

Truss Training – Basics Level 100

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March 2019

Agenda – Part 1

- 🏠 Overview of build day
- 🏠 Safety & quality
- 🏠 Organization & tools
- 🏠 Truss layout
- 🏠 Brace preparation
- 🏠 Marking truss overhang

Agenda – Part 2

- 🏠 Staging trusses
- 🏠 Loading trusses
- 🏠 Setting back gable truss
- 🏠 Setting common trusses

Agenda – Advanced Overview

- 🏠 Hurricane ties
- 🏠 Interior permanent bracing
- 🏠 Rat runs
- 🏠 Setting front gable truss
- 🏠 Setting front porch trusses
- 🏠 Sub-fascia
- 🏠 HUGs

Reminder...

DAHFH Construction Staff may ask volunteers to vary from the practices included in the Construction Manual due to a change in materials, procedures, or other special circumstances.

Ready for trusses



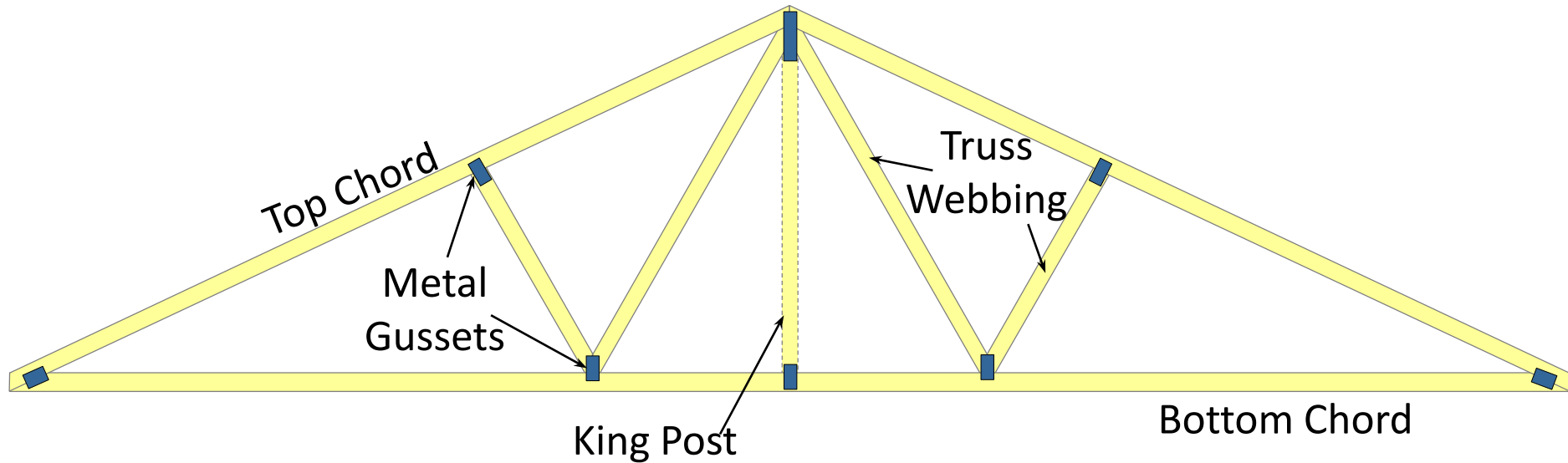
Delivered trusses



Truss type ID tag



Common truss components



Vision for the end of the day



Overview of build day

- 🏠 Preparation
- 🏠 Trusses are a team effort
- 🏠 Repeatable processes
- 🏠 Serial & parallel tasks
- 🏠 Say thanks

Safety & Quality

🏠 Safety on the ground

- 🏠 Correct lifting and ladder use

- 🏠 Spatial awareness

🏠 Safety on the top

- 🏠 Secure everything

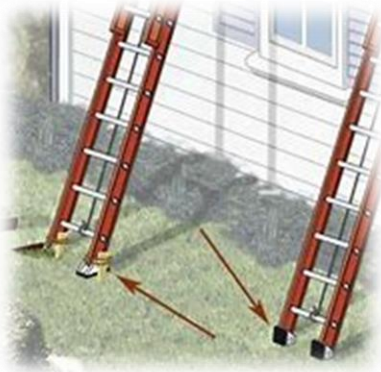
- 🏠 Constant communications

- 🏠 FPE (next slide)

🏠 Quality is a process

- 🏠 1/4 of an inch matters

Fall Protection



- 🏠 Must be used when working over 6'
- 🏠 HUGS best solution roof work
- 🏠 FPE harnessed trained personnel for truss setting
- 🏠 Ladders
 - 🏠 Do not lean A frame ladders – new ladders purchased are designed to lean
 - 🏠 Extension ladders – claws in dirt, pad on concrete
 - 🏠 Extend at least 3' beyond roof
 - 🏠 “tie off” at top to prevent slipping
 - 🏠 Do not carry shingles on ladders

