

# Truss Training – Basics Level 100

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# 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



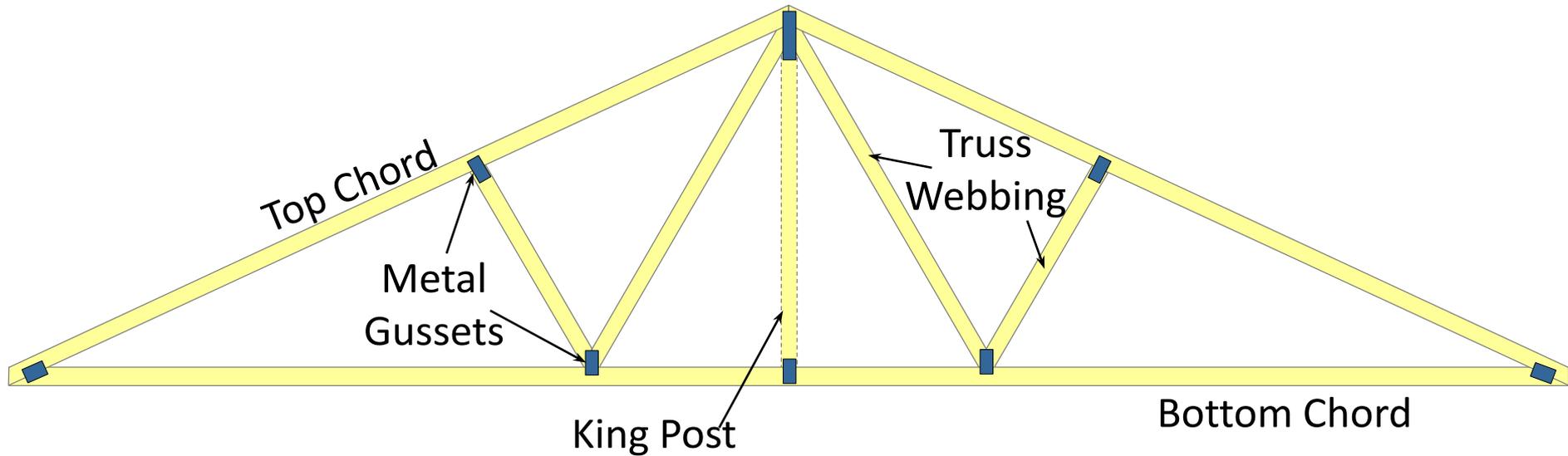
# Delivered trusses



# 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

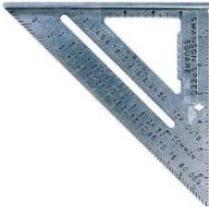
🏠 Ladders



