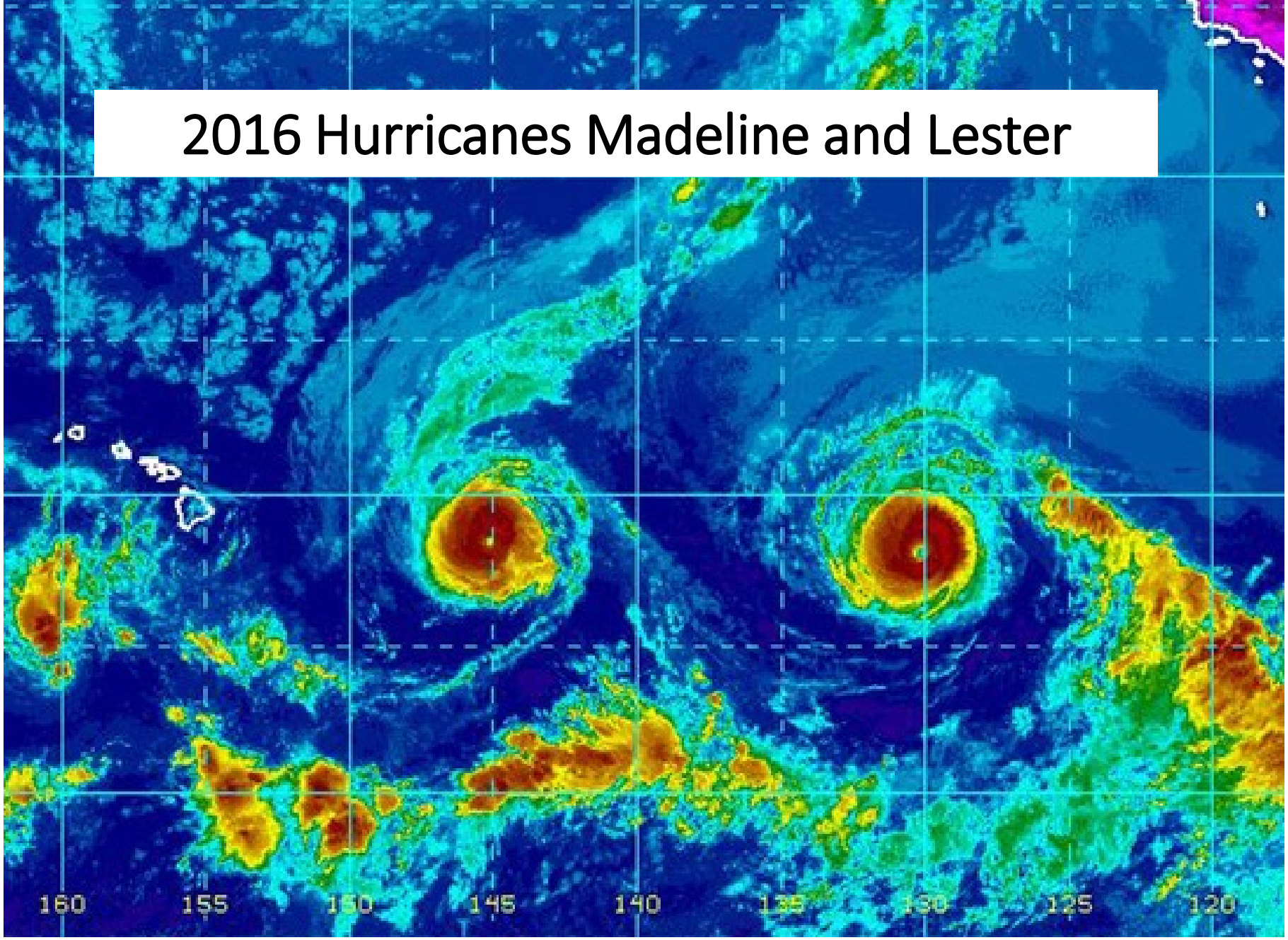
I don't live near the coast, so I am safe.

Installing hurricane clips doesn't guarantee there will be no damage after a hurricane– so why bother?

# Three Category 4 Hurricanes at Same Time in 2015



# 2016 Hurricanes Madeline and Lester




2018 Hurricane Lane

# PRESENTERS

**Barbara Sannino Shideler, AIA**

*Principal & Historical Architect, Mason*

Barbara joined the firm's predecessor, Spencer Mason Architects, in 1989, transitioned to Mason Architects Inc. (recently renamed MASON), as the firm launched in 1998, and became a partner in 2009. She has a B.Arch. and a Graduate Certificate in Historic Preservation from the University of Hawai‘i.

Barbara has designed the restoration and renovation of significant historic buildings and residences in Hawai‘i, including award winning projects at Kaumakapili Church and the Historic Kaua‘i County Building. She has been the Project Architect for eighteen phases of work at Shangri La: the Doris Duke Foundation for Islamic Art and has prepared design guidelines and preservation plans for historically significant projects as diverse as Kōke‘e and Waimea Canyon State Parks, Punahou Campus, and the Hāna Highway Historic Bridge District.

Barbara is the president of the Association of Preservation Technology Hawaii/Pacific Islands Chapter.

# PRESENTERS

**Lyle Carden**

*Vice-President, Martin & Chock*

Lyle is a professional structural engineer.  He has been a consulting engineer at Martin & Chock in Hawaii since November 2005, where he has been involved in the design and construction management of numerous structural engineering projects for new buildings, renovations and evaluations. He has also performed multi-hazard mitigation planning, post-disaster reconnaissance, development of seismic retrofit strategies and several research projects.

Lyle is actively involved in a number of local and national professional organizations, such as the SEAOH representative on the State Building Code Council and WCSEA representative on the board for the Applied Technology Council.  He is also active in education of young engineers as a P.E. review course instructor, of high school students as an ACE Hawaii program mentor, and formally as an adjunct professor at the University of Hawaii.

# PRESENTERS

**Alan Shintani**

*President, Alan Shintani, Inc.*

Alan is the president of Alan Shintani, Inc., founded in 1984. He has been a general contractor for 37 years. Shintani began as a small residential contractor in 1981 with the business originating with a commitment to Hawaii residents & local businesses.

Some of his achievements include the historical renovation of the Royal Mausoleum Chapel, Mauna Ala in1984; 8(a) Contractor 1996; awarded Special Congressional Recognition by the City and County of Honolulu and the US Small Business Administration for Small Business Person of the Year 2002; Noteworthy Contender, Top 25 Contractors Building Industry Magazine 2011; past president of City Contractor and Building Industry Association; mentor, joint ventures and partnerships in support & development of many small businesses.

Alan is very active in the community as a contributor to Moanalua Lion’s Club and Knights of the Orthodox Order of St. John.

# PRESENTERS

**Sue Savio**

*President & Owner, Insurance Associates, Inc.*

Sue Savio has been President and Owner of Insurance Associates Inc. since 1975. She is past President of the Hawaii Independent Insurance Agents Association and the Community Association Institute (CAI) and has served on their board in different capacities since 2000.

She was recently honored with the Gourley Award for distinguished service to the CAI Hawaii and currently serves on the boards of three condo associations.

# Historically-appropriate Ways to Strengthen & Protect your Historic Home

PRESENTED BY: BARBARA S. SHIDELER

# Resiliency & Storm Preparedness for Historic Homes

## *Protecting your heritage home from high winds & flood*

*This presentation will introduce cost effective and historically-appropriate ways to strengthen and protect your historic home.*

- Two most important things you can do to strengthen your house are to
  1) add hurricane clips to tie the roof to the walls of your house, and

  2) protect the openings of your home, including windows and doors, garage doors, and attic vents

- Historic homes require special consideration when retrofitting storm protections in order to preserve the historic character-defining elements of your historic home.

# A guide to hurricane strengthening for Hawaii single-family residences, Dec. 2015

Wind resistive devices and the loss mitigation grant program


**1] Add roof to wall uplift restraint to roof framing:**

- Hurricane clips at rafters to walls and beam supports
- Straps at ridges

**2] Strengthen Roof Sheathing:**
When re-roofing, install continuous plywood sheathing and fasten it for uplift resistance, and add a secondary waterproofing membrane.

**3a] Protect All Residential Doors and All Windows:**
Install protection against windborne debris; include at least two storm-resistant or storm-protected doors that can remain operable for access and exiting at any time.

**3b] Strengthen Garage Doors and Protect Windows:**
Reinforce all doors and window openings of an attached garage.

**4] Strengthen Foundation Against Uplift:**
Reinforce all doors and window openings of an attached garage.

**5] Add a Residential Safe Room:**
Utilize an impact resistant structural wall and ceiling enclosure with operable window protection, an impact resistant entry door and an anchored floor.

*Source: Department of Commerce and Consumer Affairs*

# Storm Preparedness:
## Cautions

- Although well-crafted and built of durable materials, historic homes were constructed prior to implementation of current life-safety and building codes.
- Homeowners can take measures to reduce – but not necessarily eliminate – risk; the major goal of the retrofits is to lessen damage.
- Preparedness requires evacuation planning since sheltering in-place may not always be the safest option.
- Prep for the worst, but hope for the best!

# Historic Homes:

## Historic character-defining elements to prioritize and protect

***Character-defining*** *elements include the overall shape of the building, its materials, craftsmanship, decorative details, interior spaces and* ***features****, as well as the various aspects of its site and environment.*

- Public-facing elevations
- Roofing and roof form
- Exterior building materials, i.e. siding and trims
- Foundation and relationship of building to the site
- Primary entrances
- Windows
- Unique or decorative features

# Historic Homes:

## Standards for the Treatment of Historic Properties

1. Historic properties shall undergo minimal change to historic character-defining materials, features, and spaces.
2. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
3. Deteriorated historic features will be repaired rather than replaced.
4. Additions, exterior alterations, or related new construction will not destroy historic materials or features that characterize the property.
5. Additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property would be unimpaired.

# Prior to Storm Season:
## Planning

*Hurricane preparedness should not be done at the last minute when supplies and options are low. Take the initiative and have your storm plan in place.*

- Locate nearest evacuation shelter and compile emergency supplies
- Use FEMA maps/website to determine your flood elevation and area flood history
  https://msc.fema.gov/portal/search#%20searchresultsanchor
- Obtain adequate hurricane and flood insurance

# Prior to Storm Season:

## Prepare your Property

*Time and money spent to prepare your house to minimize damage from a natural hazard is a fraction of what it would cost to otherwise repair significant damage.*

- Trim tree branches and clear debris from around your home, including your crawl space and carport
- Relocate equipment (water heaters, propane tanks, air conditioners) above flood level
- Store chemicals, fertilizers, and other toxic materials off the floor and away from openings
- Stockpile sandbags, make sure you have a shovel, etc.

# Prior to Storm Season:

## Prepare your House

- Repair termite damage and rotted wood; a well-maintained structure has a better chance of surviving a storm.
- Re-adhere loose shingles with roofing cement; replace missing or damaged tiles.
- Add hurricane clips or other tie-downs for significant protection at a relatively low cost. Simpson Strong-tie has developed the Hawaii Plantation Tie (HPT) hurricane clip for our single-wall houses.
- Permanent strengthening your roof structure can be done cost effectively when you are reroofing or adding solar/PV panels.
- Install “hurricane film” on your window and door glazing and prepare protective panels, shutters, or screens.

The cost of many of these improvements can be offset with insurance premium discounts.