Tools

🏠 Ladders



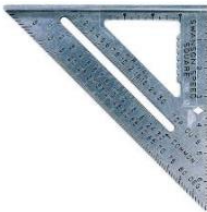
🏠 Tool belt, hammer & 12D nails



🏠 Tape measures & speed square



🏠 Hammer drill & screws



🏠 8 foot level



🏠 Push sticks

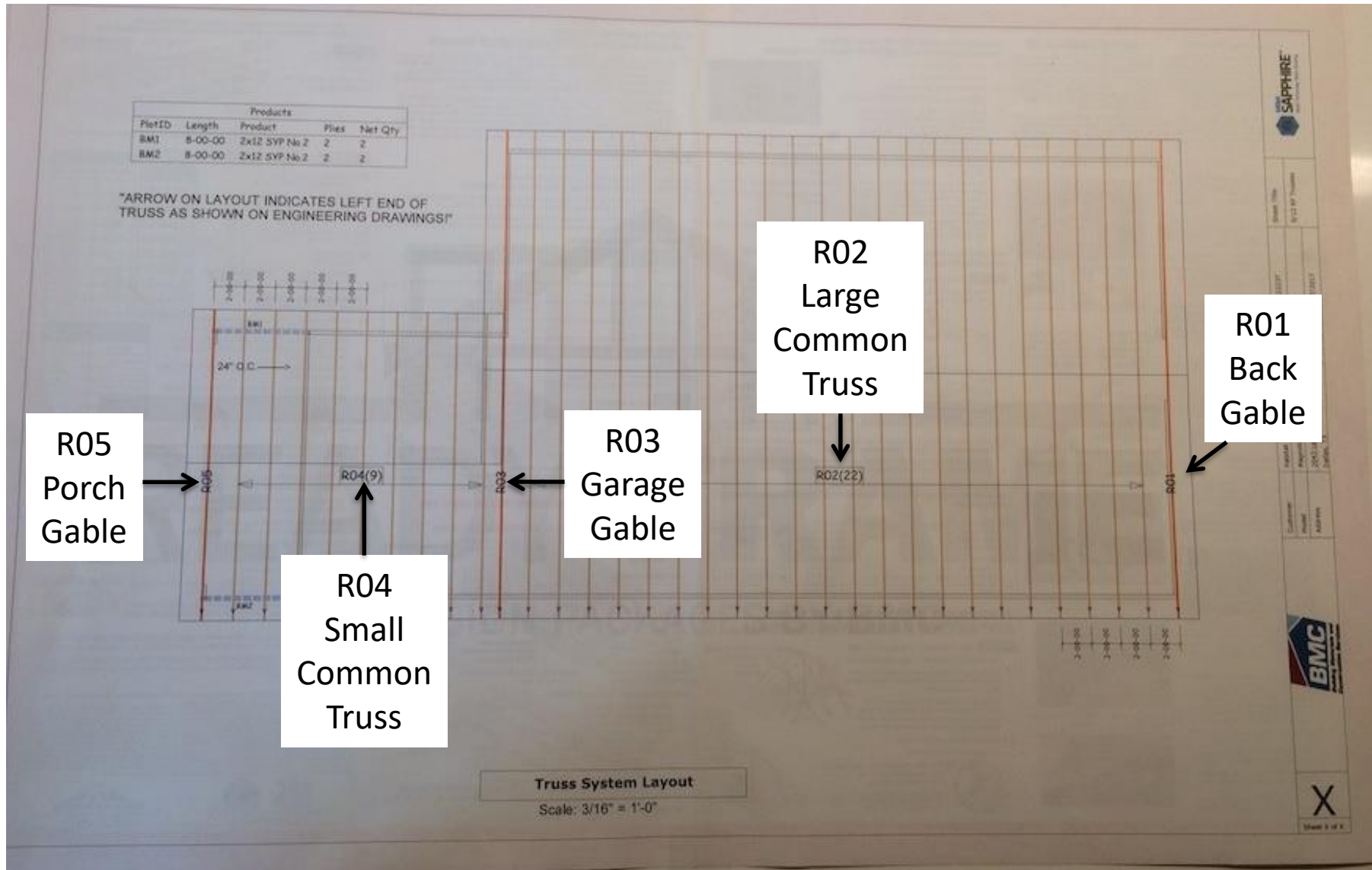


🏠 Clamps



Truss layout

- 🏠 Check wall bracing & alignment
- 🏠 Review truss plan
- 🏠 Use 100 foot tape for measurement
- 🏠 Working back to front
- 🏠 Working front to back
- 🏠 Marks visible & consistent
- 🏠 Snapping a line on the longer wall



Truss spacing

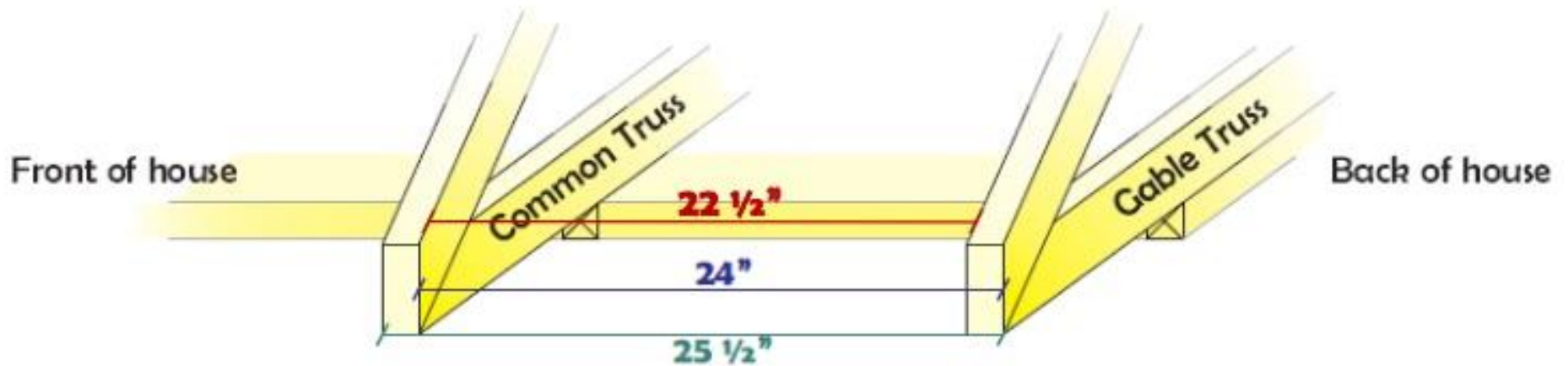


Figure 5-4

Tr



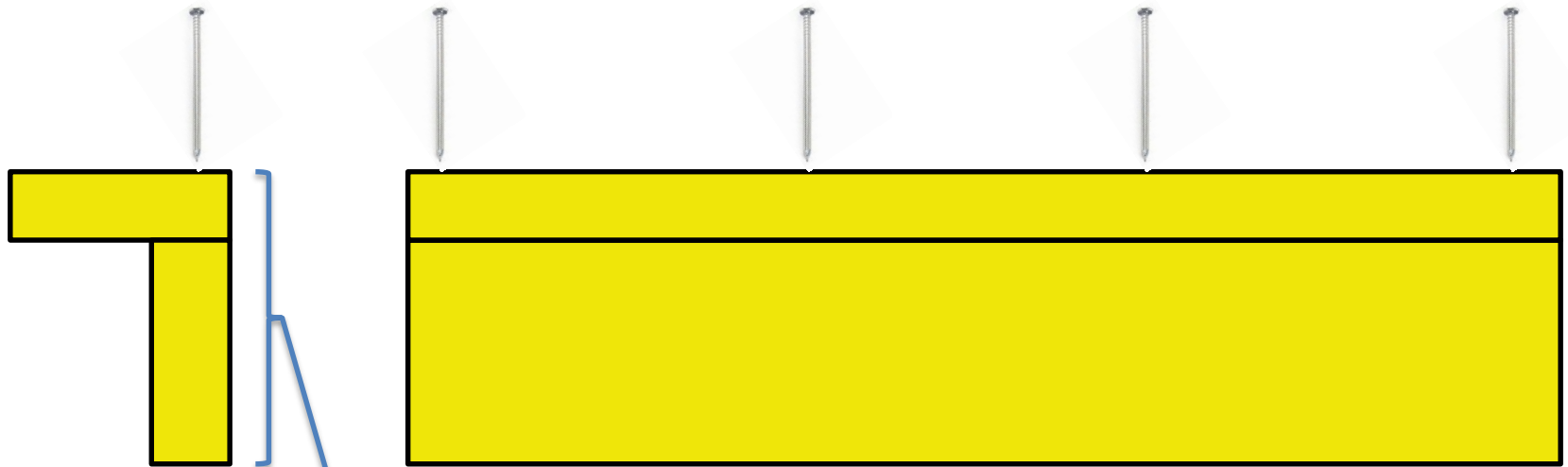
Truss alignment guide



Brace preparation

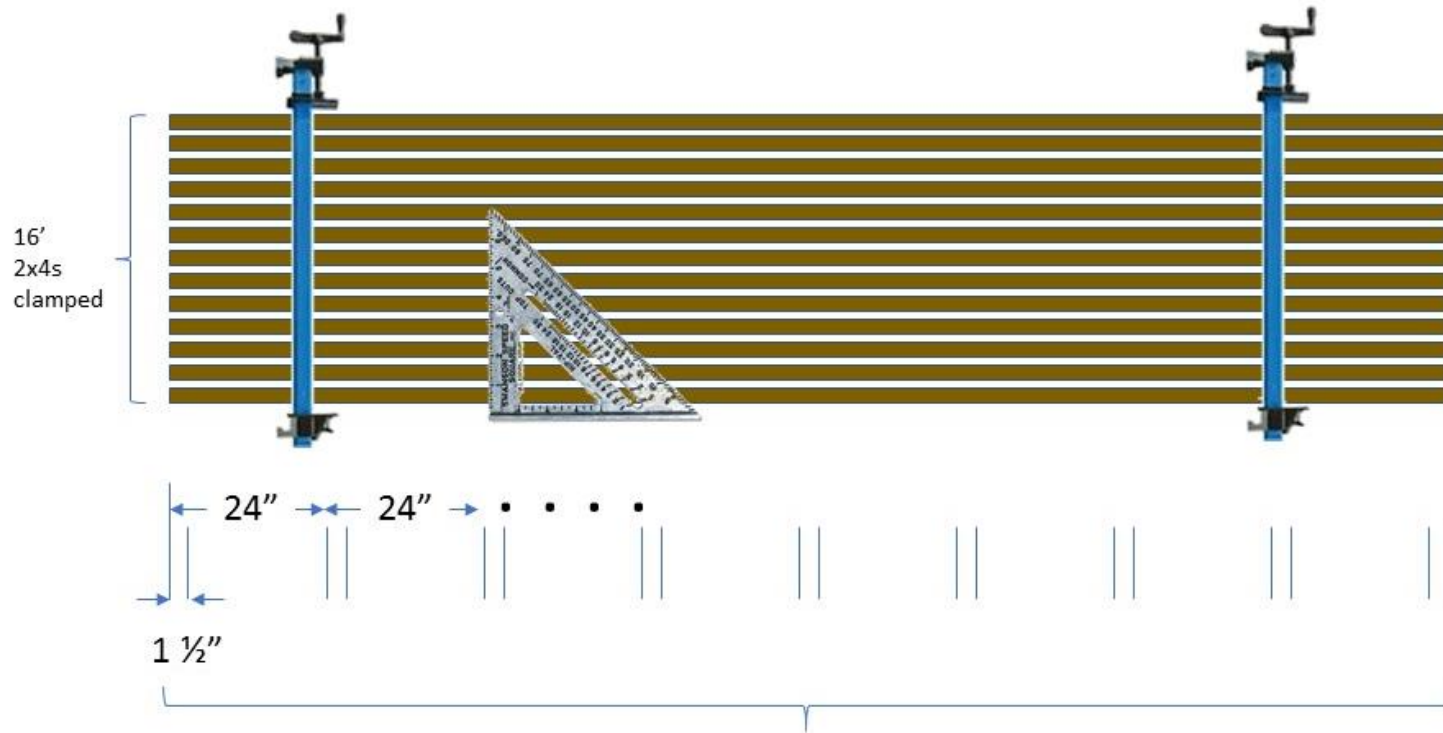
- 🏠 Complete while staging trusses
- 🏠 Strongbacks for back gable support
- 🏠 Marked 16 footers for lateral web bracing
- 🏠 Marked 16 foot CA corners for rat runs
- 🏠 8 foot CA corners for K-bracing support
- 🏠 T-blocks for temporary gable bracing