🏠 Tool belt, hammer & 12D nails



🏠 Tape measures & speed square



🏠 Hammer drill & screws



🏠 8 foot level



🏠 Push sticks

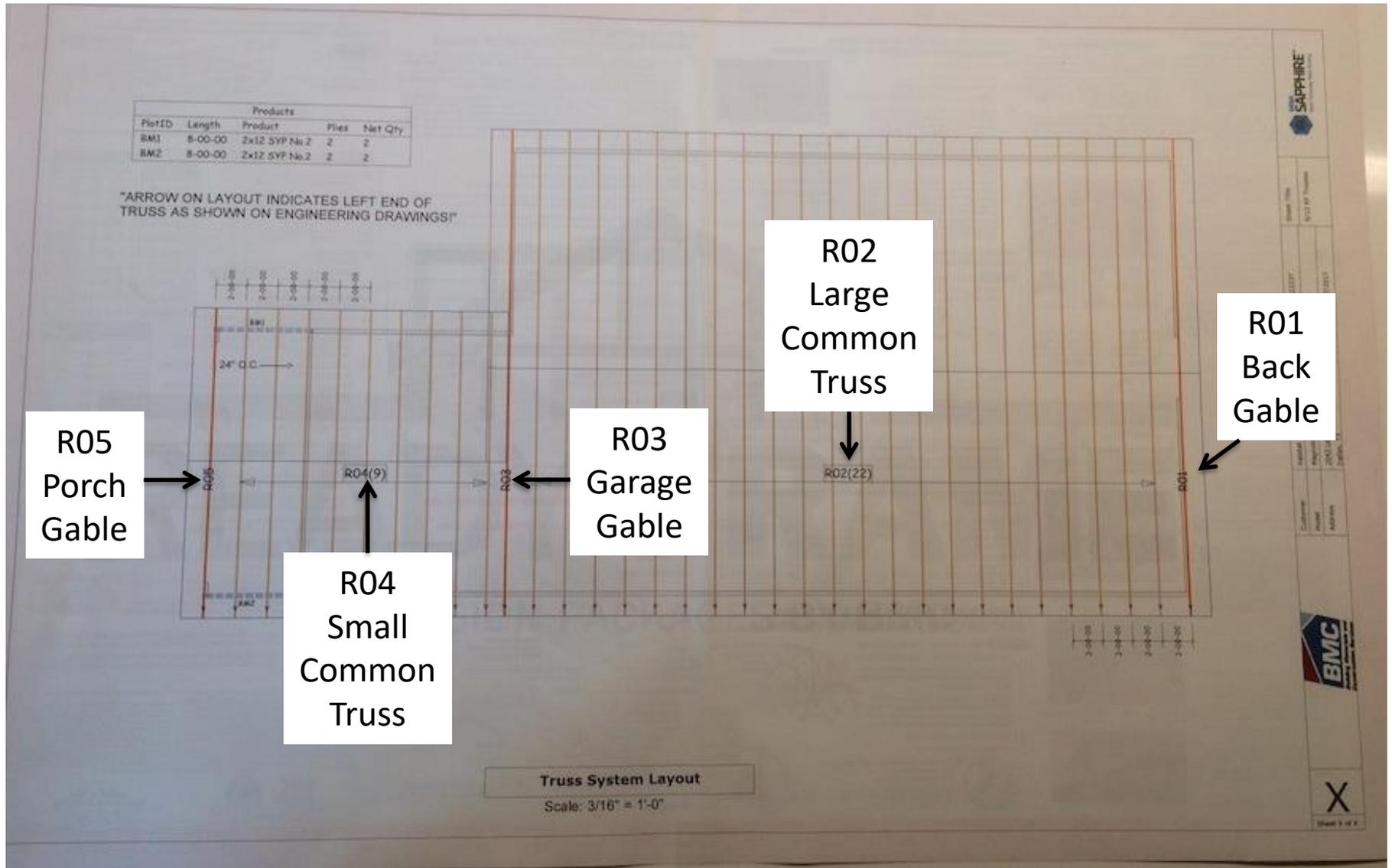


🏠 Clamps



# 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

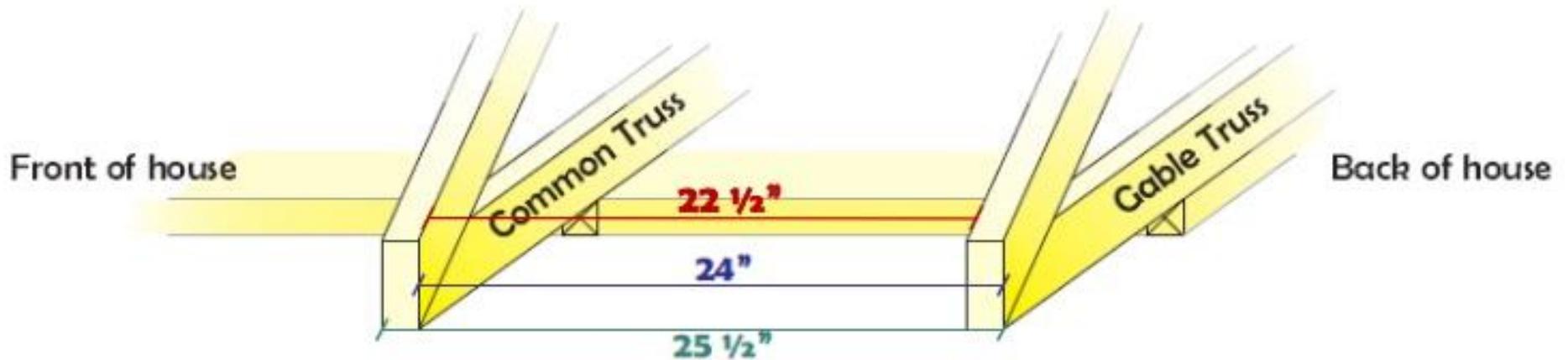


Figure 5-4

Tr



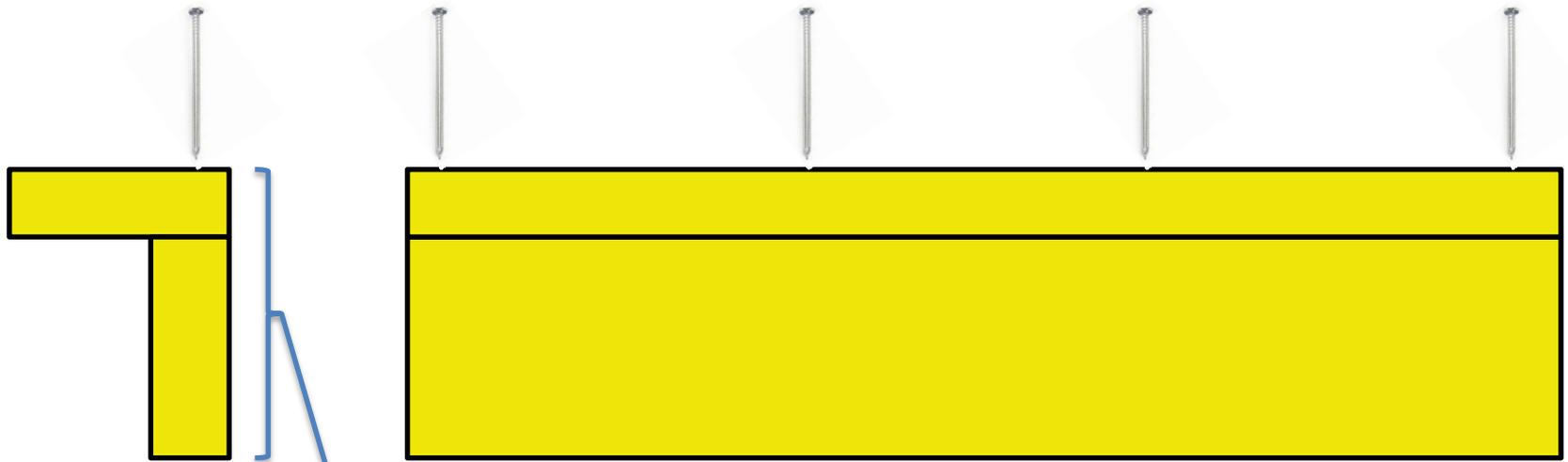