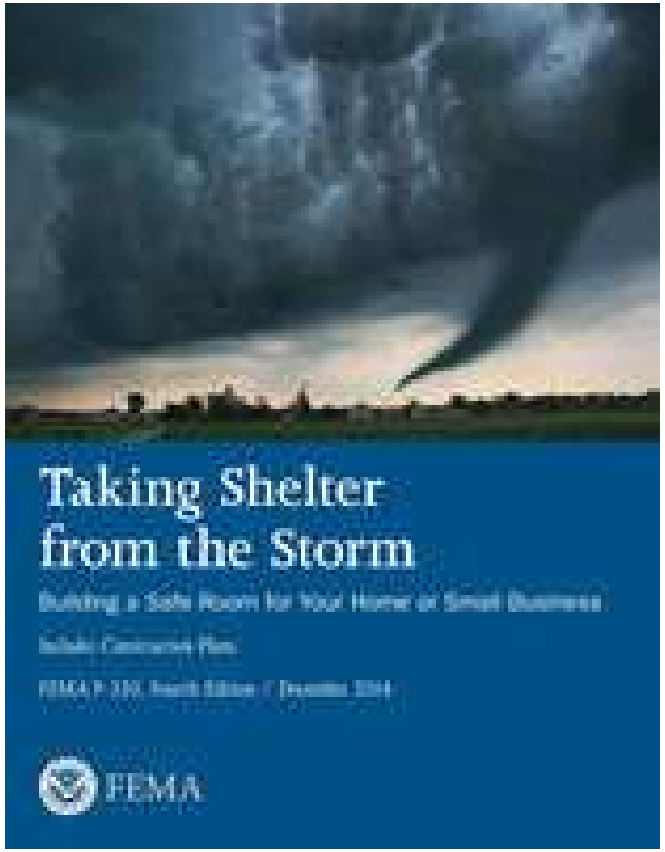
# As the Storm Approaches:
## Secure your House

- Deploy window protection. A physical barrier – wind-rated shutters or panels or mesh - is recommended; taping window glass does not keep you safe or prevent your windows from breaking.
- Brace sliding glass doors to prevent them from being lifted from their tracks or ripped loose by wind vibrations
- Secure awnings and outdoor furniture
- If you are evacuating, shut off electricity at the main panel, and gas and water at the valves

# During the Storm:
## Protect Yourself and Family

- If your property is without adequate storm planning or improvements, evacuate to a shelter or FEMA safe room.

  http://seagrant.soest.hawaii.edu/wp-content/uploads/2019/05/shelter-in-place-graphic-and-instructions.pdf



# Roofing:
## Material Selection and Installation

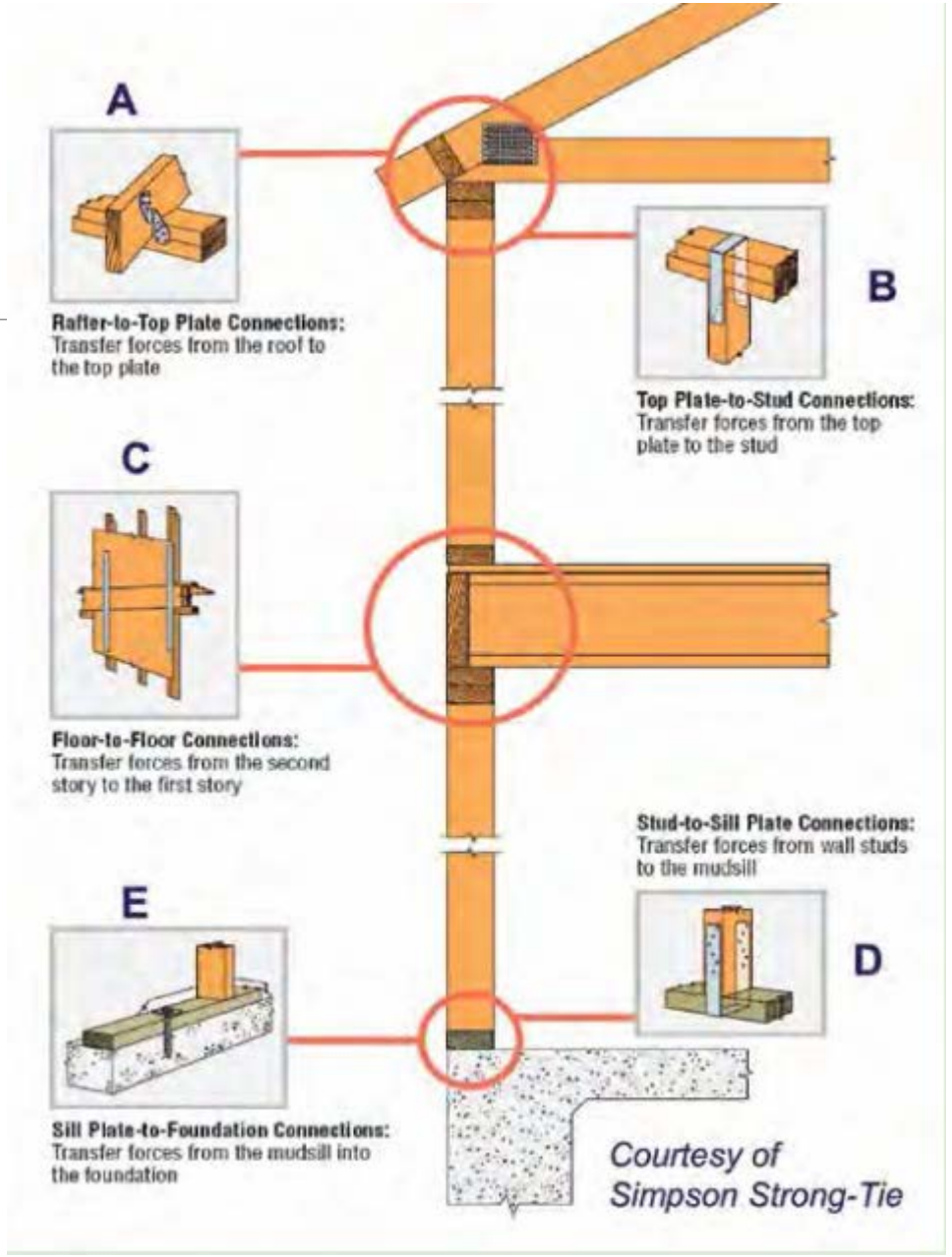
*Choosing the right roof covering is imperative to keeping your home safe.*

The cost of the material is generally minimal compared to the labor to install it, thus you should upgrade to a wind-rated shingle or tile.

- Manufacturers now offer asphalt shingles rated for 135 mph winds and some even offer shingles that will withstand 150 mph winds!
- Clay tile roofs can be installed with a polyurethane foam adhesive system that meets Miami-Dade County requirements (the gold standard for hurricane-rated construction products).
- Wood shingle roofing should always be installed per the Cedar Shake and Shingle Bureau (CSSB) recommendations for nailing and coverage.
- Synthetic underlayment (polyester or fiberglass) performs better in extreme weather events than asphalt building felt.

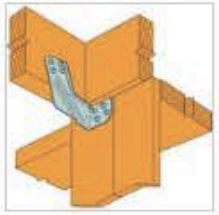
# Structure:
## Continuous Load Path

***"Incomplete design and construction for load transfer and improper connections, especially between roof and walls, were found to be the most important factors causing structural failure of buildings due to uplift wind forces."[21]*** **This statement relates to Concept 1: Creating the Continuous Load Path Connection and tying your roof to the wall with hurricane clips to significantly reduce the risk of structural failure to your house.**



# Structure:
## Hawaii Plantation Tie (HPT)

Internet #202092490 Model # HPTZ Store SKU #658089



Exclusive

Simpson Strong-Tie >

HPT 18-Gauge ZMAX® Galvanized Hurricane Tie

★★★★★ Write the first Review Questions & Answers (2)

BULK PRICE ELIGIBLE $1 38 Buy **100** or more **$1.14**

**Save up to $100**◇ on your qualifying purchase.
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### Overview

The HPT is specially designed and tested for single-wall homes and meets Hawaii state requirements for uplift resistance. The unique design of the HPT connects the wall to the rafter, avoiding interference from the blocking. The strengthened tr... See Full Description

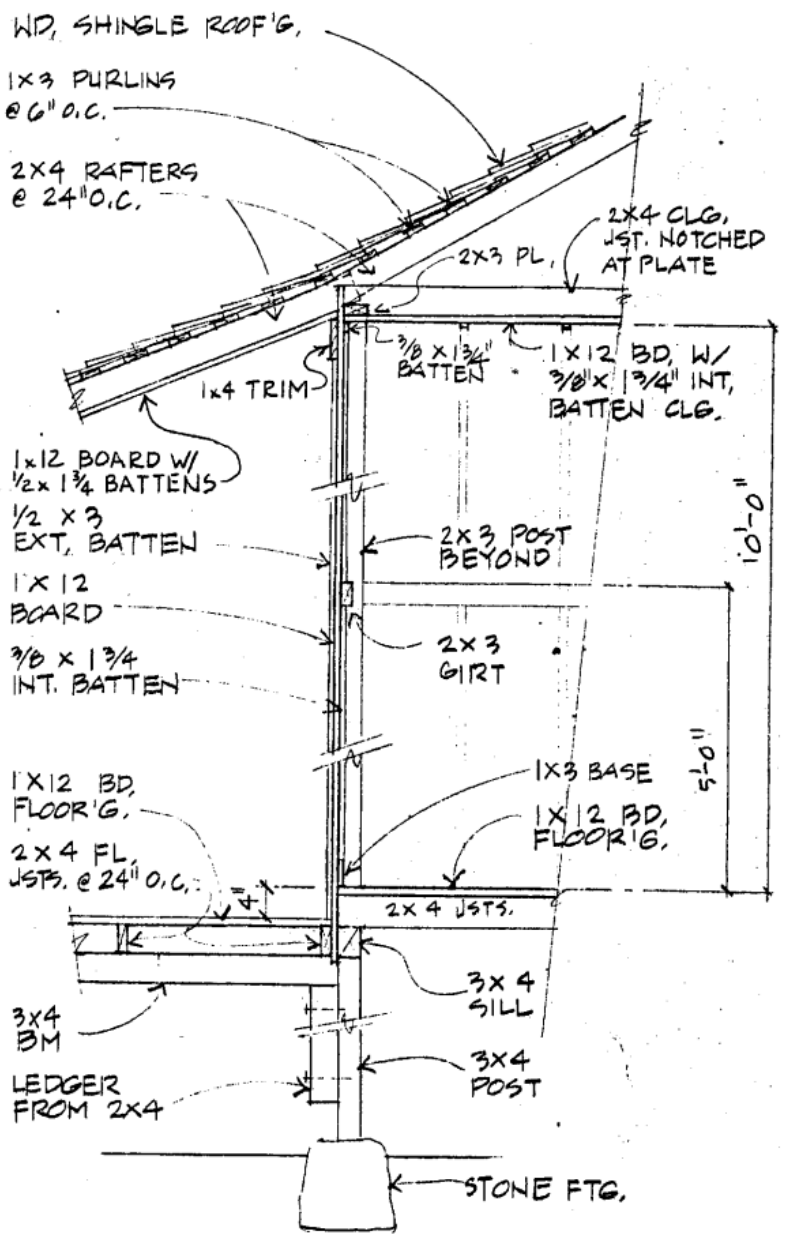



Figure 8: Board and batten single-wall construction detail

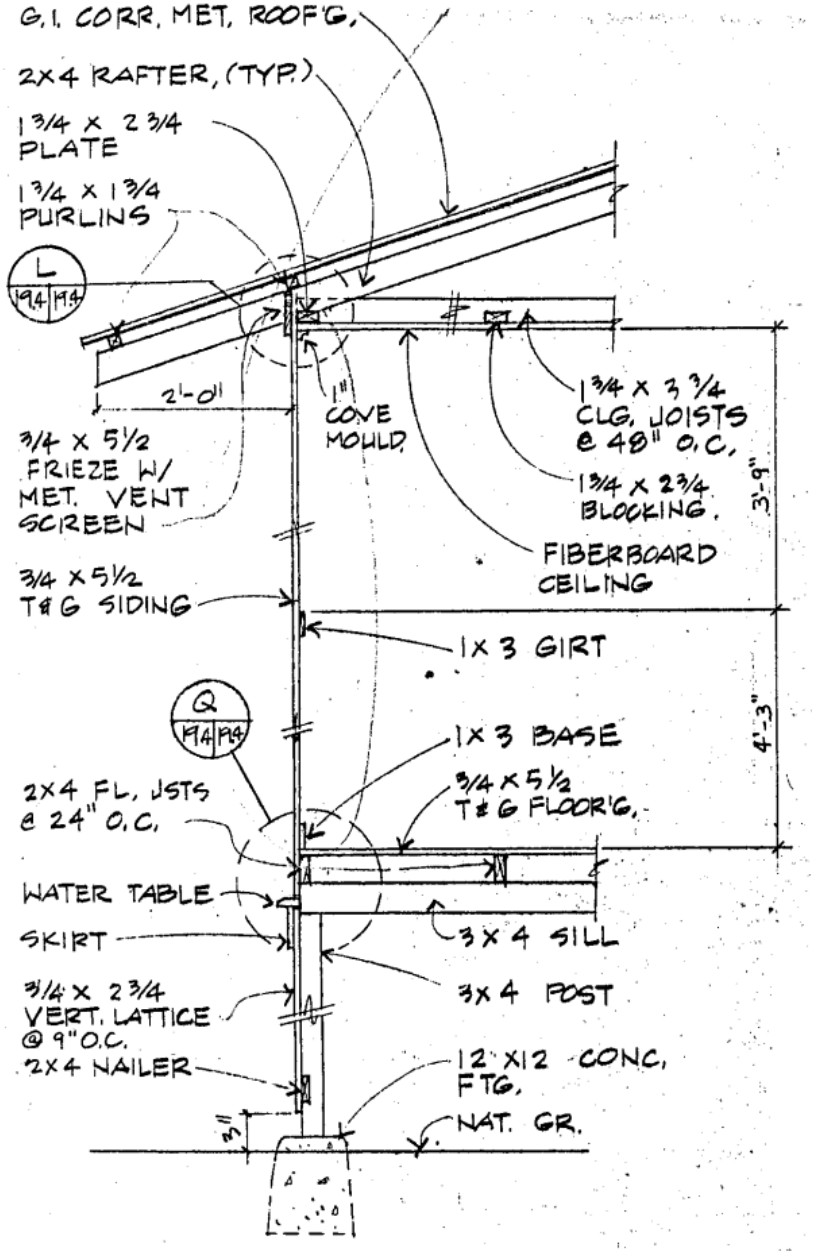



Figure 9: Tongue and groove single-wall construction detail

# Window Protection:

## Panels and Shutters

*"In many instances, loss of glazing (e.g., glass doors and windows), either from direct wind pressure or from debris impact, resulted in breach of the building envelope, subsequent internal pressures, and progressive structural failure."*[22] **This statement relates to Concept 2: Creating a Wind- and Rain-Resistant Envelope by protecting the openings around your house such as windows.**

- Storm windows or shutters can provide permanent protection from high winds.
- Plywood is a commonly available alternative. Use 5/8" plywood, not OSB or particle board.
- A recent development is corrugated plastic (polypropylene) panels. Installed like plywood, but they are lighter, stronger, and translucent.
- Wind abatement screens provide another alternative for protection.