California Corner



Rest on truss bottom chord for Rat Runs and K" bracing

Temporary and Permanent Bracing Prep



Mark 1 1/2" lines on narrow side of clamped 2x4s every 24"
(use large speed square or framing square for ease of marking)

Marking temporary/permanent lateral bracing



Marking trusses

🏠 Overhang

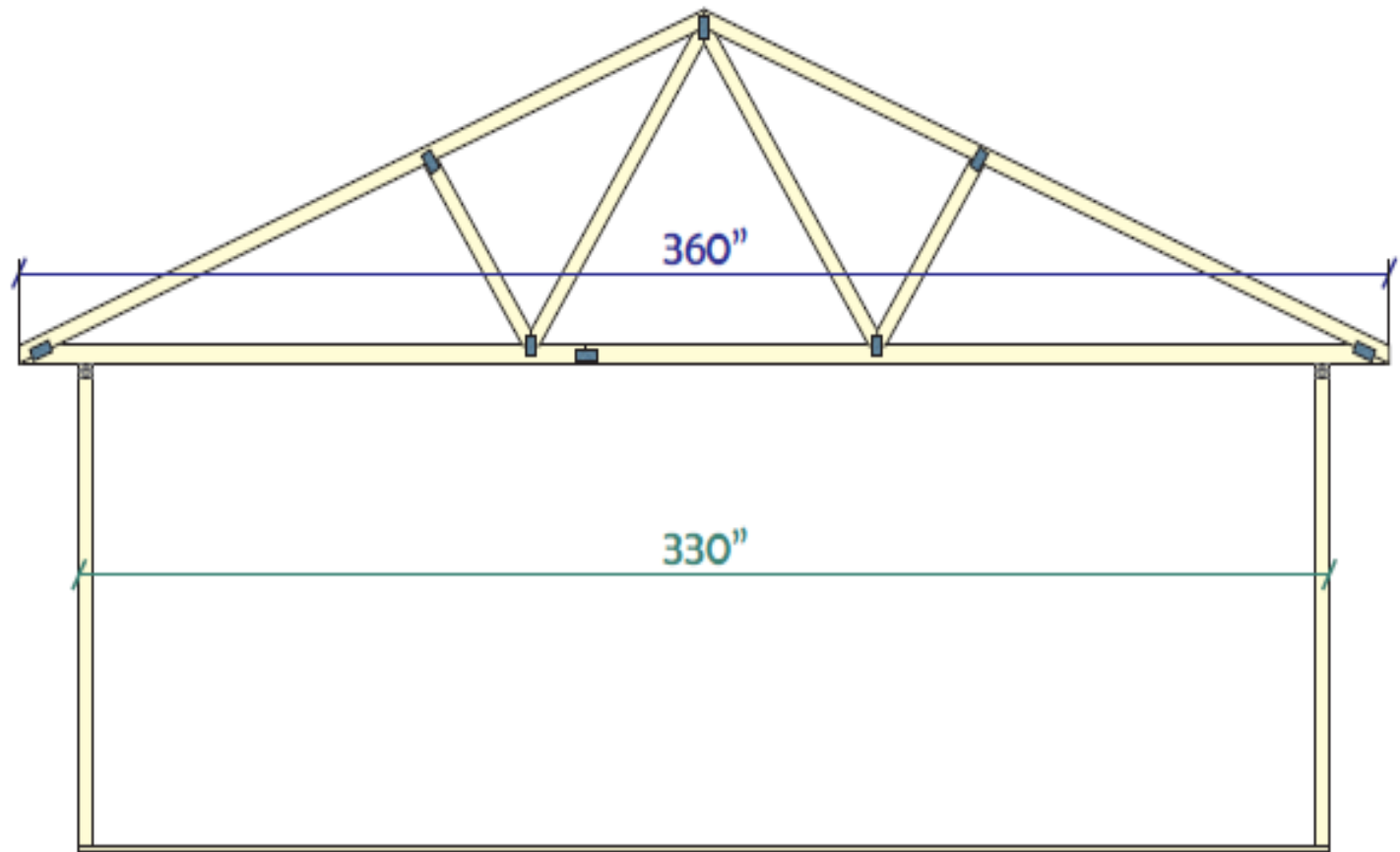
- 🏠 Purpose of truss marking
- 🏠 Calculation of overhangs
- 🏠 Markings and truss orientation
- 🏠 Flat Trinity style soffit

🏠 Lateral

- 🏠 Make a 9' mark on top chord (from bottom)

Figure 5-6

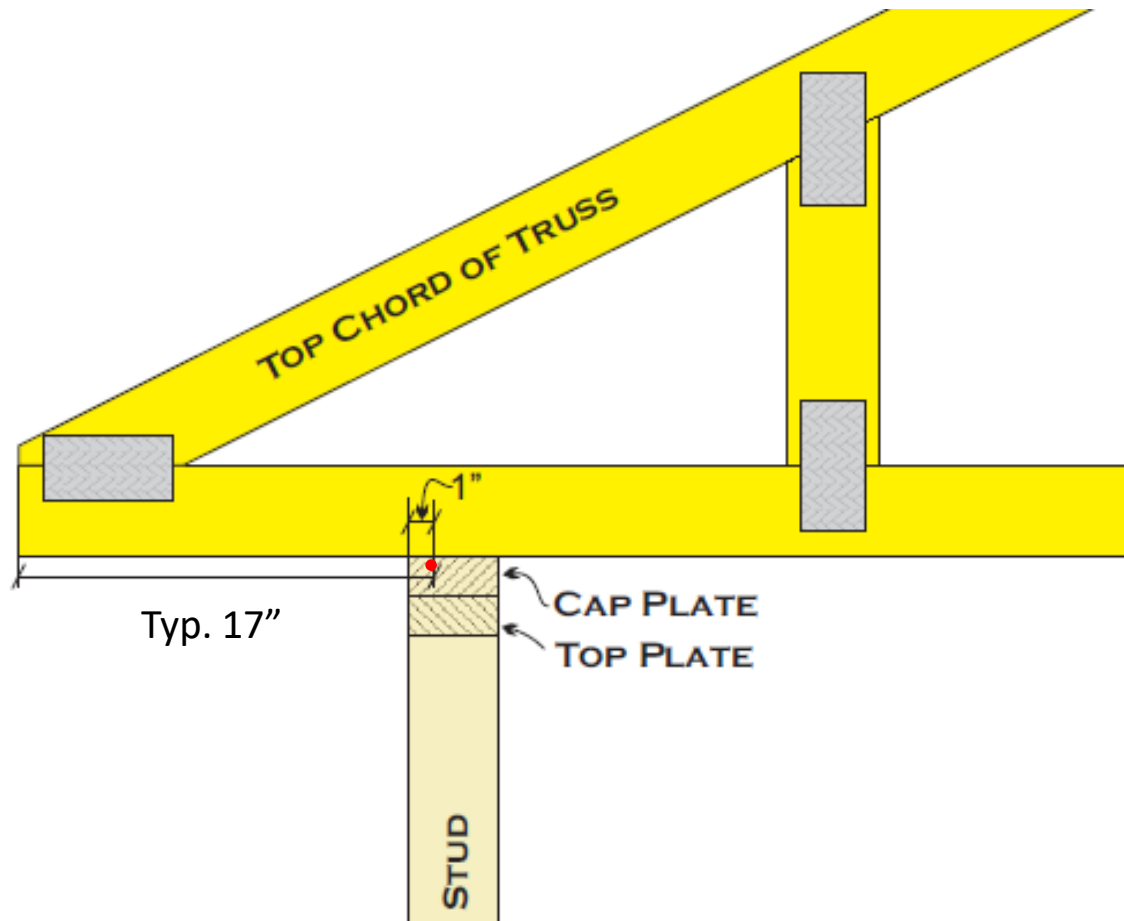
Calculation of flat truss overhang



Truss width
 - House width
 Total overhang
 ÷ 2
 Eave width
 + 1"
 Alignment mark