# Truss alignment guide



## Brace preparation

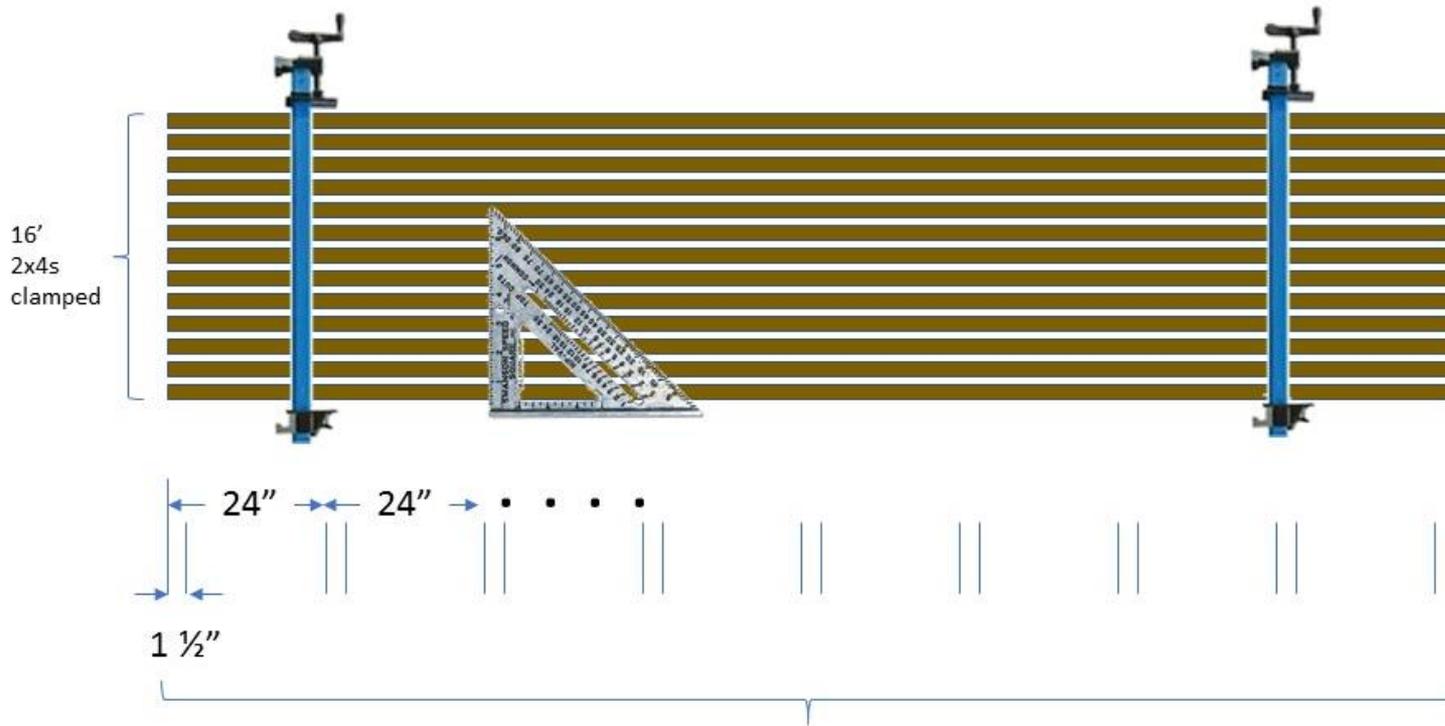
- 🏠 Complete while staging trusses
- 🏠 Strongbacks for back gable support
- 🏠 Marked 16 footers for lateral web bracing
- 🏠 Marked 16 foot CA corners for rat runs
- 🏠 8 foot CA corners for K-bracing support
- 🏠 T-blocks for temporary gable bracing