# Window Protection:

## Corrugated Plastic Sheets

Home / Building Materials / Glass & Plastic Sheets / Corrugated Plastic Sheets

Internet #206084782 Model # COR10MM4896-WT



Share Save to Favorites Print

**Coroplast** ›

# 48 in. x 96 in. x 0.393 in. Fluted Twin Wall Plastic Sheet (3-Pack)

★★★★★ (6) Write a Review Questions & Answers (34)

**$163**31 /package

**Save up to $100** on your qualifying purchase.
Apply for a Home Depot Consumer Card

### Overview

This 48 in. x 96 in. corrugated "plastic cardboard" sheet is waterproof and lightweight. Ideal for projects around the home, office and jobsite. A very versatile sheet that is widely used in applications ranging from hobby, craft, and school projects... See Full Description

Quantity - 1 +

# Window Protection:
## Wind Abatement Mesh

- Light weight, flexible screen fits a variety of openings, including lanai.
- Impact-resistant fabric made of heavy-duty, geosynthetic polypropylene mesh
- Screens block wind-borne debris and 97% of wind and driving rain – while allowing natural light into the building.
- Attached with straps and buckles to the wall, eave, or beams with large eye-bolts or ground anchor screws. Some systems use clips, carabineers, or grommets.

# Resources:
## Historic Architecture

- Secretary of the Interior's Standards for the Treatment of Historic Properties
  https://www.nps.gov/tps/standards/treatment-guidelines-2017.pdf
- Homeowner's Handbook to Prepare for Natural Hazards
  https://dod.hawaii.gov/hiema/files/2016/03/webhomeownershandbooknatural_hazards_0.pdf
- NCPTT Preparing Historic Buildings and Site for a Disaster
  https://www.ncptt.nps.gov/articles/disasters/preparing-historic-buildings-and-sites-for-a-disaster/all/1/
- Hurricane Retrofit Guide (Florida Division of Emergency Management)
  https://apps.floridadisaster.org/hrg/index.asp
- Taking Shelter from the Storm: Building a Safe Room for your Home or Small Business
  https://www.fema.gov/fema-p-320-taking-shelter-storm-building-safe-room-your-home-or-small-business

# Structural Engineering for Historic Homes

PRESENTED BY: LYLE CARDEN PH.D., P.E.

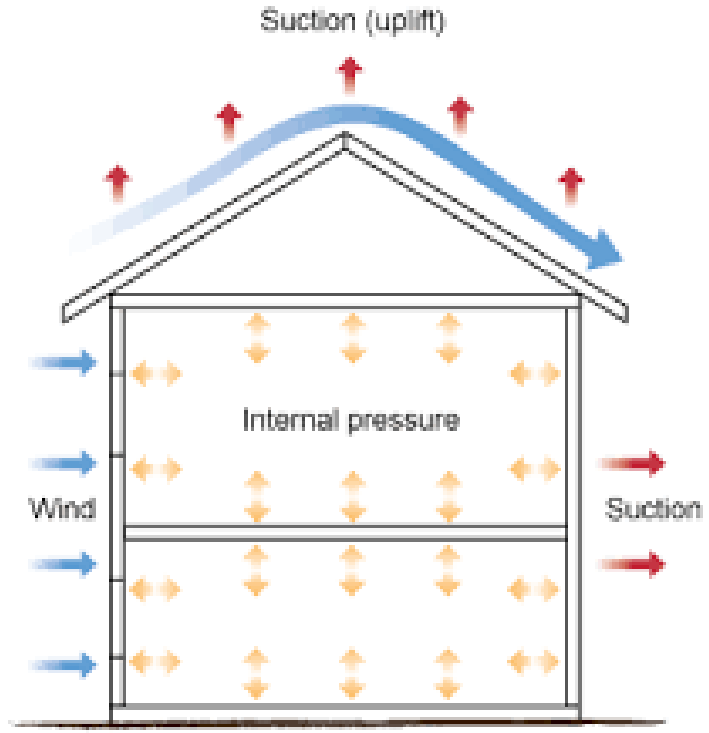
# STRUCTURAL VULNERABILITIES - WIND

In Order of Structural Importance

- 3a - Windows and Doors
- 3b – Garage Doors and Windows
- 2 – Roof Sheathing
- 1 – Roof to Wall Uplift Restraint
- 4 – Wall or Posts to Foundation

# WIND EFFECTS

- External Pressures
  - Pushes windward wall
  - Sucks leeward wall
  - Roof uplift
- Internal Pressures
  - Can be pushing or sucking
- Failure of windows and doors can significantly increase internal pressures.



# WINDOWS

- Glazing replacement within historic windows frames.
  - This can generally be done for houses post 1950's era, when glazing is architecturally similar to current glazing.
  - Replace single pane monolithic glass with laminated glazing with internal film.
  - Glazing may break but glass will remain together and minimize leaking.
  - Frames sufficient strength may still limit hurricane resistance.
  - Bonus - energy performance

# WINDOWS

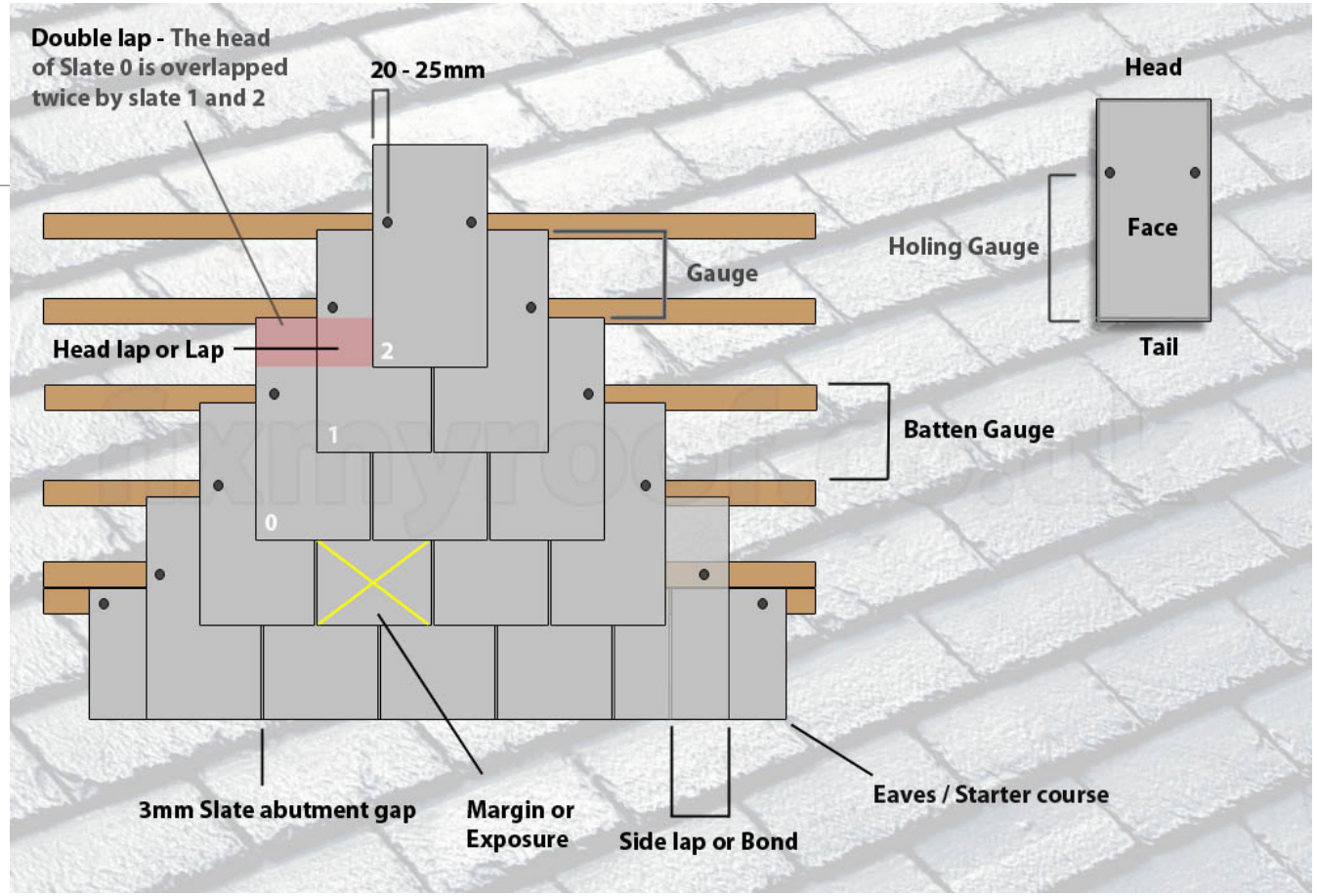
- Window Film possible for all glazing except textured glass.
  - Can apply LLumer or similar film to windows.
  - Must be applied to the interior to be effective for hurricane windborne debris protection.
  - Best if also applied with structural silicone around the perimeter.
  - Not code rated protection
  - Bonus - energy performance
  - Many window tinting companies on Island. Often to automotive tinting as well as building tinting.

# DOORS

- Solidcore doors
- Door latches
- Door latch and hinge frames.
- Garage doors
  - Hurricane rated doors.
  - Alternatively, is garage isolated from the rest of the house.