Figure 5-7

Marking flat truss overhang

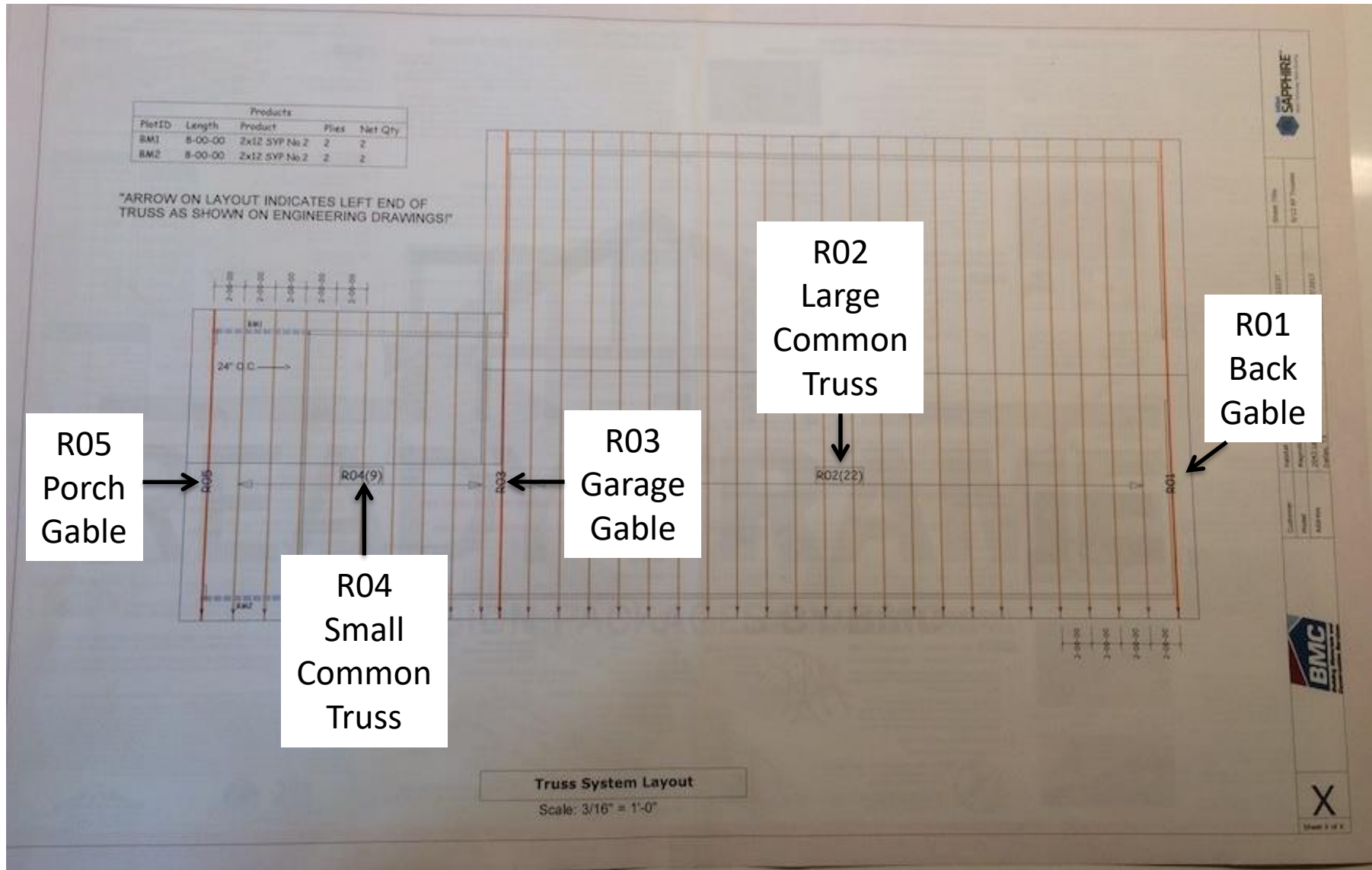


Staging trusses

- 🏠 Identify truss staging destinations
- 🏠 Use enough volunteers
- 🏠 Review lifting mechanics & flow
- 🏠 Sort trusses by type
- 🏠 Move trusses to staging locations

Staging trusses





Loading trusses

- 🏠 Assemble 3 teams
 - 🏠 Delivery, lifting, pushing
- 🏠 Arranging step ladders for loading
- 🏠 Order / orientation of truss loading
 - 🏠 Back gable is last to load
 - 🏠 Not all trusses are symmetrical and must be loaded in correct orientation (check with staff)
- 🏠 Moving in synch
- 🏠 Prone truss placement

Loading trusses

Figure 5-11



Pushing trusses into place

Figure 5-11



Alternative Loading Process for Large Trusses



Step 1: Prepare the bracing to hold the trusses.



Step 2: Lay the truss on the bracing rails with the bottom cord resting in the "V" of the stakes

Alternative Loading Process for Large Trusses



Step 3: Using push sticks, push the trusses up the bracing



Step 4: As the top of the truss reaches the top of the wall, guide the truss along the wall for the volunteers

Trusses loaded

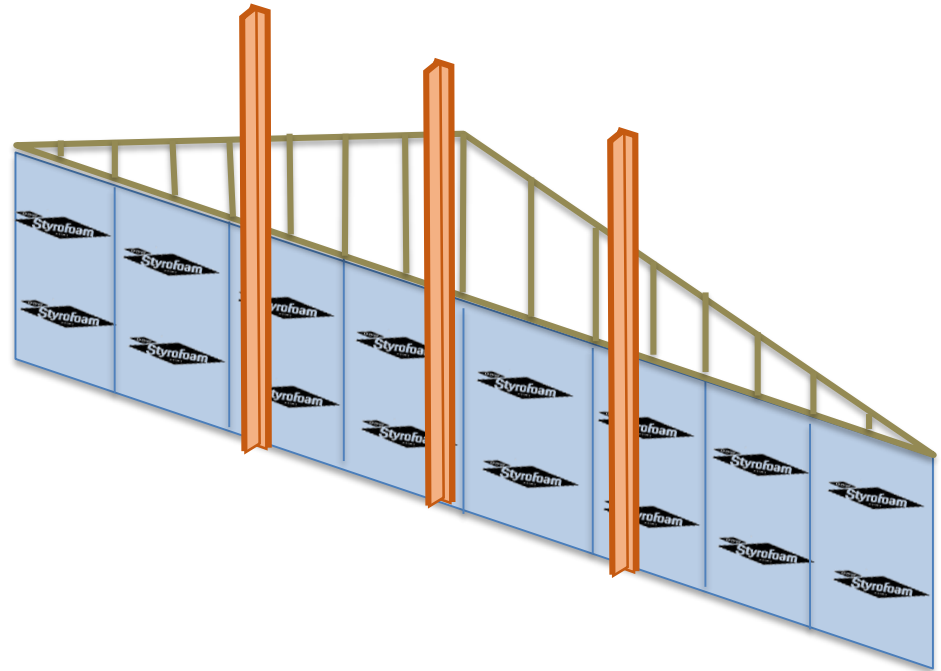


Setting back gable truss

- 🏠 Installation of strongbacks
- 🏠 Raising of gable into position
- 🏠 Placement with gable nailer
- 🏠 Overhang alignment
- 🏠 Bottom chord nailing pattern
- 🏠 Attach to strongbacks