# 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

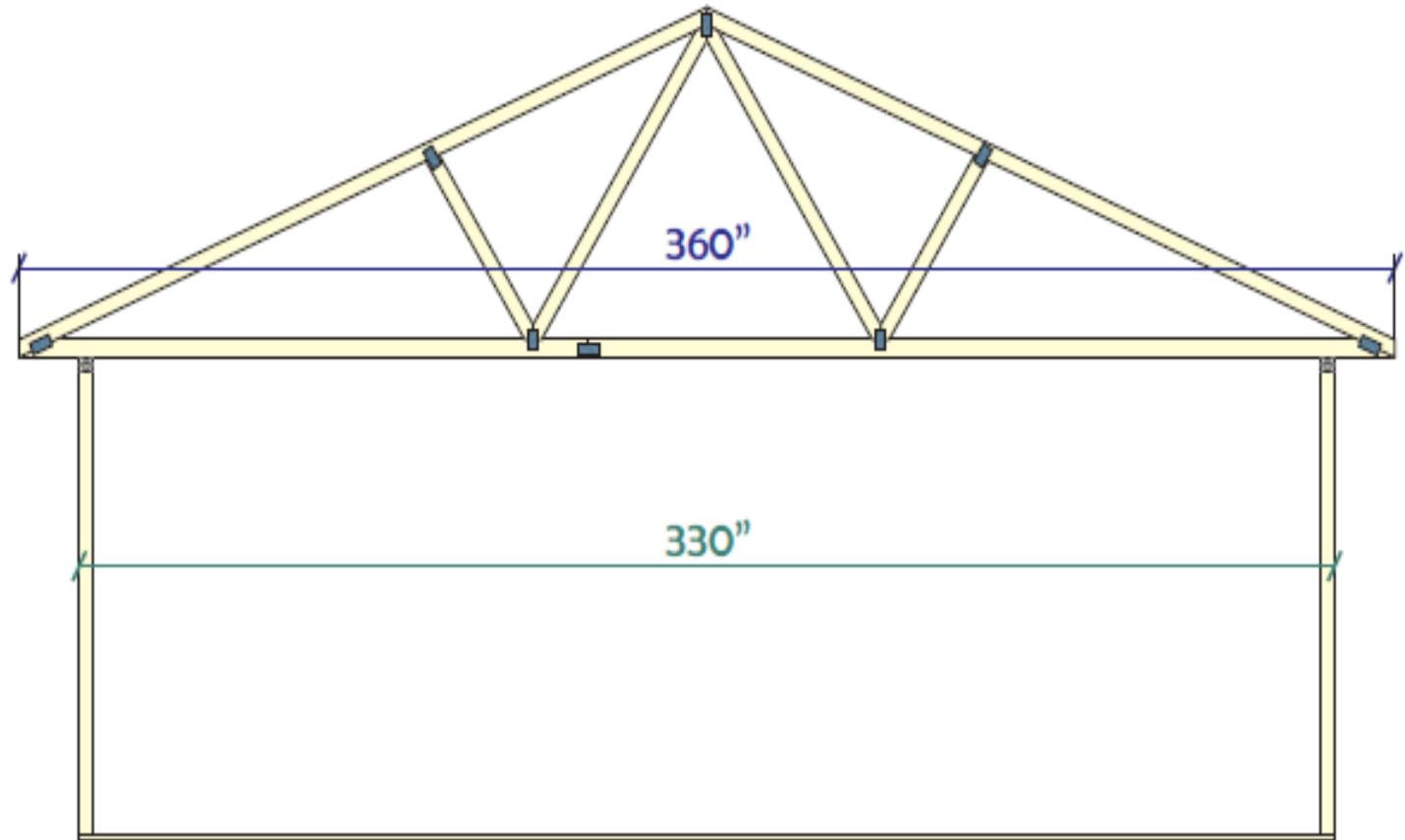
- 🏠 Markings and truss orientation

- 🏠 Flat Trinity style soffit

## 🏠 Lateral

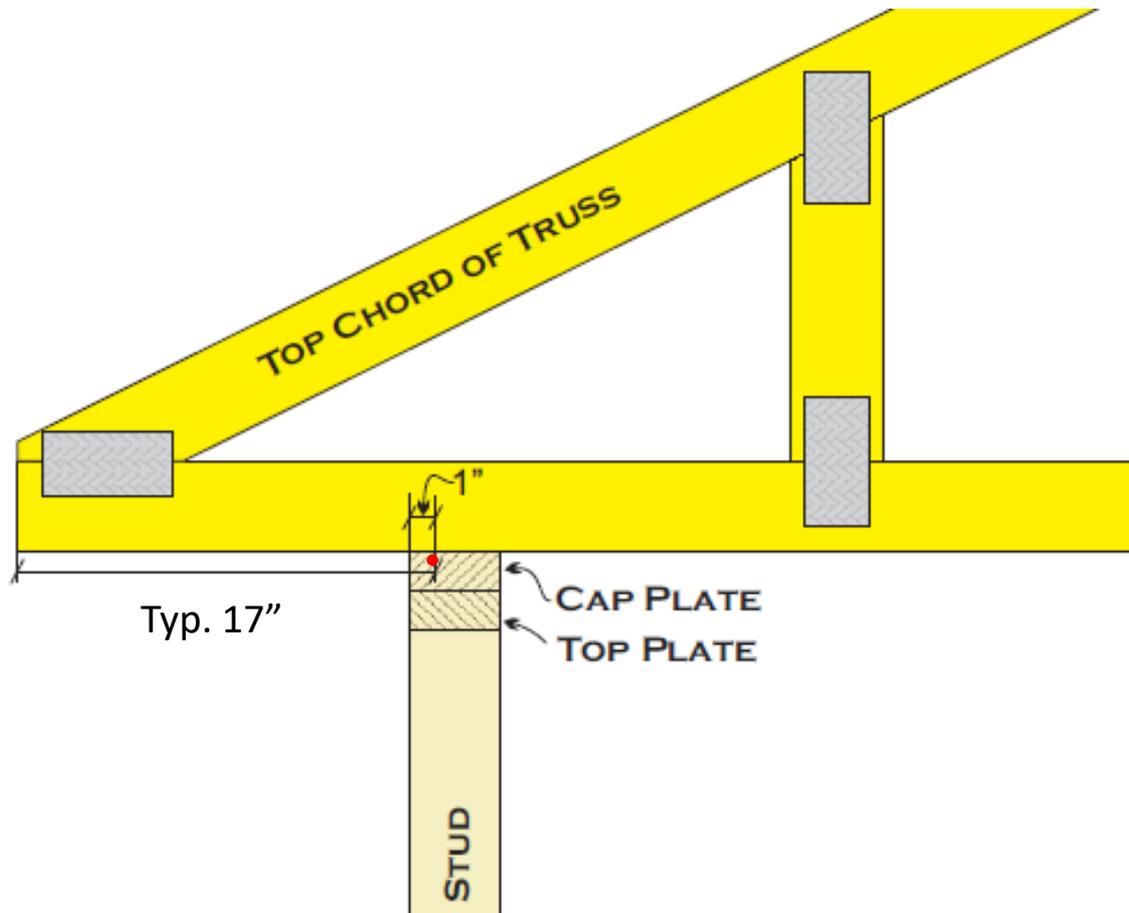
- 🏠 Make a 9' mark on top chord (from bottom)