# ROOFING

- High wind rated Asphalt Shingles
- Concrete and Clay Tile Roofs
  - Adhesive for reinstallation of historic tiles
  - Screw fastened for new tiles
- Metal Roofs

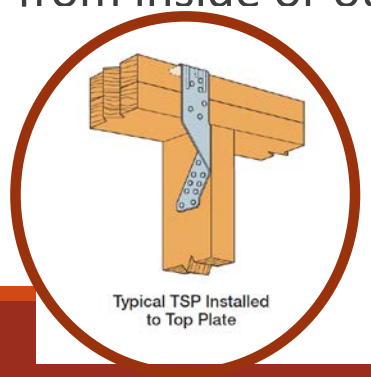


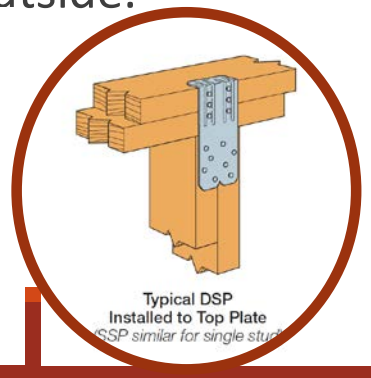
# ROOF SHEATHING

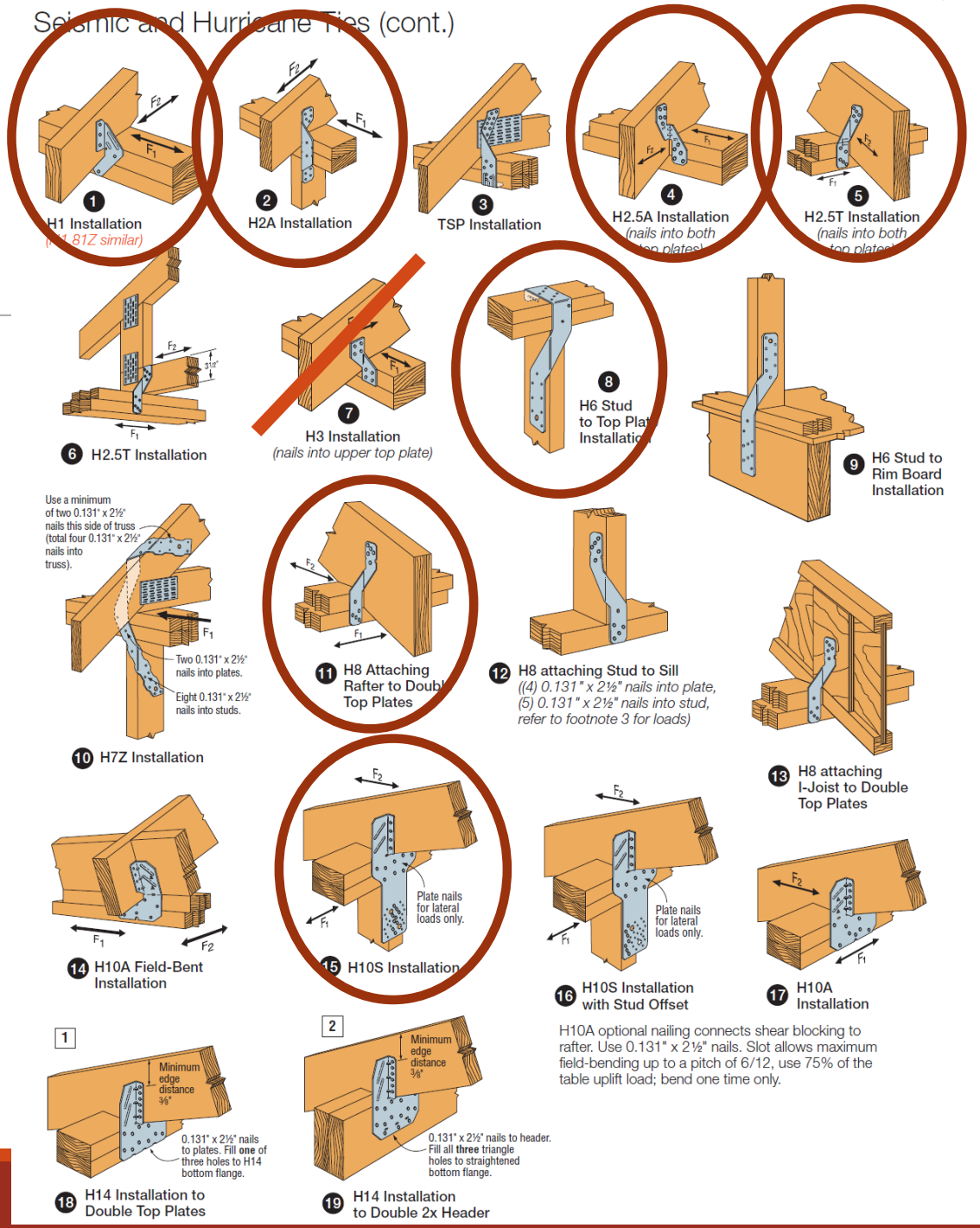
- Install continuous sheathing
  - Exterior grade plywood.
  - $^{5}/_{8}$” for supports at 16” on center
  - $^{3}/_{4}$” for supports at 24” on center
- Ensure adequately fastened
  - Screws vs Nails
    - Most sheathing is nailed. Penetrate around 2”
    - Screws have better withdrawal strength if there is limited thickness for fastening

# ROOF FRAMING FASTENING TO WALLS

- **Stud Wall Framing**
  - Install hurricane ties between rafters/trusses and wall studs - H2A, H10S
  - Alternatively in two parts:
    - Hurricane tie between rafter/truss and wall top plate – H1, H2.5A, H2.5T
    - Top plate tie to stud – H6, H8, TSP, DSP
    - This is often necessary when rafters are not aligned with walls.
  - Can be installed from inside or outside.


Typical TSP Installed to Top Plate


Typical DSP Installed to Top Plate



# ROOF FRAMING FASTENING TO WALLS

- **Stud Wall Framing**
  - Strength is generally based on number of nails into each component.
  - Nails generally better than screws for these.
  - Simpson Strong Tie Self Drilling Screws (SDS) combine best properties of screw and nails.
  - Use correct nailing according to Simpson Strongtie Wood Construction Connector Catalogue.
  - Common Nails
    - 8d Nail = 0.131” diameter
    - 10d Nail = 0.148” diameter
  - Box nails (nailgun nails) have a smaller diameter, need to use longer nails to get the same diameter.
  - Use stainless steel options where exposed to weather or not painted.

| Model No. | Ga. | Fasteners (in.) | | | DF/SP Allowable Loads | | | Uplift with 0.131" x 1½" Nails (160) |
|---|---|---|---|---|---|---|---|---|
| | | To Rafters/ Truss | To Plates | To Studs | Uplift (160) | Lateral (160) $F_1$ | Lateral (160) $F_2$ | |
| H1 | 18 | (6) 0.131 x 1½ | (4) 0.131 x 2½ | — | 480 | 510 | 190 | 455 |
| NEW H1.81Z | 18 | (6) 0.131 x 1½ | (4) 0.131 x 2½ | — | 350 | 335 | 195 | 330 |
| H2A | 18 | (5) 0.131 x 1½ | (2) 0.131 x 1½ | (5) 0.131 x 1½ | 525 | 130 | 55 | — |
| SS H2ASS | 18 | (5) 0.131 x 1½ | (2) 0.131 x 1½ | (5) 0.131 x 1½ | 400 | 130 | 55 | 400 |
| H2.5A | 18 | (5) 0.131 x 2½ | (5) 0.131 x 2½ | — | 565 | 110 | 110 | 575 |
| SS H2.5ASS | 18 | (5) 0.131 x 2½ | (5) 0.131 x 2½ | — | 440 | 75 | 70 | 365 |
| H2.5T | 18 | (5) 0.131 x 2½ | (5) 0.131 x 2½ | — | 495 | 135 | 145 | 420 |
| SS H3 | 18 | (4) 0.131 x 2½ | (4) 0.131 x 2½ | — | 400 | 210 | 170 | 415 |
| H6 | 16 | — | (8) 0.131 x 2½ | (8) 0.131 x 2½ | 1,230 | — | — | — |
| H7Z | 16 | (4) 0.131 x 2½ | (2) 0.131 x 1½ | (8) 0.131 x 2½ | 830 | 410 | — | — |
| SS H8 | 18 | (5) 0.148 x 1½ | (5) 0.148 x 1½ | — | 780 | 95 | 90 | 630 |
| H10A Field Bent | 18 | (9) 0.148 x 1½ | (9) 0.148 x 1½ | — | 855 | 590 | 285 | — |
| H10A | 18 | (9) 0.148 x 1½ | (9) 0.148 x 1½ | — | 1,040 | 565 | 285 | — |
| SS H10ASS | 18 | (9) 0.148 x 1½ | (9) 0.148 x 1½ | — | 970 | 565 | 170 | — |
| H10AR | 18 | (9) 0.148 x 1½ | (9) 0.148 x 1½ | — | 1,050 | 490 | 285 | — |
| H10S | 18 | (8) 0.131 x 1½ | (8) 0.131 x 1½[1] | (8) 0.131 x 2½ | 910 | 660 | 215 | 550 |
| H10A-2 | 18 | (9) 0.148 x 1½ | (9) 0.148 x 1½ | — | 1,080 | 680 | 260 | — |
| H11Z | 18 | (6) 0.162 x 2½ | (6) 0.162 x 2½ | — | 830 | 525 | 760 | — |
| H14 | 18 | (12) 0.131 x 1½ | (13) 0.131 x 2½ | — | 1,275 | 725 | 285 | — |
| | | (12) 0.131 x 1½ | (15) 0.131 x 2½ | — | 1,340 | 670 | 230 | — |
| TSP | 16 | (9) 0.148 x 1½ | (6) 0.148 x 1½ | — | 755 | 310 | 190 | — |
| | | (9) 0.148 x 1½ | (6) 0.148 x 3 | — | 1,015 | 310 | 190 | — |

# ROOF FRAMING FASTENING TO WALLS

- **Single Wall Framing**
  - HPTZ – Hawaii Plantation Tie
    - Specifically design for Hawaii Single Wall houses.
    - Single tie with Self Drilling Screws (SDS)
    - Double tie with nails.
    - Connect through trim into vertical wall boards.
  - Outside only

Two HPTZ ties installed with nails.

Typical HPTZ with SD10112 installation.

# HPTZ

- **Single Wall Framing**
  - HPTZ – Hawaii Plantation Tie Used where trim board is below rafter
  - May need to install trim board to attach hurricane tie