Strongback and Gable Installation

- 🏠 Secure to wall studs with screws
- 🏠 Raise back gable
- 🏠 Use screws to attach gable to strongbacks



Setting common trusses

- 🏠 Assemble 4 teams

 - 🏠 Raising, wall attachment, top chord bracing and ground team

- 🏠 Temporary bracing inventory

- 🏠 Following the quarterback

- 🏠 Aligning in two dimensions

- 🏠 Bottom chord center set to 24" intervals

Setting common trusses



Secure
temporary
bracing
with
Duplex
nails

Securing common trusses to wall



Securing common trusses to wall



Figure 5-12

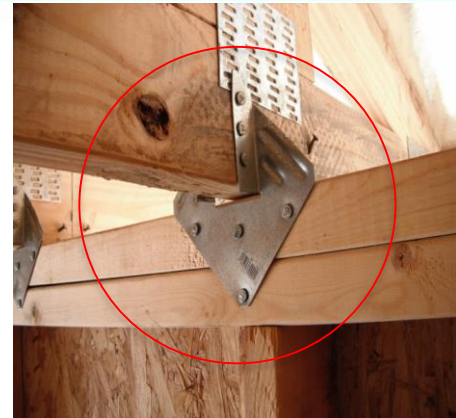
Common truss temporary braces



Agenda – Advanced Overview

- 🏠 Hurricane ties
- 🏠 Bracing Overview
- 🏠 Interior permanent bracing
- 🏠 Rat runs
- 🏠 Setting front gable truss
- 🏠 Setting front porch trusses
- 🏠 Ladder Panels
- 🏠 Subfascia
- 🏠 HUGs

Hurricane Ties



🏠 Purpose:

- 🏠 A connecting tie to provide structural load path to resist high winds

🏠 Installation

- 🏠 1 tie/truss installed to wall or porch beam with Simpson nails only

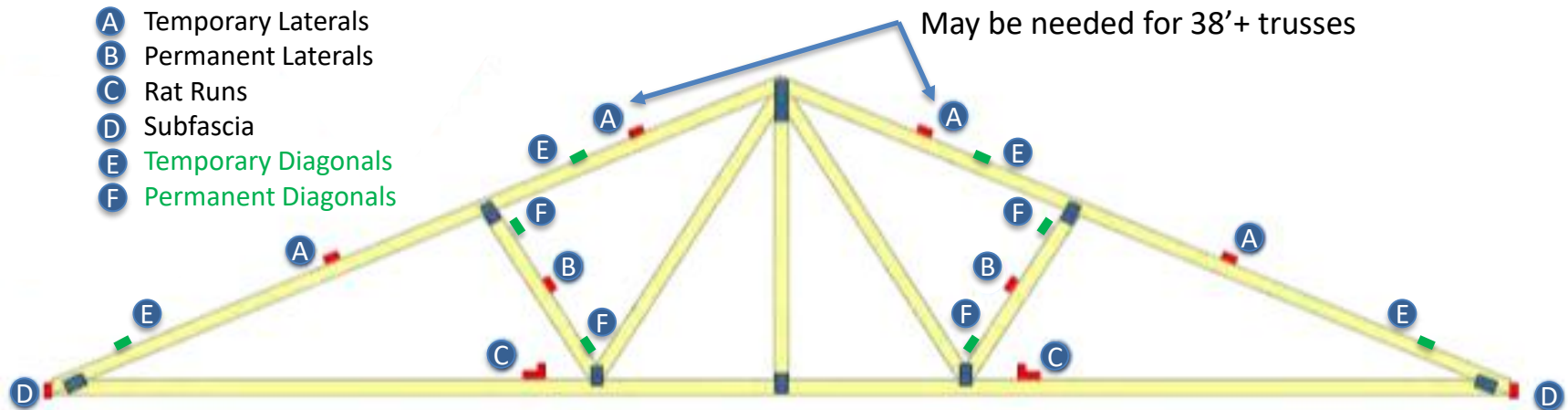
🏠 Check:

- 🏠 Vertical position (wall board issue), 10 nails and fully seated (not proud)

Truss Bracing Overview

🏠 Purpose

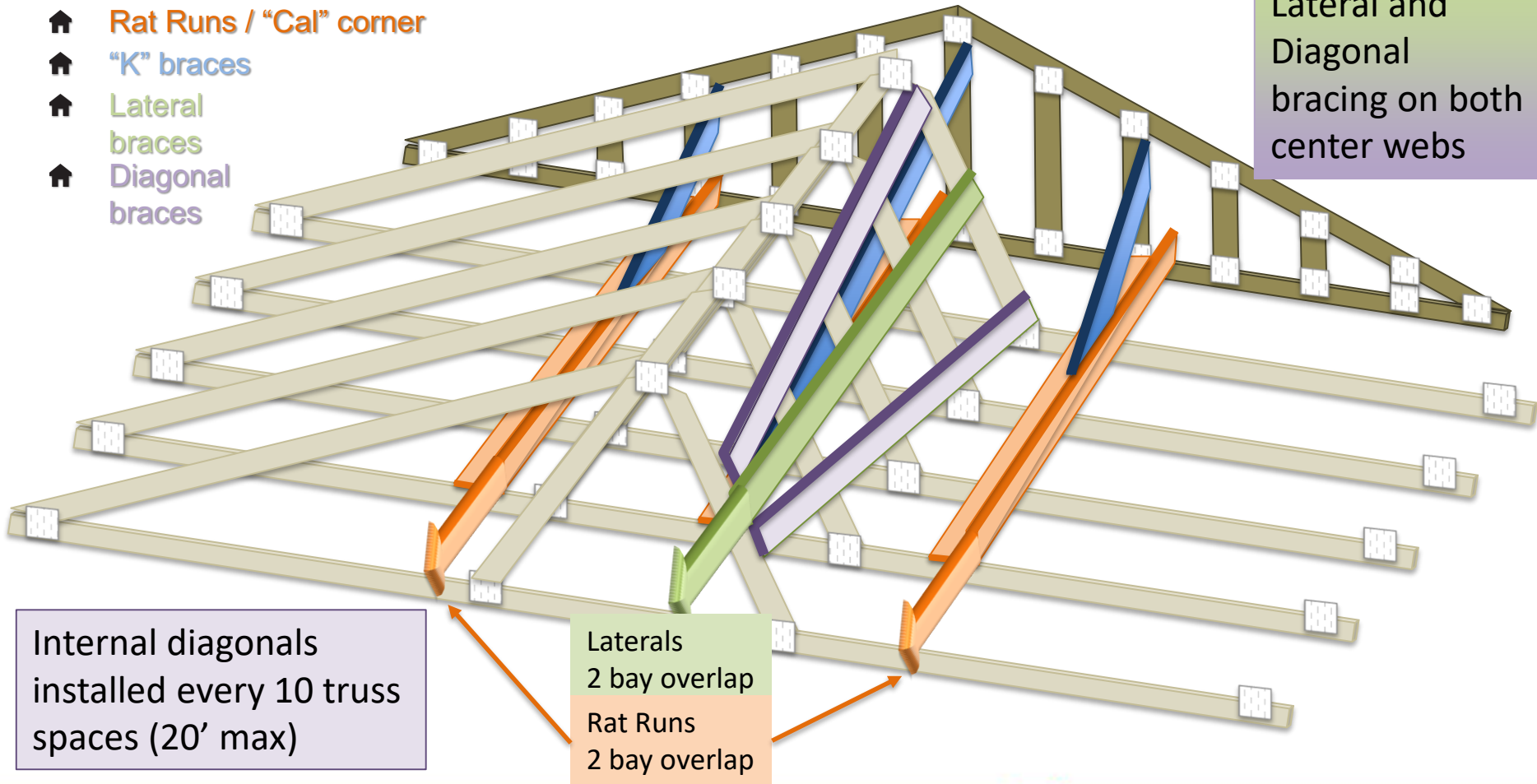
- 🏠 Temporary (external) and Permanent (internal) bracing to support truss location and provide stability against unintended forces / movement (e.g. gravity, wind, seismic, etc.) and secure for **FPE**
- 🏠 Internal K braces to provide lateral force support to gables
- 🏠 Lateral and Diagonal bracing shown below:



Internal Permanent Bracing

- 🏠 Rat Runs / "Cal" corner
- 🏠 "K" braces
- 🏠 Lateral braces
- 🏠 Diagonal braces

Lateral and
Diagonal
bracing on both
center webs



Interior Permanent Bracing

🏠 Purpose

- 🏠 Ensure trusses and roof structure won't rack when subjected to strong winds

- 🏠 2 types: Diagonal (K) and lateral

🏠 Installation

- 🏠 Diagonal (perform first)

- 🏠 Large gable trusses have 3 K braces (center, 4-6' left and right of center)
- 🏠 Attached typically to California corner or King Post (depends on house plan)

Figure 5-17



K Brace (Magnolia)
Figure 5-18

Interior Permanent Bracing

🏠 Installation (cont'd)

🏠 Lateral Bracing

- 🏠 Attached to truss interweb ~ 4' from bottom bottom chord.
Start on first common truss

🏠 Diagonal Bracing

- 🏠 Two 8' 2x4s (top / bottom) start on first common angled to lateral brace from the back. Repeat every 10 truss spaces. Front diagonals start on last common toward lateral

🏠 Check

- 🏠 K brace down 2" from peak to clear ladder panel
- 🏠 Braces adequately nailed (12d, fully seated)



Figure 5-20

Rat Runs

🏠 Purpose

- 🏠 Lateral bracing to bottom truss chord, aid drywall installation

🏠 Installation

- 🏠 Calif. Corner (typically 16') attached 1/3 from outside wall (most plans)
 - 🏠 Attach 3 runs 1/4th from outside wall (large floor plans – Hickory, Hawthorne)
- 🏠 24" O.C. with 3 truss overlap. Square against truss bottom chord (see next page)

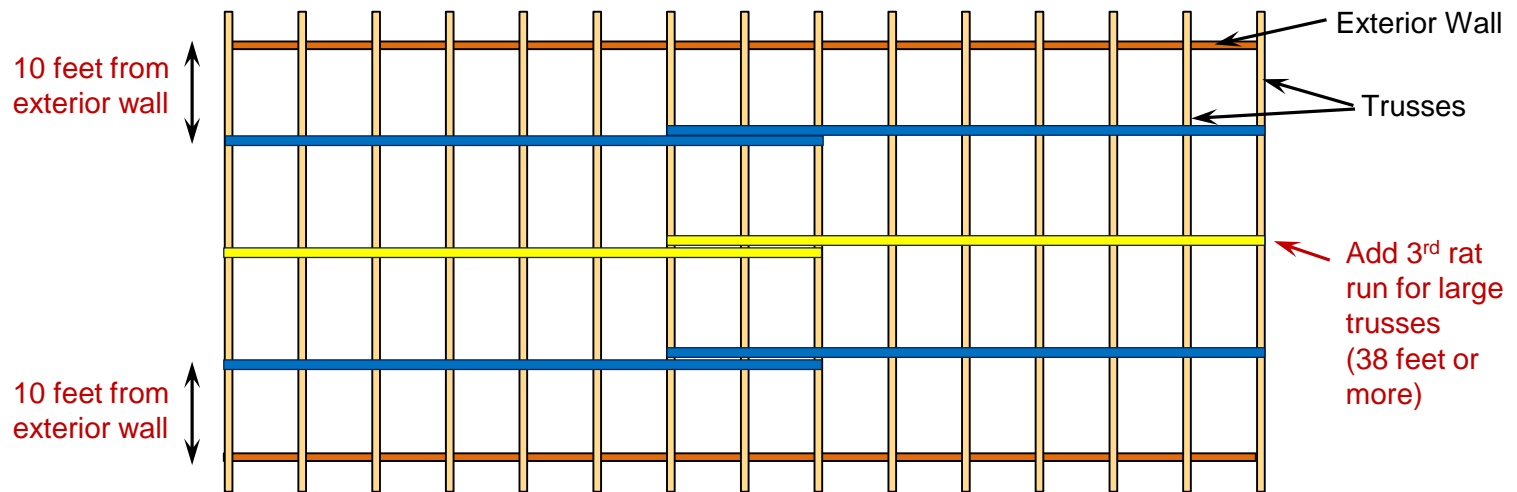
🏠 Check

- 🏠 2 nails per truss, spacing, overlay



Figure 5-20

Rat Run Layout



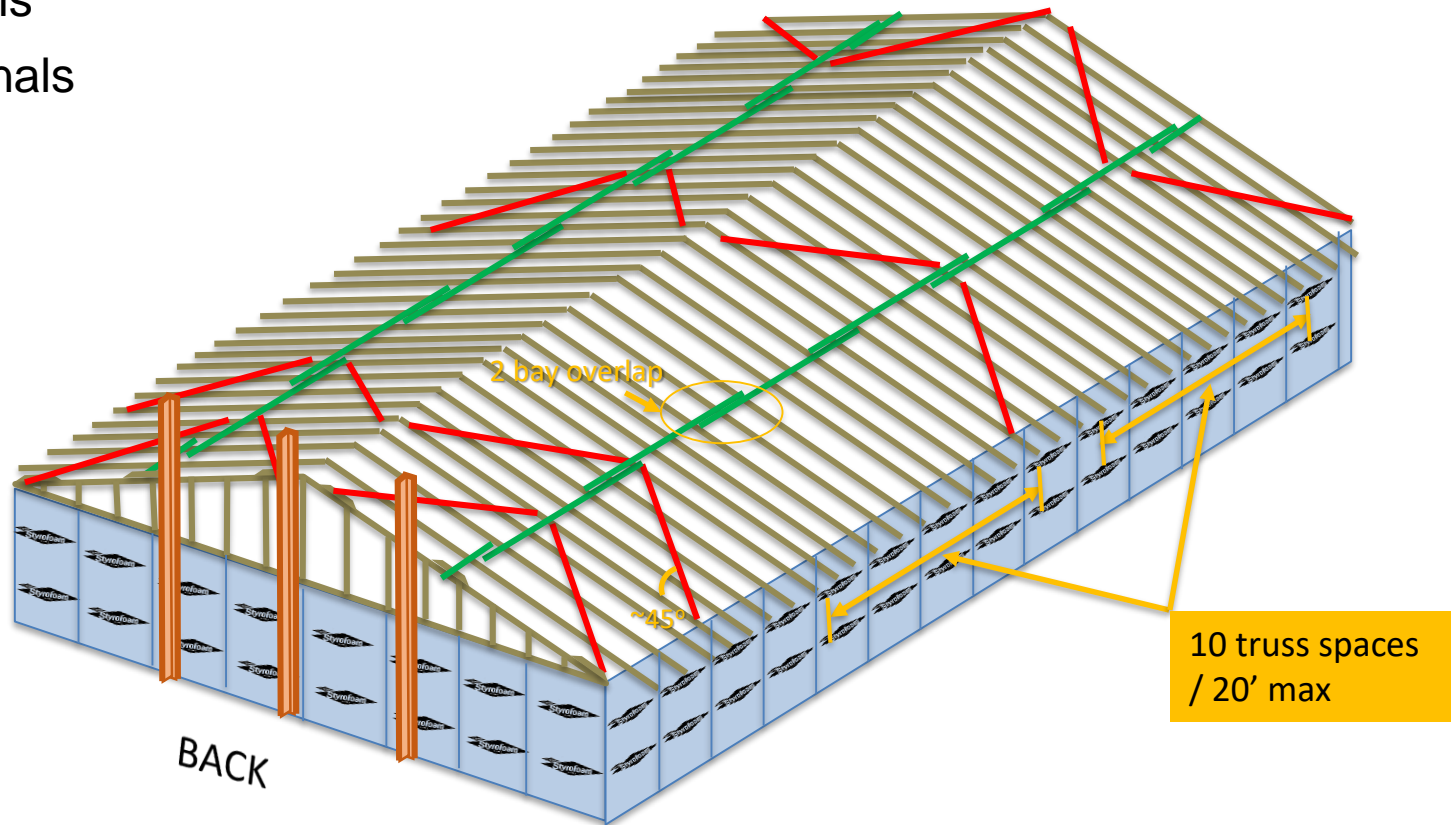
Smaller trusses (~30') = 2 Rat Runs @ $\frac{1}{3}$ spacing (e.g. Trinity & Magnolia)