# Calculation of flat truss overhang



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

# Marking flat truss overhang

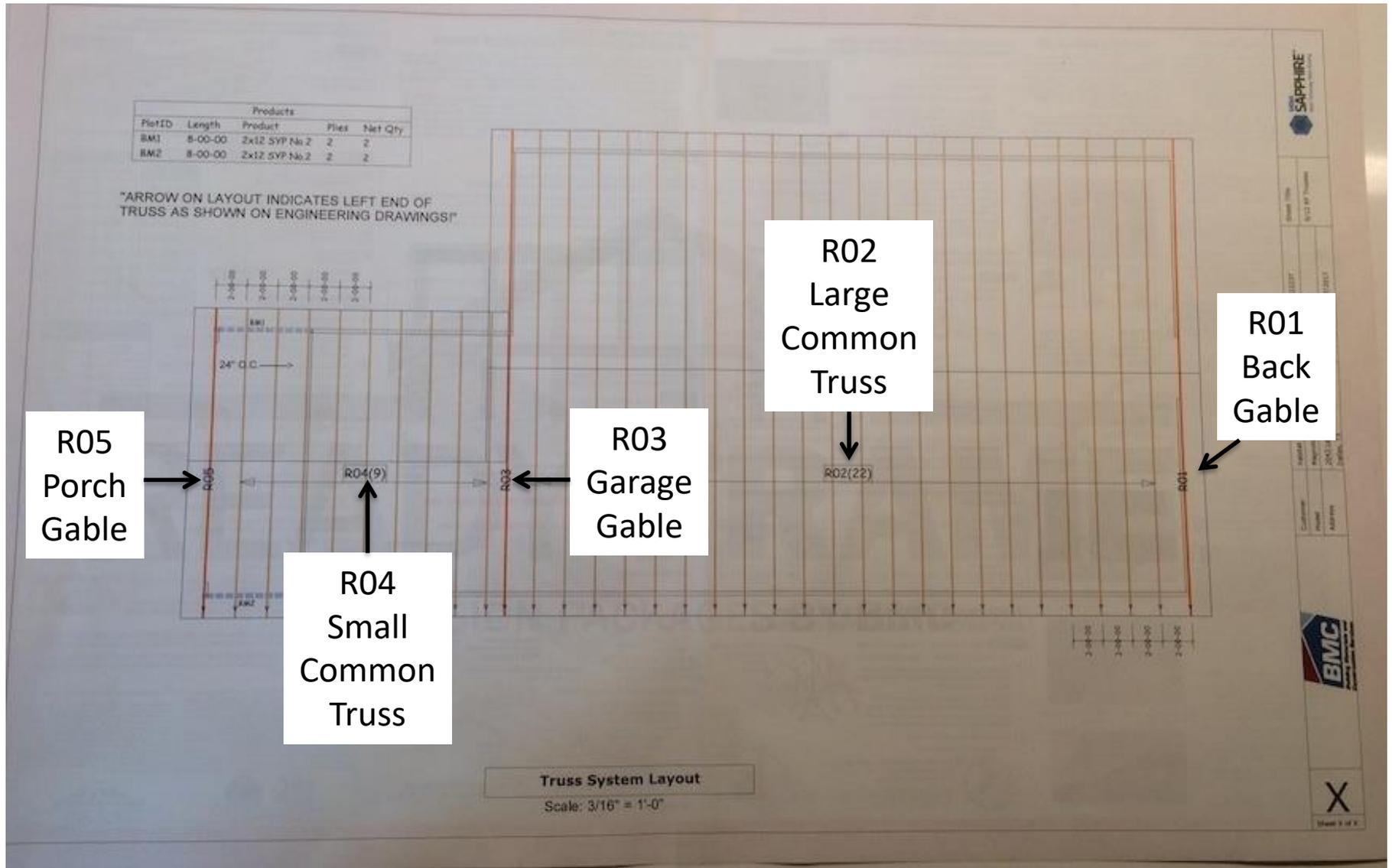


# Staging trusses

- 🏠 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

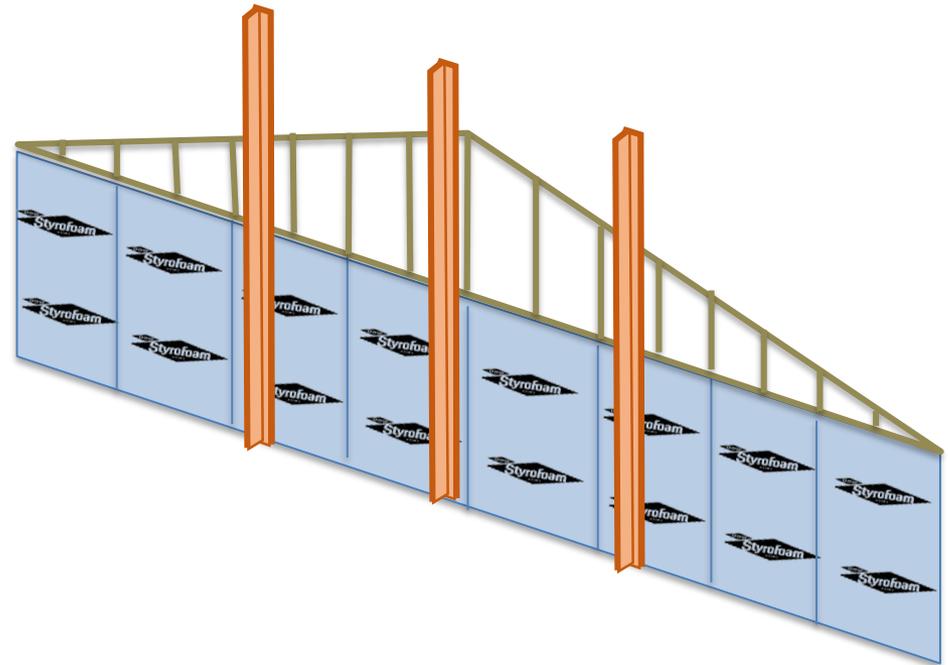


# Setting back gable truss

- 🏠 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



Use DUPLEX nails for easy removal



# 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

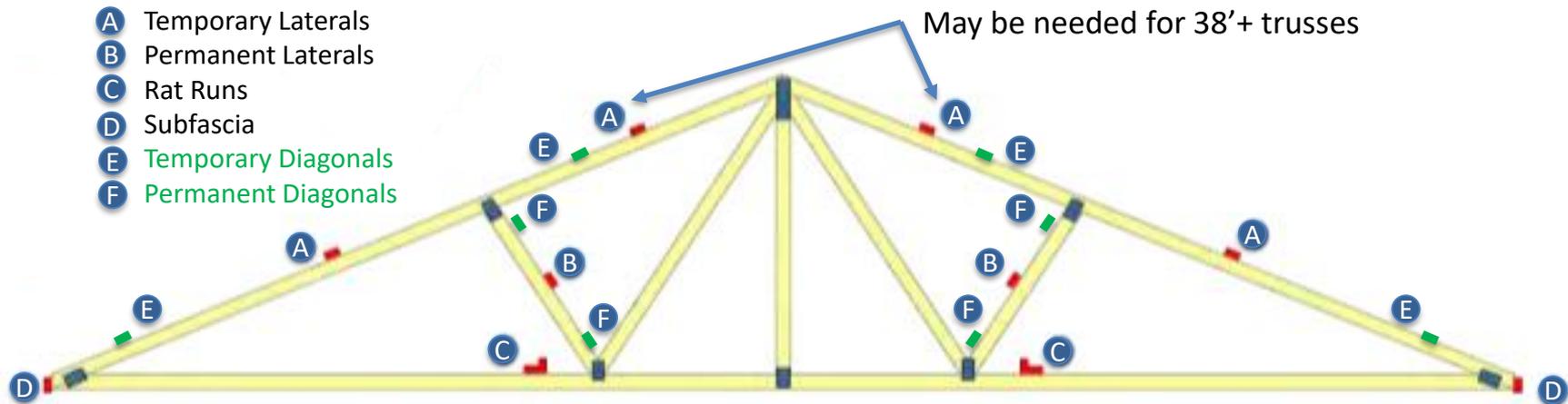
## 🏠 Check:

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

# Truss Bracing Overview

## 🏠 Purpose

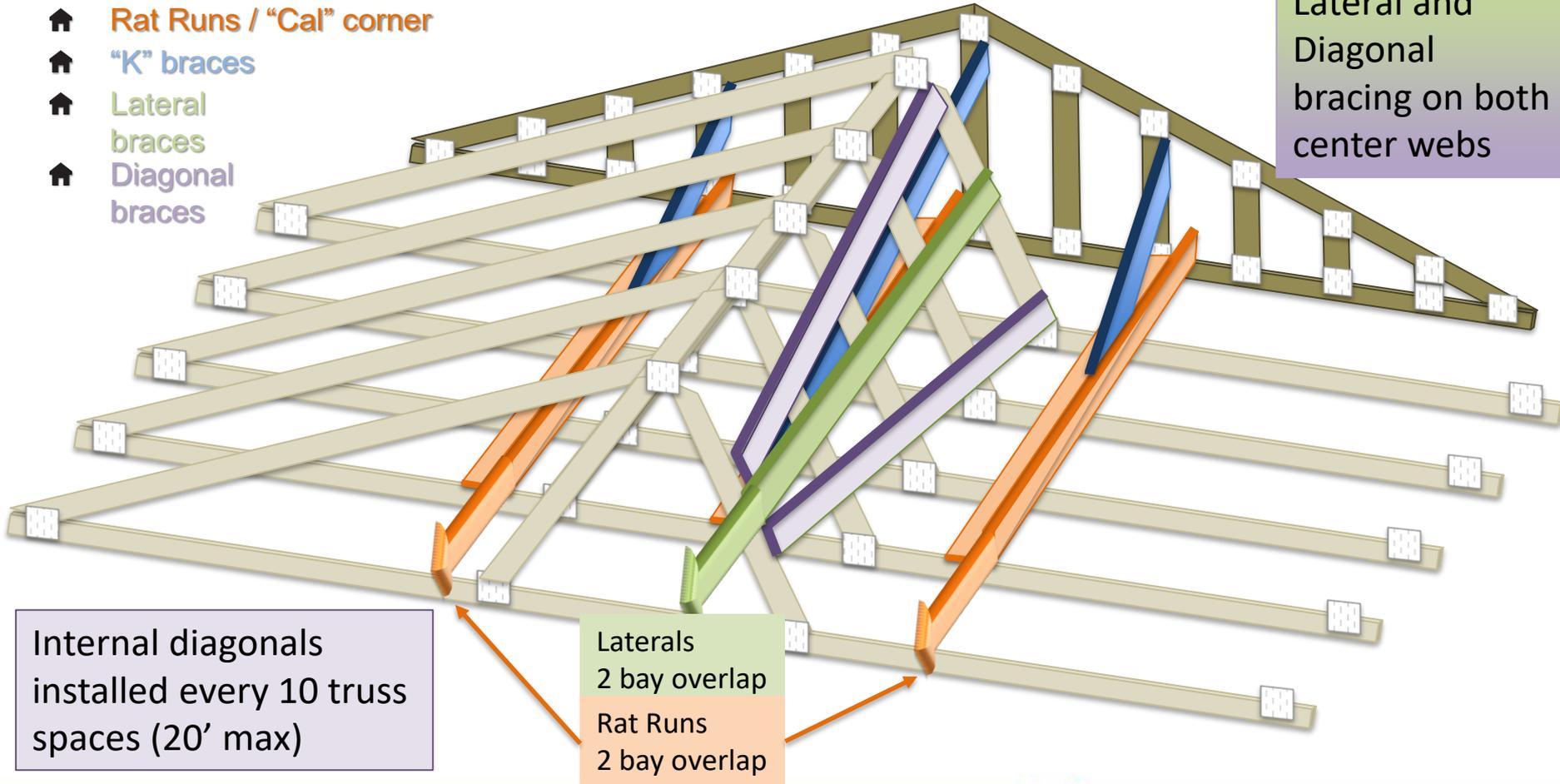
- 🏠 Temporary (external) and Permanent (internal) bracing to support truss location and provide stability against unintended forces / movement (e.g. gravity, wind, seismic, etc.) and secure for **FPE**
- 🏠 Internal K braces to provide lateral force support to gables
- 🏠 Lateral and Diagonal bracing shown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



# Internal Permanent Bracing

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

Lateral and Diagonal bracing on both center webs



Internal diagonals installed every 10 truss spaces (20' max)

Laterals  