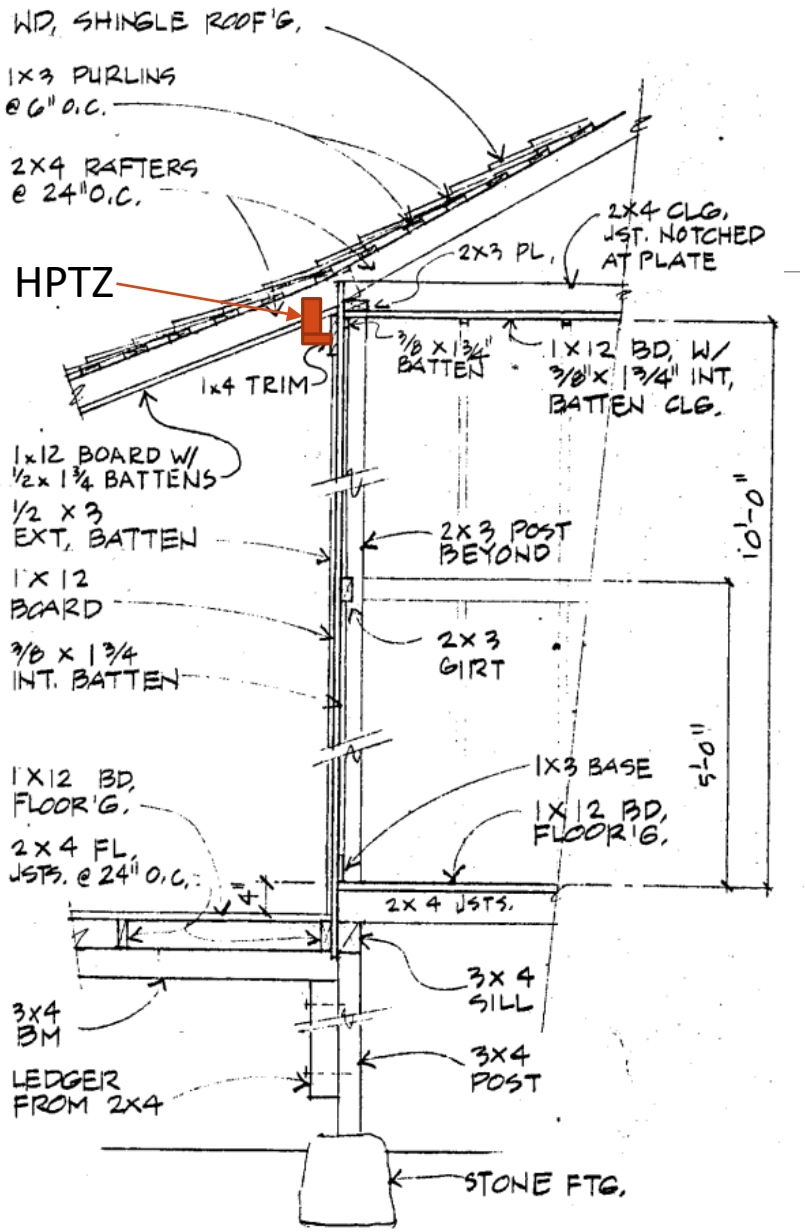



Figure 8: Board and batten single-wall construction detail

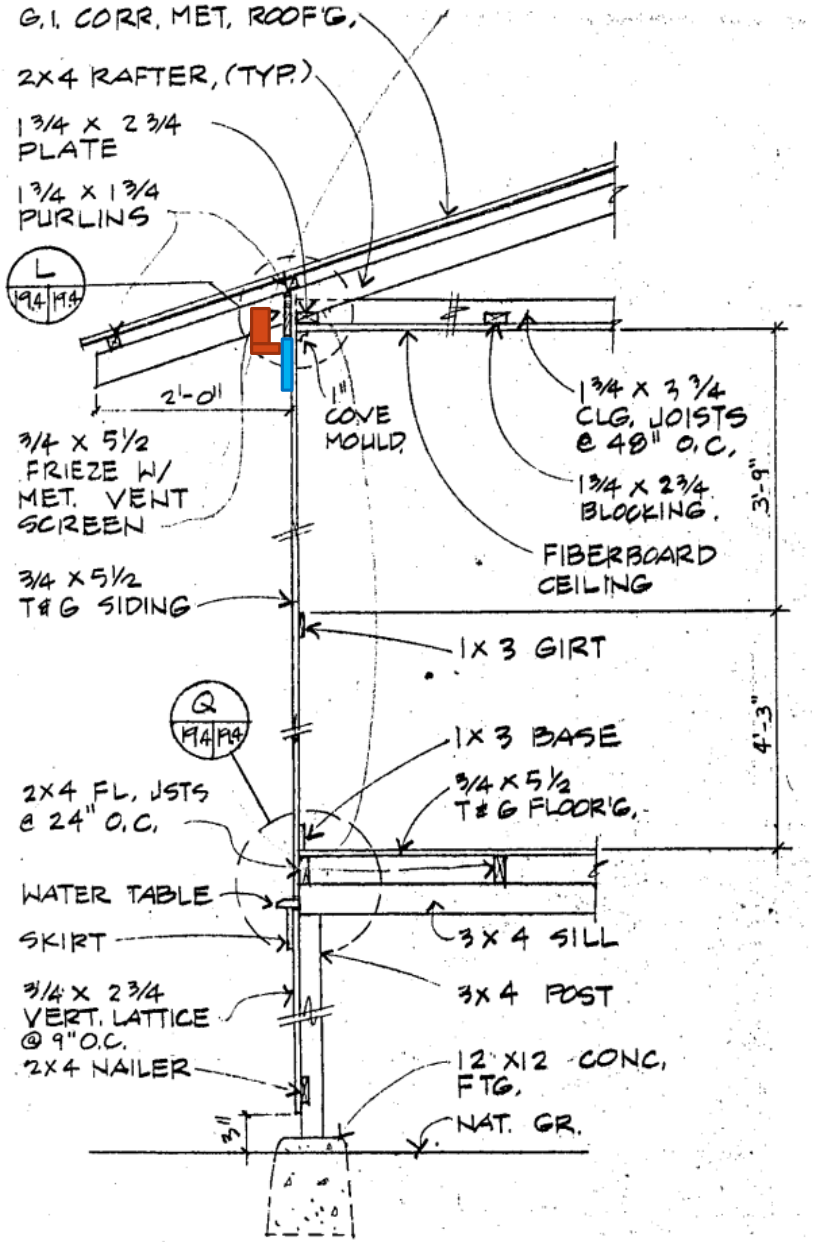
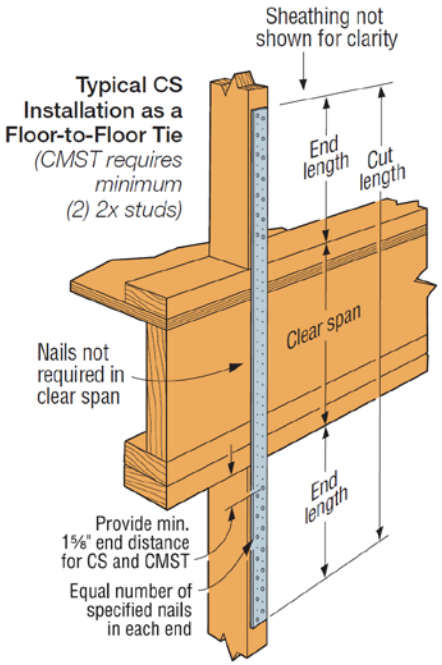
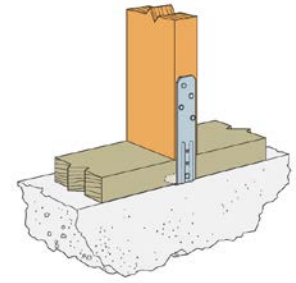


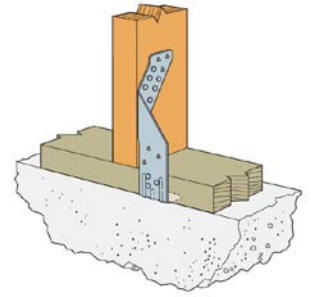

Figure 9: Tongue and groove single-wall construction detail

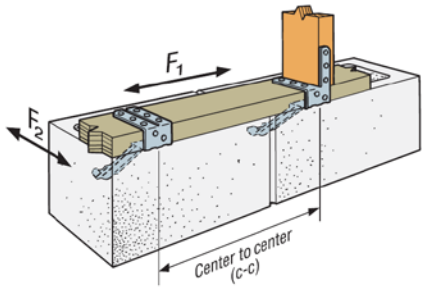
# WALL FRAMING FASTENING TO SLAB OR RAISED FLOOR

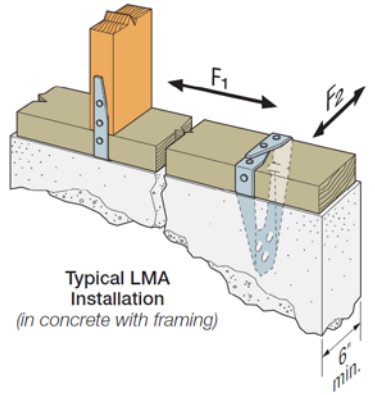
- **Stud Wall Framing**
  - Connect studs through intermediate floors with straps.
  - Connect studs to wall bottom plate (sill plate) – SSP, TSP
  - Wall bottom plate should be connected to slab with embedded ties (MASB or simlar) or anchor bolts
  - If possible, check condition of embedded ties, often severely corroded – add anchor bolts if needed



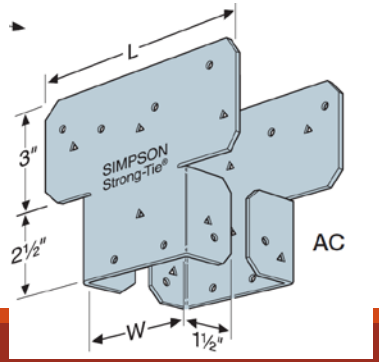



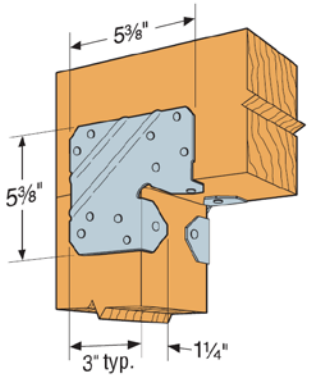



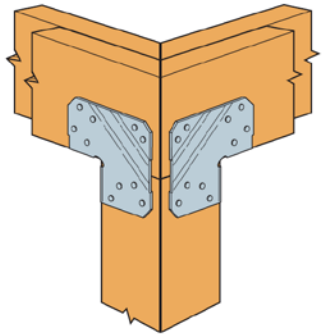
# WALL FRAMING TO FLOOR

- **Single Wall Framing**
  - The vertical siding on single wall houses is generally already connected to (sill) beams or rim joists – no added connectors needed.
  - Connect posts to the beams using post caps, inside and/or outside - AC, LCE

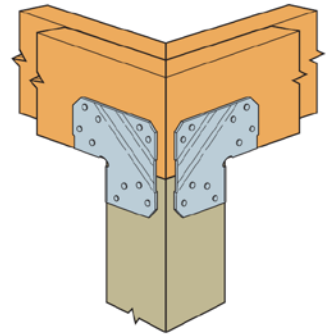



Typical LCE4 Installation
*(for 4x or 6x lumber)*



Typical LCE4
Corner Installation
*(see note 7)*



Typical LCE4Z Installation
*(mitered corner)*

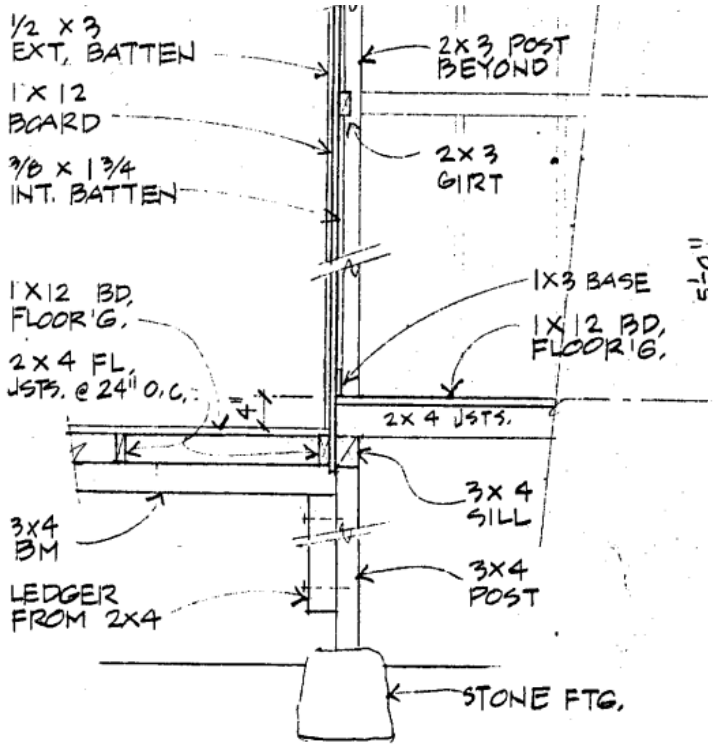



Figure 8: Board and batten single-wall construction detail

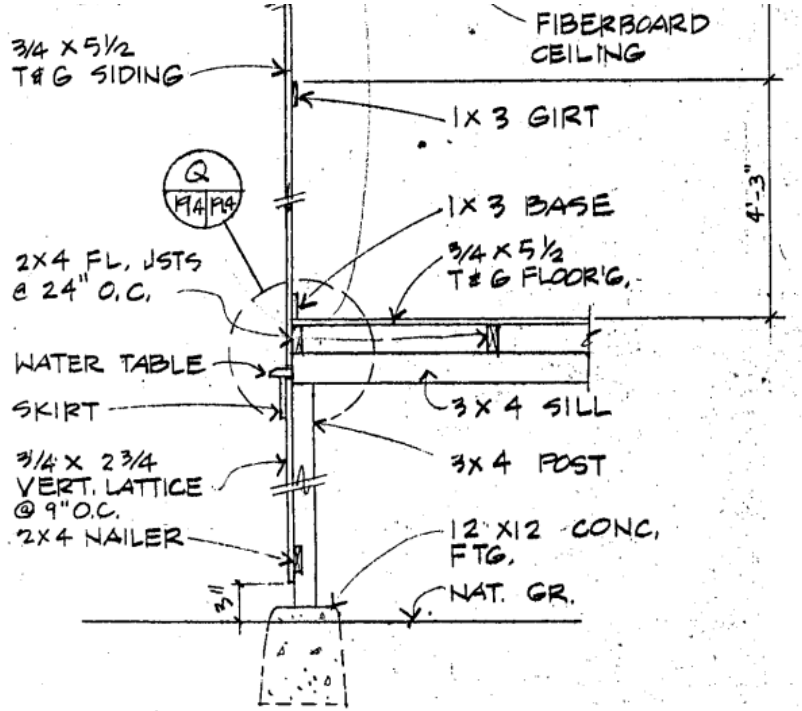



Figure 9: Tongue and groove single-wall construction detail

# FOUNDATIONS

- **Single Wall Framing or Stud Wall Framing on Post and Pier Foundations**
  - Replace piers with new concrete footings with embedded footings CBSQ or similar
  - New footing shall be at least size of the original pier.