Larger Trusses (~38') = 3 Rat Runs @ $\frac{1}{4}$ spacing (e.g. Hawthorne & Hickory)

} ~10' spacing

External Truss Bracing (FPE)

- 🏠 Strongbacks
- 🏠 Laterals
- 🏠 Diagonals



External Braced Trusses



Setting Front Gable Truss

🏠 Installation

- 🏠 Aligned with cap plate marker
- 🏠 Straight and “toe” nail pattern to cap/nailer
- 🏠 Temp lateral bracing with “T” spacer
- 🏠 Plumb and K brace (2-3)

🏠 Check

- 🏠 Check for plumb, 2-3 braces

Note: Front gable truss must rest on the front wall cap plate or porch beam. Truss layout adjusted accordingly.



Temporary lateral gable brace

🏠 Short 2X4 connecting gable to common truss



Setting Front Porch Truss

🏠 Installation

- 🏠 Truss aligned to common truss tails and “plane of the roof”. Ensure peaks are aligned
- 🏠 1st common porch truss used to mark deck nailer on front gable truss
- 🏠 Temp lateral bracing, plumb / brace King post

🏠 Check

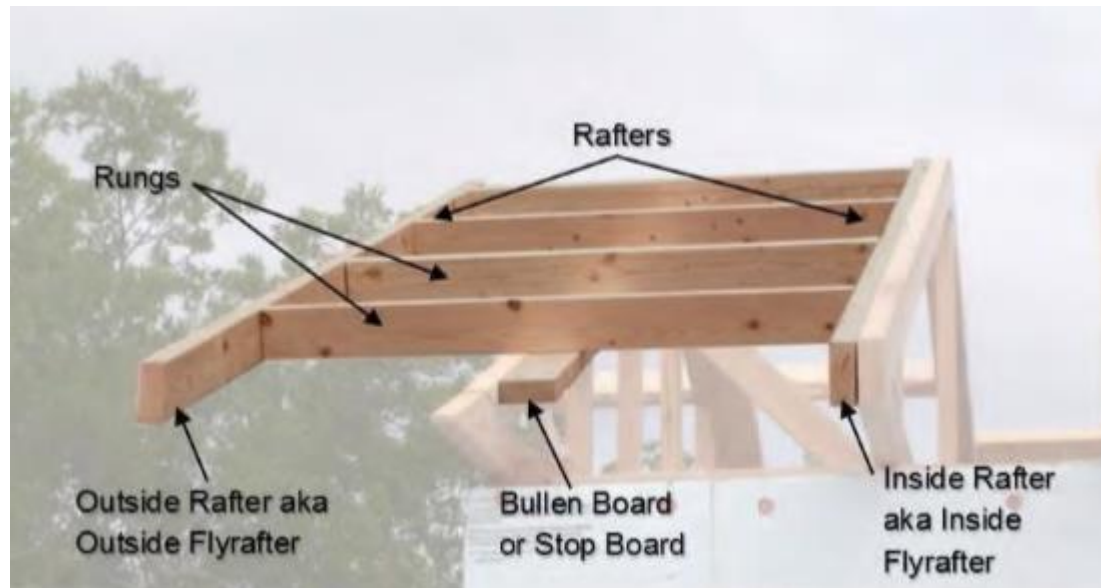
- 🏠 Gable for plumb and Rat Run bracing



Ladder Panels (aka Lookout Ladders)

🏠 Purpose

- 🏠 Provides strong overhang structure for the eave of the gables



Ladder Panels (aka Lookout Ladders)

🏠 Installation

- 🏠 Panels are premade on the ground consisting of two parallel rafters with rungs 24" O.C.
- 🏠 Panels connect to the first common truss and rest/secured on the gable truss
 - 🏠 Secured to gable via Bullen Board and Rung toenail
- 🏠 Panels are made (see advanced course) for gable left and right side installation

🏠 Check

- 🏠 Rungs, Bullen board and inside rafter are securely fastened, panel peaks meet and not offset

Subfascia

🏠 Purpose

- 🏠 Permanent truss tail bracing enabling fascia and soffit installation and support to the roof deck

🏠 Installation

- 🏠 2"x4" - 16' nailed (2) to truss tail positioned with speed square (see photo)
- 🏠 Must be straight down eave, shim/cut tails as required

🏠 Check

- 🏠 Straightness, joint/seam nailing

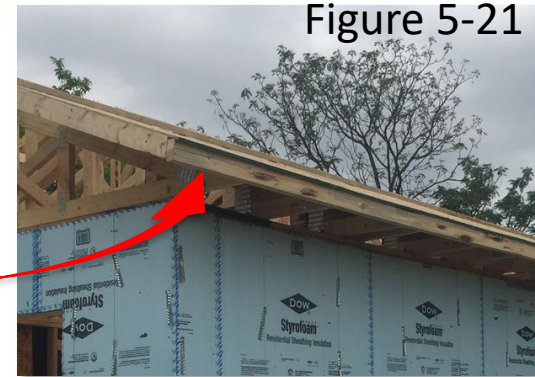
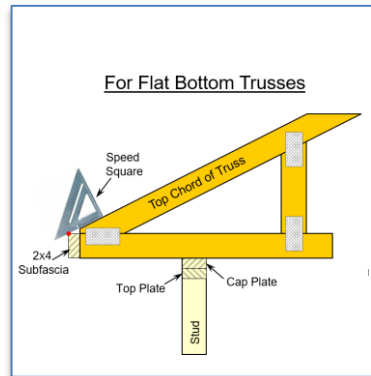


Figure 5-21

HUGs - this



not this



🏠 Purpose

- 🏠 Horizontal Under-Eave Guardrail System (HUGS)

- 🏠 Fall protection rail system enabling more freedom of movement

🏠 Caution:

- 🏠 Not to be used as a foot hold or leaned against

- 🏠 Ladders should be centered in open 8' section

HUGs - this



not this



🏠 Check

- 🏠 3 rows of safety rails around perimeter of the house

Truss team leadership elements

- 🏠 Trusses are a team effort
- 🏠 Drafting your teams
- 🏠 Finding your quarterbacks
- 🏠 Clearly explain tasks and context
- 🏠 Repeatable processes
- 🏠 Serial & parallel tasks
- 🏠 Say thanks

Questions?