2 bay overlap  
Rat Runs  
2 bay overlap

# Interior Permanent Bracing

## 🏠 Purpose

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

- 🏠 2 types: Diagonal (K) and lateral

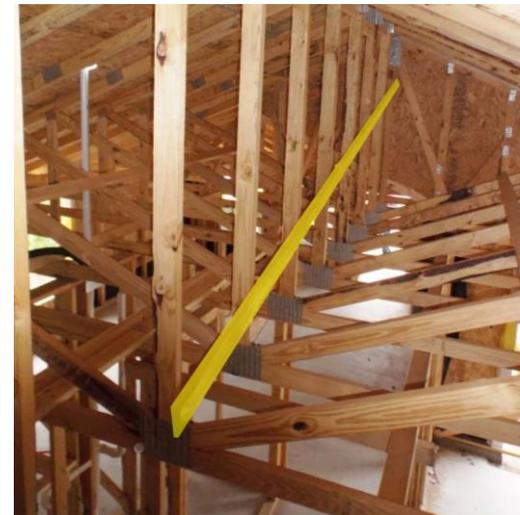
## 🏠 Installation

- 🏠 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)



# Rat Runs

## 🏠 Purpose

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

## 🏠 Installation

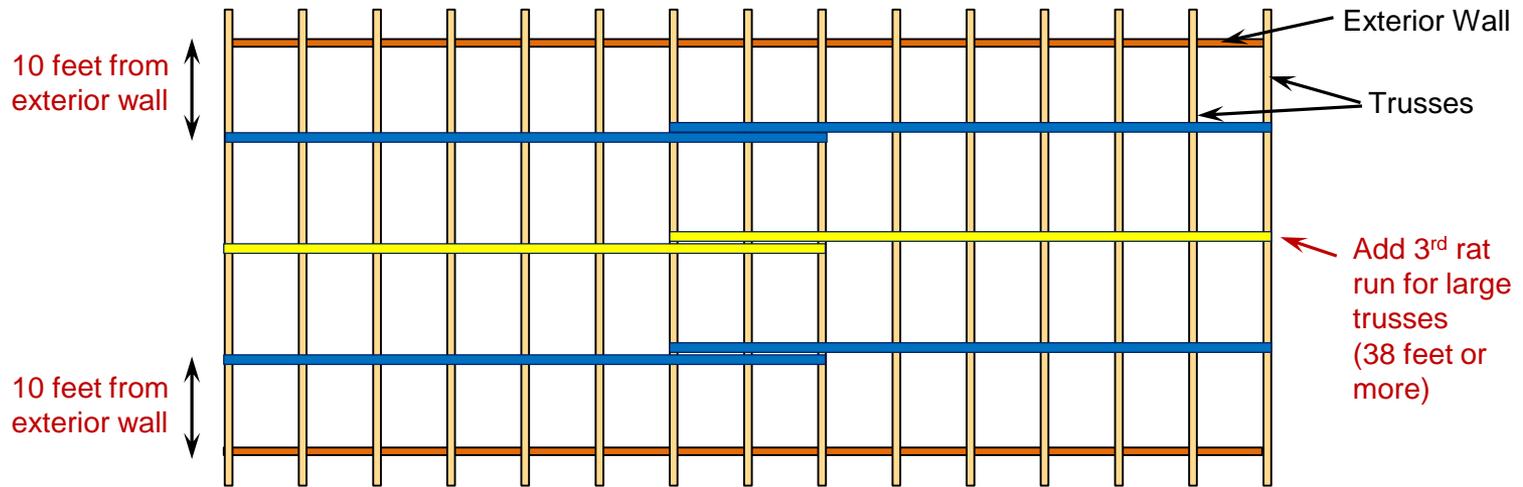
- 🏠 Calif. Corner (typically 16') attached 1/3 from outside wall (most plans)
  - 🏠 Attach 3 runs 1/4<sup>th</sup> from outside wall (large floor plans – Hickory, Hawthorne)
- 🏠 24" O.C. with 3 truss overlap. Square against truss bottom chord (see next page)