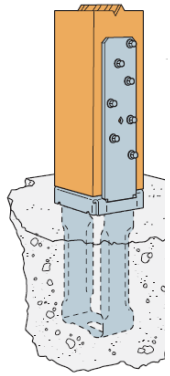


Figure 1 — Post Base with 1" Standoff

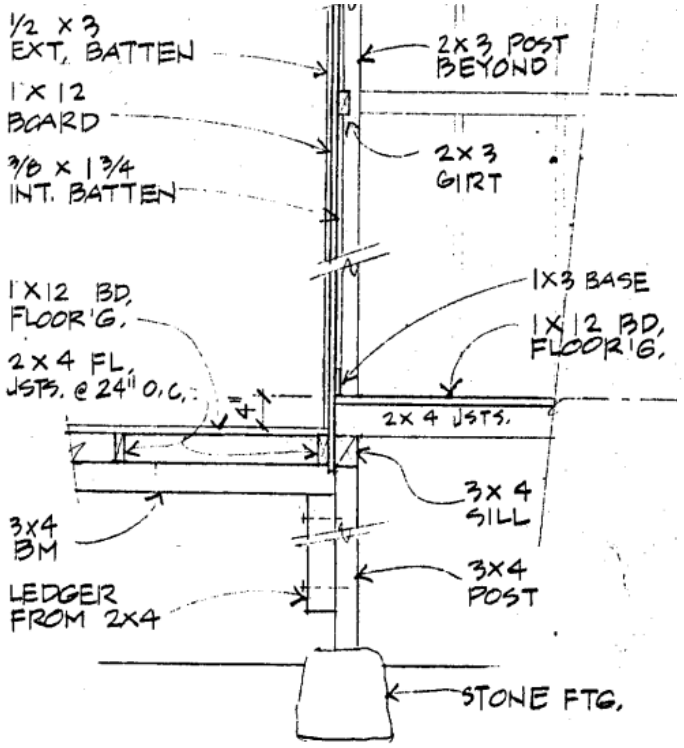



Figure 8: Board and batten single-wall construction detail

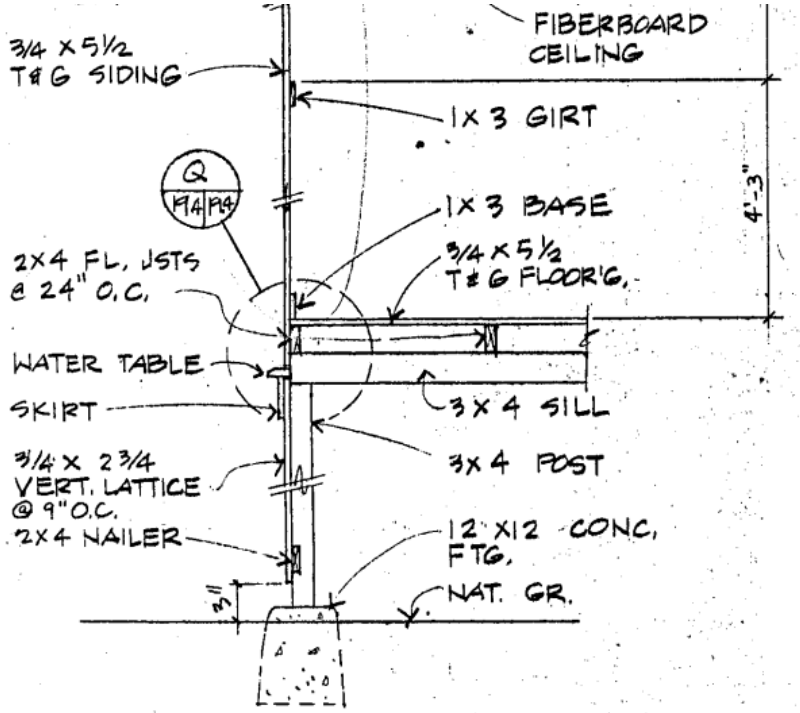



Figure 9: Tongue and groove single-wall construction detail

# STRUCTURAL VULNERABILITIES - FLOOD

- Need to anchor Posts and Walls to the foundations as described in previous slides

# Resources:

## Structural Engineering: Windows, Doors, Roofing, Foundations

- State Building Codes

https://ags.hawaii.gov/bcc/building-code-rules/

- City and County of Honolulu Building Code

https://www.honolulu.gov/cms-ocs-menu/site-ocs-sitearticles/972-roh-chapter-16-1.html

- Llumar Window Films

https://northamerica.llumar.com/

- Simpson Strongtie Wood Construction Connector Catalogue

https://www.strongtie.com/resources/literature/wood-construction-connectors-catalog

- Simpson Strongtie – HPT Hurricane Tie for Hawaii Single Wall Houses

https://www.strongtie.com/seismicandhurricaneties_strapsandties/hpt_tie/p/hpt

- Guide to Hurricane Strengthening for Hawai‘i Single –Family Residences

https://cca.hawaii.gov/ins/files/2016/01/Guide-to-Hurricane-Strengthening-of-Hawaii-Single-Family-Residences-Jan-2016.pdf

# Contractor for Historic Homes

BY: ALAN SHINTANI

# Wall System

- Exterior walls need to be designed to resist the wind pressures on the wall surface
- Exterior Wall Covering – Wall coverings are subject to much more damage from hurricane forces.

i. For wood frame houses – wall sliding may be used, which may or may not be plywood.

ii. EIFS – Exterior Insulation and finishing system (this is found built on newer homes)

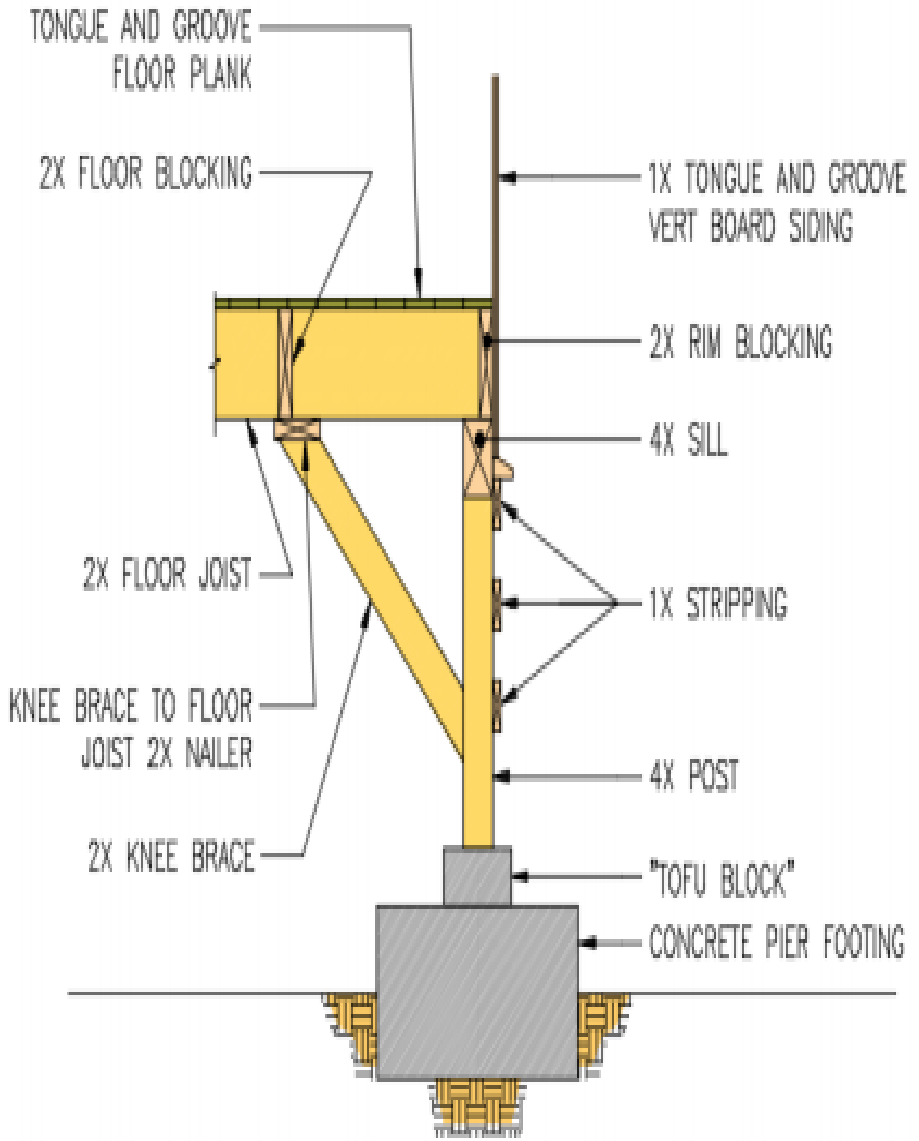



*Figure 3.4-2: Typical foundation of a single wall house*

# Single Wall Construction

Single-wall construction utilizes flat tongue and groove (T&G) boards placed vertically to form a load-bearing exterior wall without studs.

A flat, wood top plate is attached against the vertical siding boards to serve as a “supporting” ledger for the roof rafter.

The T&G siding boards are nailed at the bottom to a rim joist and sill beam of the floor, transferring its load through vertical shear (see Figure at right).

These connections typically have low uplift capacity. Roof construction in single-wall residences is typically light non-engineered framing with composition shingles on spaced battens, sometimes on tongue and groove (T & G) wood decking, or corrugated metal deck roofing directly attached to rafters.

The foundation of many single construction homes are not properly anchored down to the ground.

Therefore, single wall construction homes have multiple problem areas that will require inspection and retrofit. Single wall construction developed a significant portion of the housing stock in the past due to its low cost.

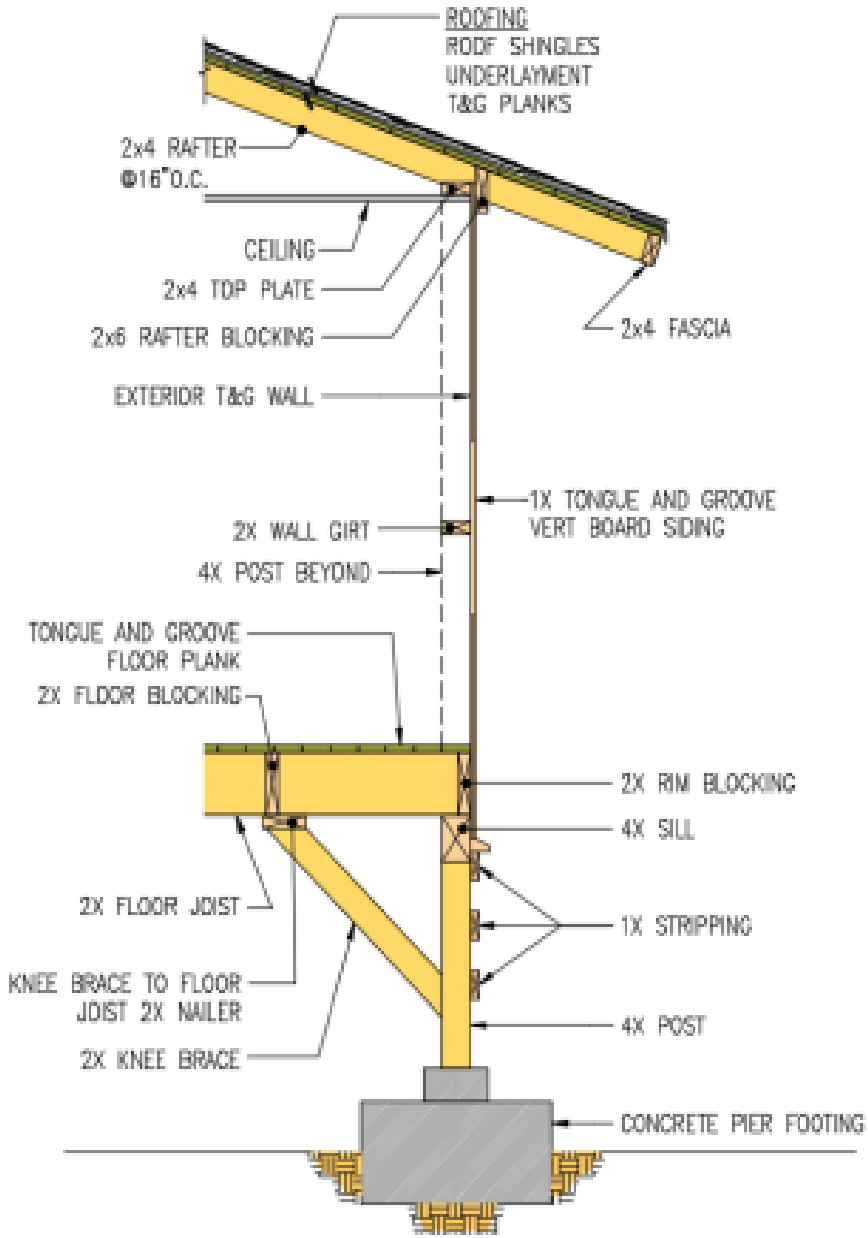
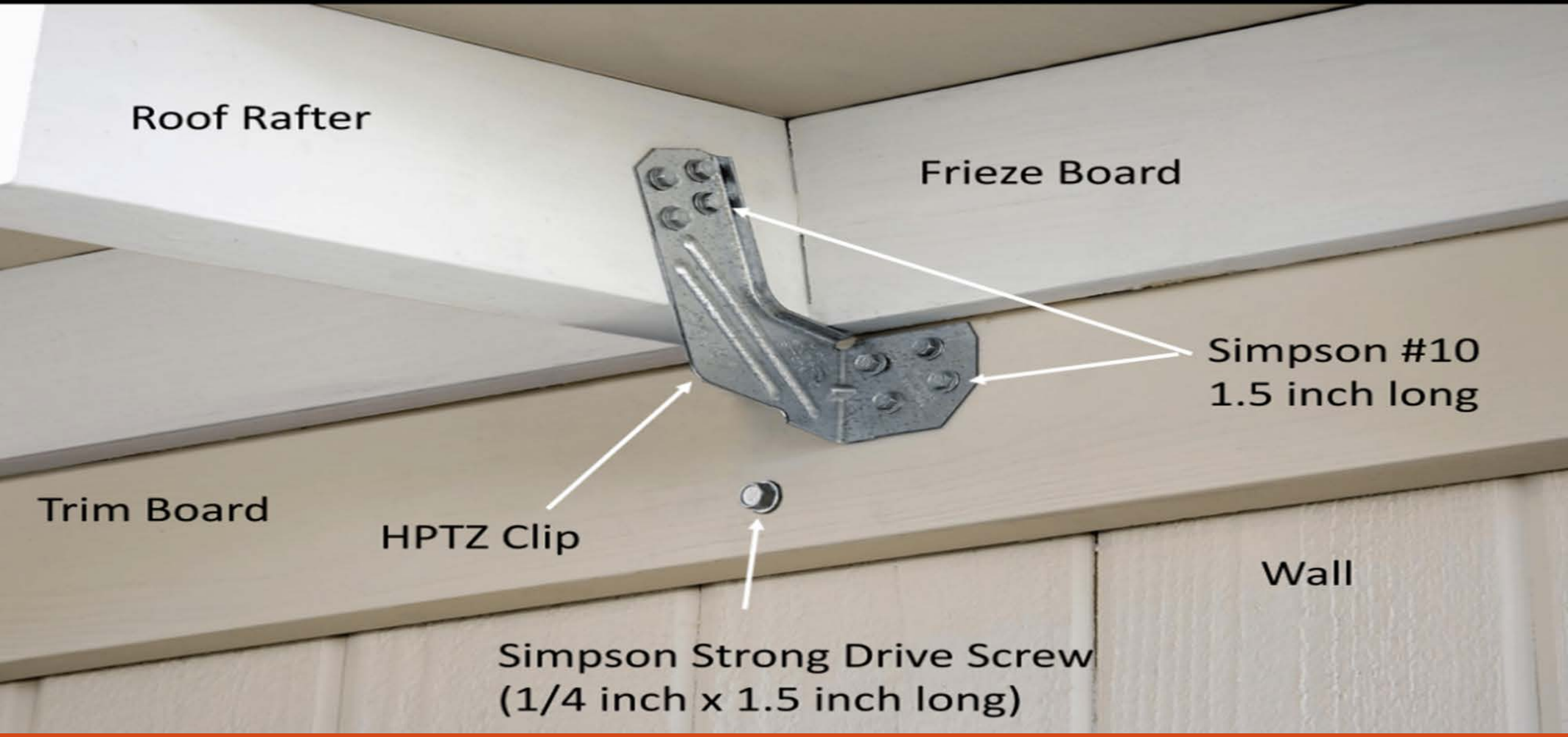