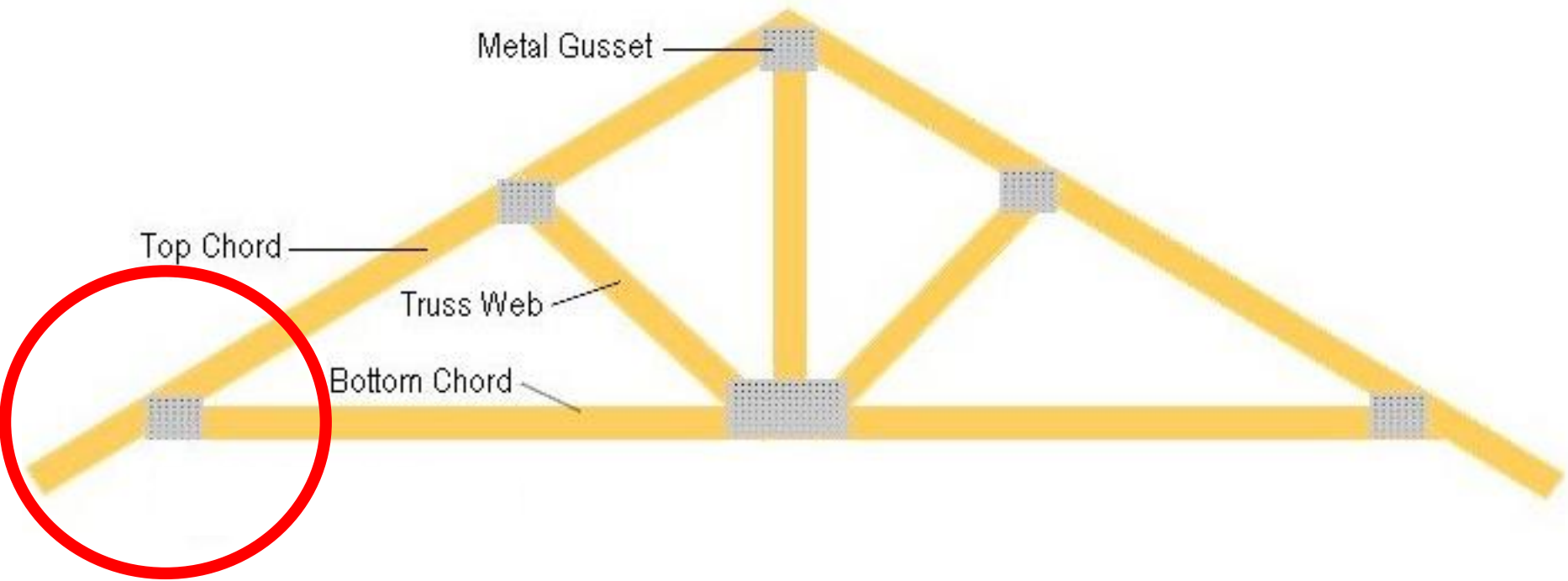
Thanks!

Mike Proch

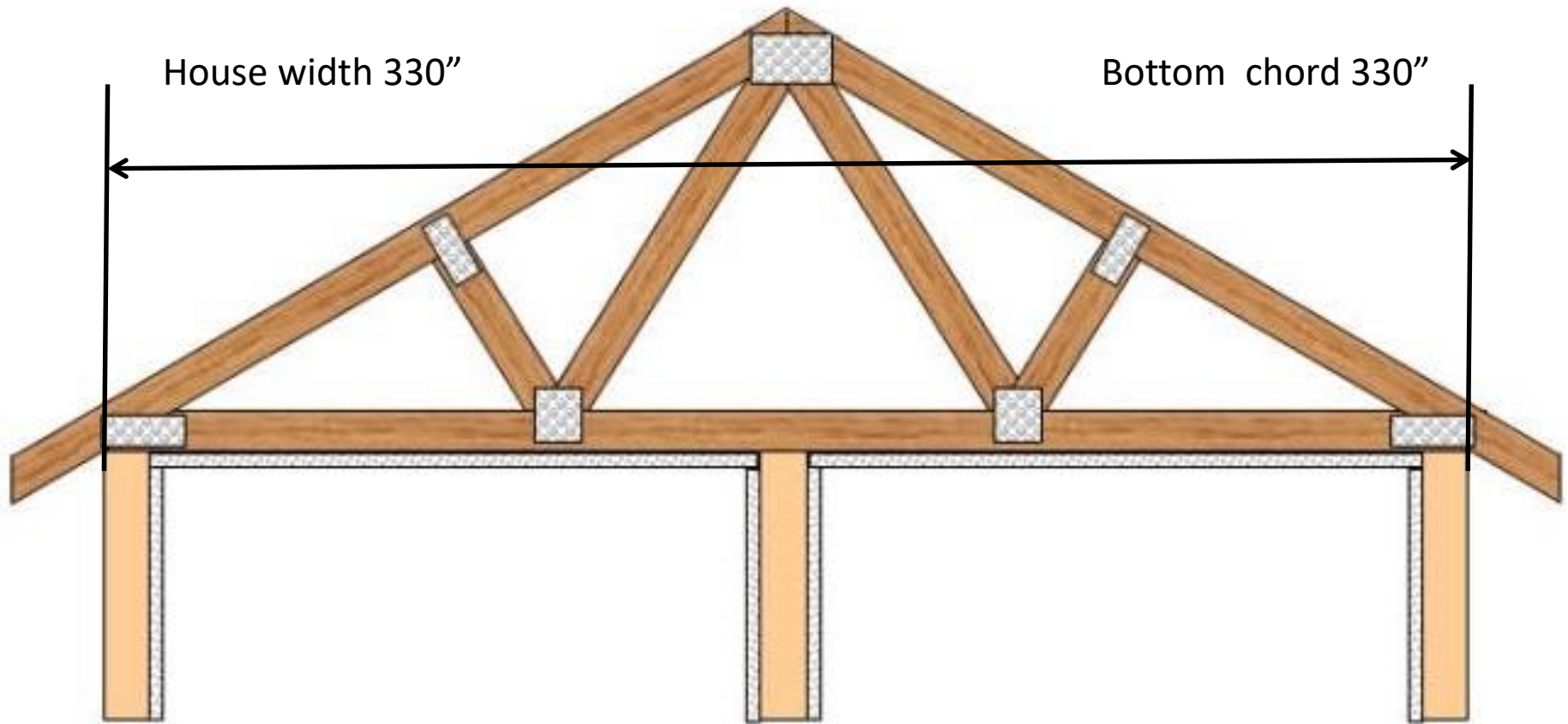
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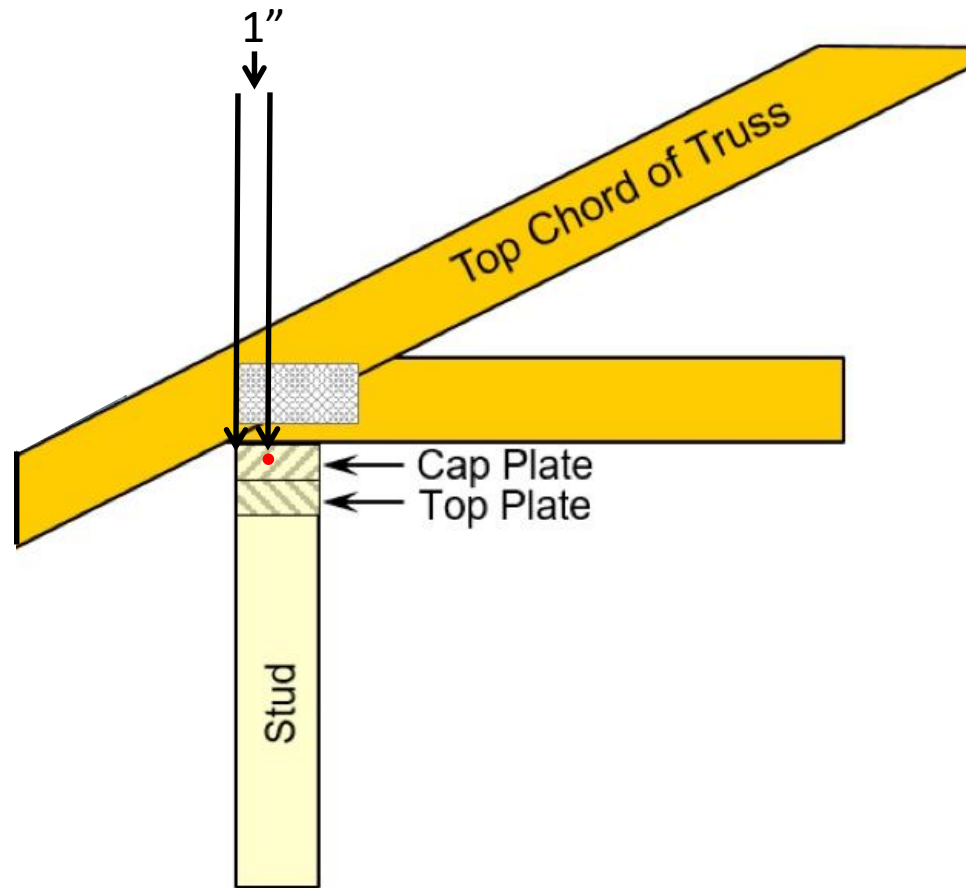
Slope tailed common truss



Slope tailed truss overhang



Marking slope tailed truss overhang



Marking slope tailed truss overhang