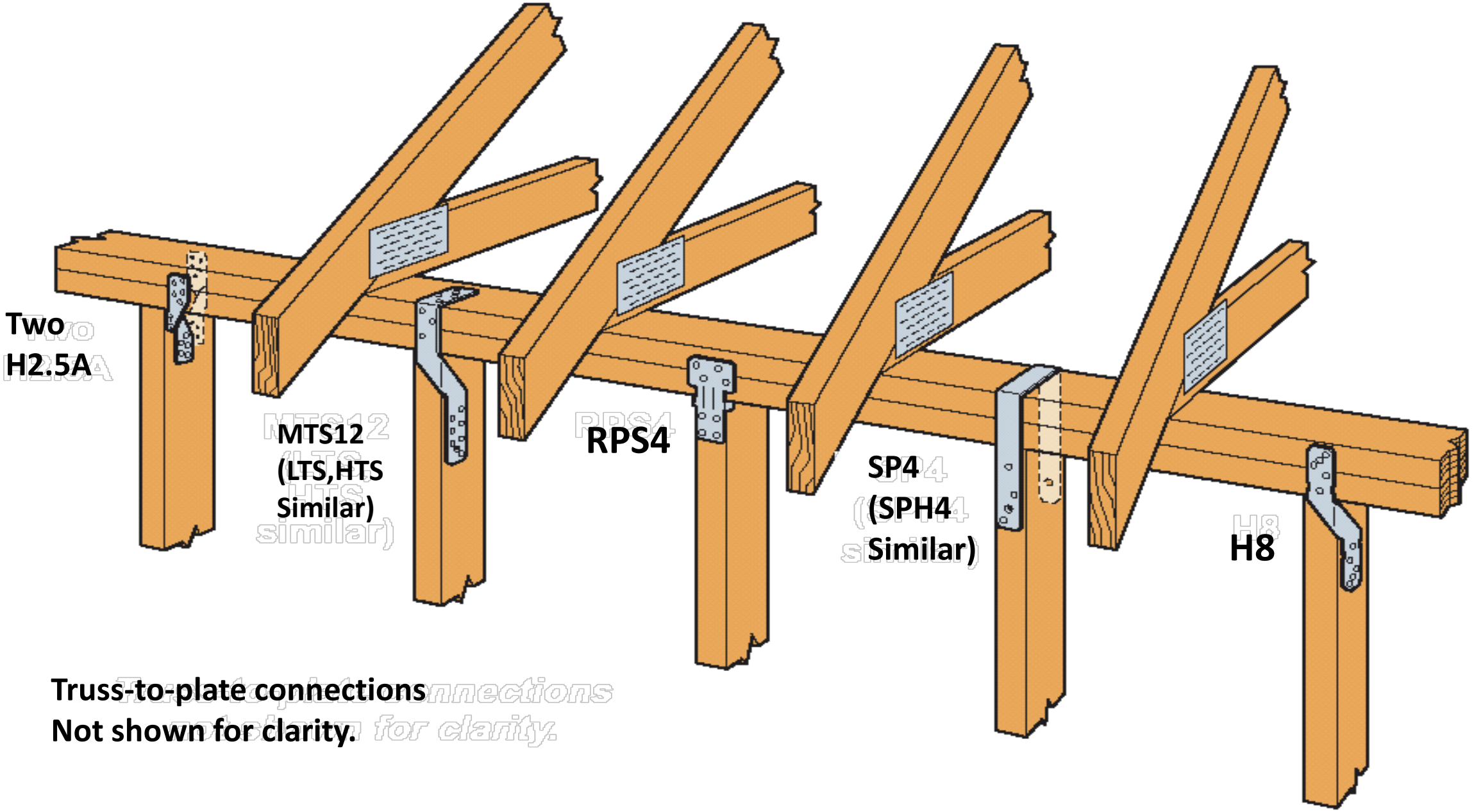

*Figure 3.1-2: Example section of single wall framing*

# HPTZ Clip Installation

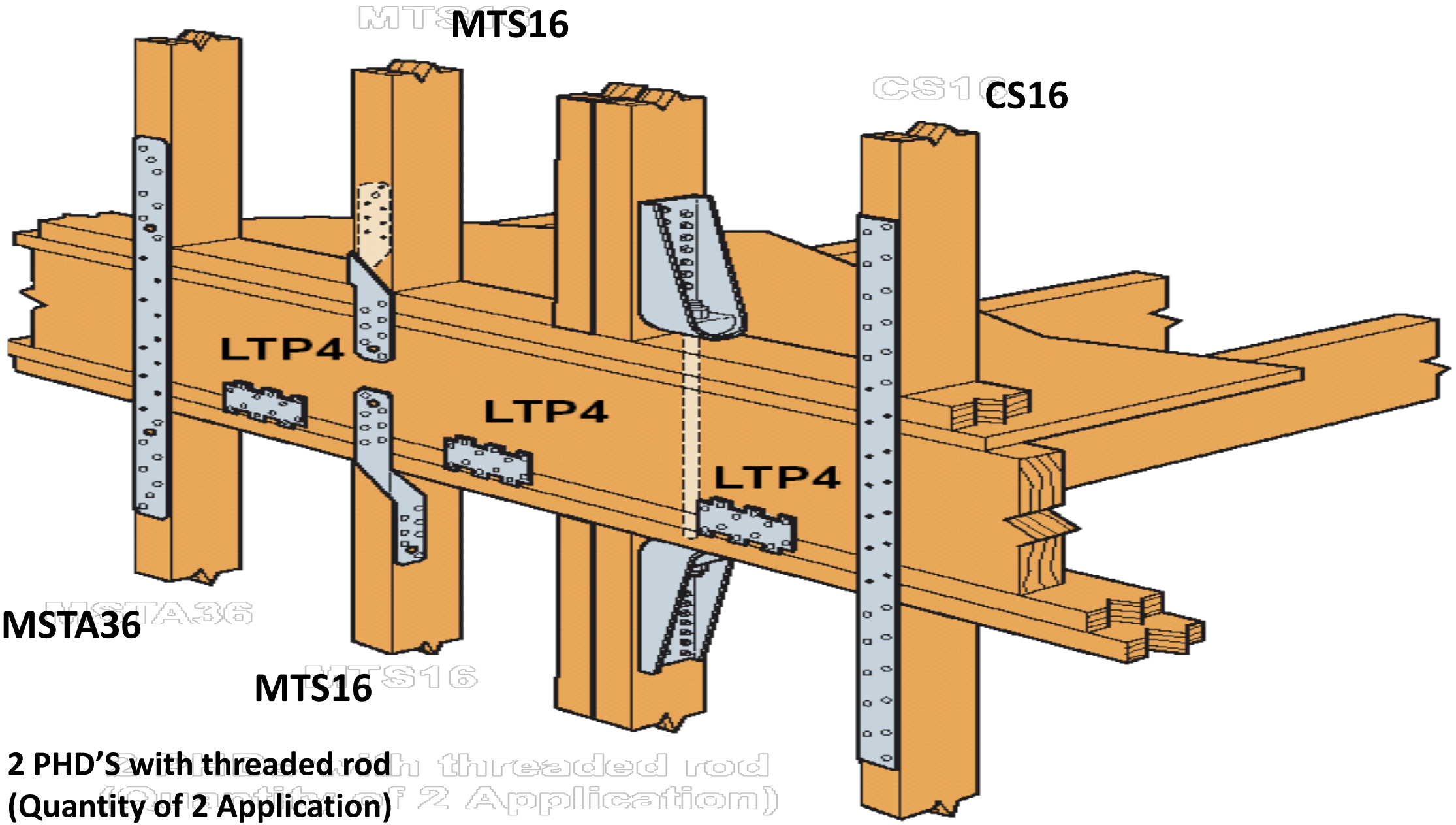



Hurricane Clip
with 4 nails on
top tab and 2 on
bottom.


Structural Screw (in testing) Purposely misses rafter to show that you can go from top plate to rafter.
Can fortify the hurricane clip or take place when missing.




Truss-to-plate connections
Not shown for clarity.




2 PHD'S with threaded rod
(Quantity of 2 Application)

# Double Wall Construction

The ‘double wall’ term comes from the fact that the walls are framed with exterior sheathing on the outside and drywall on the inside.

The sheathing may be plywood but is more commonly manufactured siding.

This construction method differs from single wall construction in the use of sheathing on the walls instead of the “single” T&G planks without any studs.

The wall studs are framed between the exterior sheathing and drywall and provide higher out-of-plane bending capacity compared to single wall homes.

Double wall houses also have much stronger shear walls and floor diaphragms, which are essential in providing stability.

The foundation typically is a slab-on-grade system that allows for anchor bolts, metal straps, and holddowns to be installed.

This provides far greater uplift capacity compared to single wall homes.

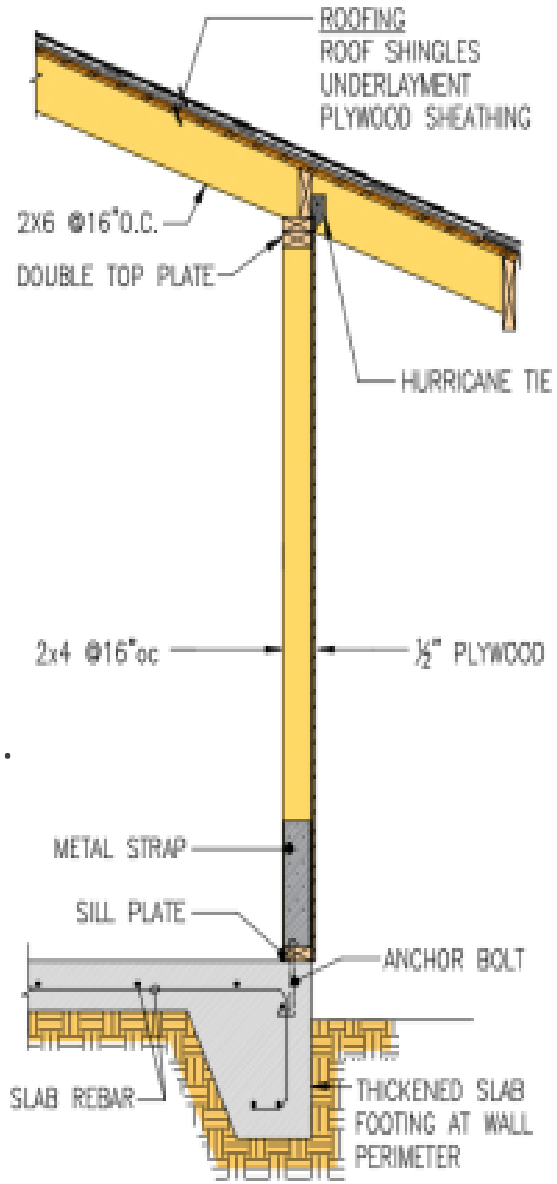
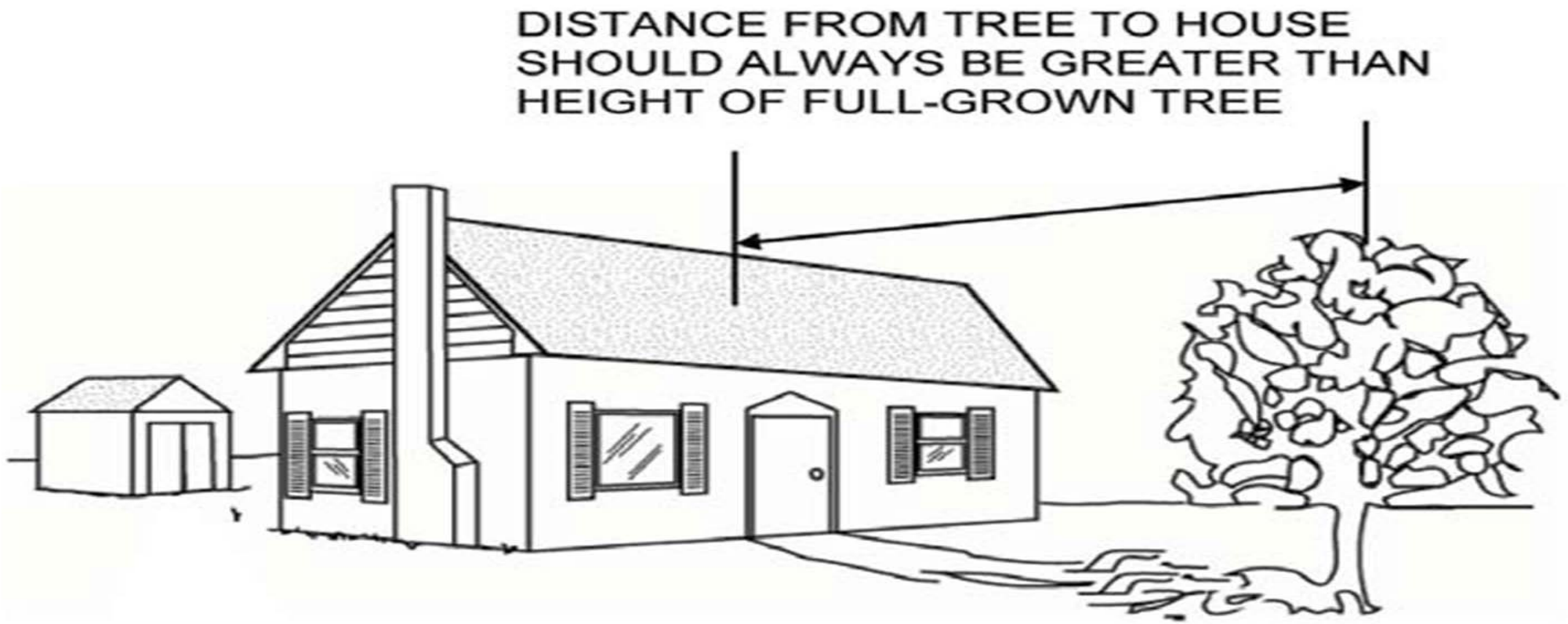



*Figure 3.1-3: Example section of double wall framing*

# How to Prevent Tree Damage



# Contractor or Handyman

## CONTRACTOR

- **Training and experience**
- **Insurance**
  - Insurance is very important on any construction project mainly because any time there can be – accidents, falling objects, not to mention fire, vandalism, malicious mischief, and theft on building items.
- **Able to obtain required permits**
  - Licensed contractors are able to apply for and obtain building permits.
- **Contractors Recovery Fund**
  - The Contractors Recovery Fund is only available to consumers who have hired a licensed general contractor.

## HANDYMAN

- Only for minor home repairs that will cost below $1,500
- Without contractor's license, handymen who do projects that are (1) over $1,500, or (2) require a building, electrical or plumbing permit, are engaged in unlicensed contracting.
- Regardless of the cost of your project, you may still want to consider hiring a licensed person.


Source: DCCA

## Hurricane resistant product vendors on Oahu

| Company Name | Website | Telephone | Product |
|---|---|---|---|
| 1 Stop Window and Doors | http://www.onestopwindowsanddoors.com/ | 808-550-2402 | Windows and doors |
| Ace Security Laminates | http://usace.com/products/ | 808-548-3400 | Window film |
| All Island Rollshutter LLC | http://allislandrollshutter.com/ | 808-833-3355 | Panel, shutter, screen |
| Be Ready Hawaii | http://www.bereadyinchawaii.com/ | 808-678-8844 | Preparedness supplies |
| City Mill – various locations | http://www.citymill.com/ | -- | Simpson strong ties |
| Coastal Windows | http://www.coastalwindows.com/ | 808-676-0529 | Windows |
| Discount Windows, Doors & Cabinets | http://www.discountwindowshawaii.com/ | 808-673-6656 | Windows, doors |
| Hawaii Security Shutters | http://www.hawaiisecurityshutters.com/ | 808-422-0707 | Security shutters |
| Hawaii Sun Control, Inc | None found | 808-845-5553 | Window film |
| Home Depot – various locations | http://www.homedepot.com/ | -- | Simpson strong ties |
| Hurricane Defense Systems | http://www.hurricanedefenses.com/ | 808-534-1134 | Various |
| HPS Construction Services, Ltd | http://hpsconstructionservices.com/ | 808-847-4400 | Various |
| Industrial Hardware Hawaii | http://www.industrialhardwarehawaii.com/ | 808-839-9061 | Simpson Strong Ties |
| Lowes – various locations | http://www.lowes.com/ | -- | Various |
| Pella Window Store | http://www.pella.com/home/default.aspx | 808-841-3200 | Windows, doors |
| RMA Sales Co, Inc | http://www.rmasalesco.com/page1.aspx | 808-487-9041 | Various |
| Roll-a-Way | http://roll-a-way.com/ | 800-446-2500 | Panel, shutter, screen |
| Screens & Things | http://www.screensandthings.net/ | 808-748-3772 | Windows, doors |
| Simpson Strong-Tie | http://www.strongtie.com/# | -- | Retailer search |
| Storm Shield | http://www.stormshieldtornadoshelter.com/ | 877-575-3059 | Tornado/storm shelters |

## Hurricane awareness/preparedness websites:

| Organization | Website |
|---|---|
| National Weather Service hurricane center | http://www.nhc.noaa.gov/ |
| American Red Cross | http://www.redcross.org/prepare/disaster/hurricane |
| C&C of Honolulu printable hurricane brochure | http://www1.honolulu.gov/dem/hurricanemar2012.pdf |

The City and County of Honolulu does not recommend any specific vendor or product; this list is alphabetical and provided to you only as a resource guide. You should shop around and decide on your own which product / vendor suits your needs best. This is not intended to be a complete list; this is the best information we currently have. Leaving out any vendor from this list is purely unintentional and not meant to be a bad recommendation against them.

# RESOURCES

- Hurricane Preparedness Starts with Your Home
  https://www.dropbox.com/s/jzizvewlg9sjen8/Zephyr2019%20Long.pptx?dl=0#
- Homeowner's Handbook to Prepare for Natural Hazards Shelter-In-Place Instructions and Table
  http://seagrant.soest.hawaii.edu/wp-content/uploads/2019/05/shelter-in-place-graphic-and-instructions.pdf
- Guide to Hurricane Strengthening for Hawaii Single-Family Residences
  https://cca.hawaii.gov/ins/files/2016/01/Guide-to-Hurricane-Strengthening-of-Hawaii-Single-Family-Residences-Jan-2016.pdf
- Department of Commerce and Consumer Affairs
  http://cca.hawaii.gov/rico/

# Insurance for Historic Homes

PRESENTED BY: SUE SAVIO

# Three Basic Coverages

- **Property**

  Valuation –replacement cost

- **Hurricane**

  Follow property policy but can choose coverages

- **Flood**

  Limitations on limits

# Historic Homes – insurance issues

Historic homes are often divided into two categories: those built before 1945 and those built before 1900.

Those that were built before 1945 might have some unique features that could be expensive to replace with period materials. Those built before 1900 are almost certain to have a great deal of unique features, one-of-a-kind architecture and materials that can be very difficult to replace or restore.

Those who have a home built before 1945 might consider a typical homeowner policy with certain additional coverages.

Those whose homes were built before 1900 should consider a historic home policy that includes restoration coverage.

# Insurance Issues

You might find that purchasing a fixer-upper means a typical homeowners policy is enough; but after you have done a few years of restoration and renovation, that policy might no longer apply.

Keep in mind that you will probably pay more for historic coverage. According toInsure.com, industry professionals warn to expect a premium that is about 20 percent higher than standard policies. However, the replacement value of historic features could make this special insurance a very wise investment.

One final point: no matter how old your home is, some modern safety measures should be taken, and won't detract from the value of your home. Smoke detectors, sprinkler systems and the like can be installed in your home in a way that doesn't compromise the historical integrity, and these measures can save a nice chunk of change on your home insurance policy.

# Homeowners & Fire Policy

**Perils covered…**

Fire and lightning,

Wind & Hail

Explosion,

Vandalism, Riot or Civil Commotion,

Smoke,

Falling Objects & Aircraft Damage,

Vehicle Damage

Theft,

Water overflow (not flood form ocean, streams etc.

# Hurricane

Wind under the Homeowner/fire policy but **Hurricane** is usually a separate policy

Higher deductible –usually % of limit of coverage

Most have minimum deductible limits

Credit for hurricane clipping - roof to wall and wall to foundation

# Flood

Flood zones are areas that FEMA has assigned different degrees of flood risk to.

These areas are shown on the FIRM (Flood Insurance Rating Map).

A few of the common flood zones are: B, C, X, A, AO, V1-V30, VE, or V

Elevation Certificate

A certificate that validates the elevation of a structure or building in relation to the ground level. Elevation certificates are often requested for the NFIP and can be expensive.

# Flood

Most homeowners who **need flood insurance** buy it from the federal government's National Flood Insurance Program. But NFIP policies max out at $250,000.

For many that means buying:

A federal policy worth $250,000 and

An excess flood insurance policy for the additional coverage you need.

An excess flood policy mimics an NFIP policy.

# Flood rating

Based on:

Your home’s location, age, and flood zone.

How high your home is elevated.

Which way your building faces (the ocean or inland).

How much coverage your want to buy.

The distance from your home to the water.

The size of the deductible you’re willing to pay.

# Conclusion

Insurance is a necessity

Limits should be realistic for today's construction costs– Historic homes cost about 20% higher in premium and 25 to 30% higher in square footage replacement cost

Coverage should be comprehensive

And may you never need to use it.

# RESOURCES

- Insurance for Historic Homes by Marjorie Musick
https://www.insure.com/home-insurance/historic-homes.html

- Historic Home Insurance by Shannon Lee
http://www.oldhouseweb.com/blog/historic-home-insurance-not-your-usual-policy/

- Historic Home Insurance by Terry Sheridan –
https://www.bankrate.com/finance/insurance/historic-home-insurance.aspx