## 🏠 Check

- 🏠 2 nails per truss, spacing, overlay



# Rat Run Layout

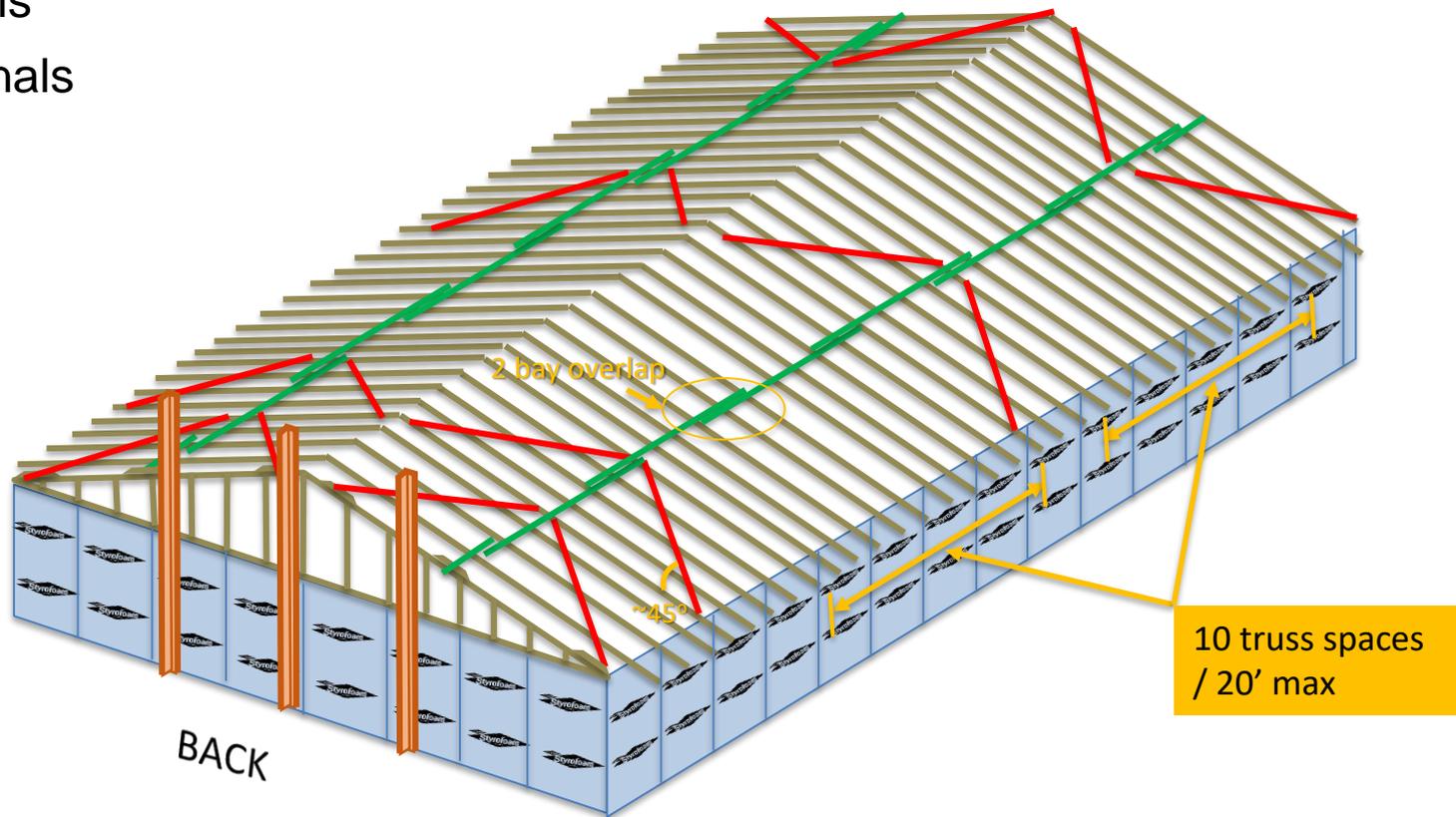


Smaller trusses (~30') = 2 Rat Runs @ 1/3 spacing (e.g. Trinity & Magnolia)  
 Larger Trusses (~38') = 3 Rat Runs @ 1/4 spacing (e.g. Hawthorne & Hickory)

} ~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
- 🏠 1<sup>st</sup> common porch truss used to mark deck nailer on front gable truss
- 🏠 Temp lateral bracing, plumb / brace King post

## 🏠 Check

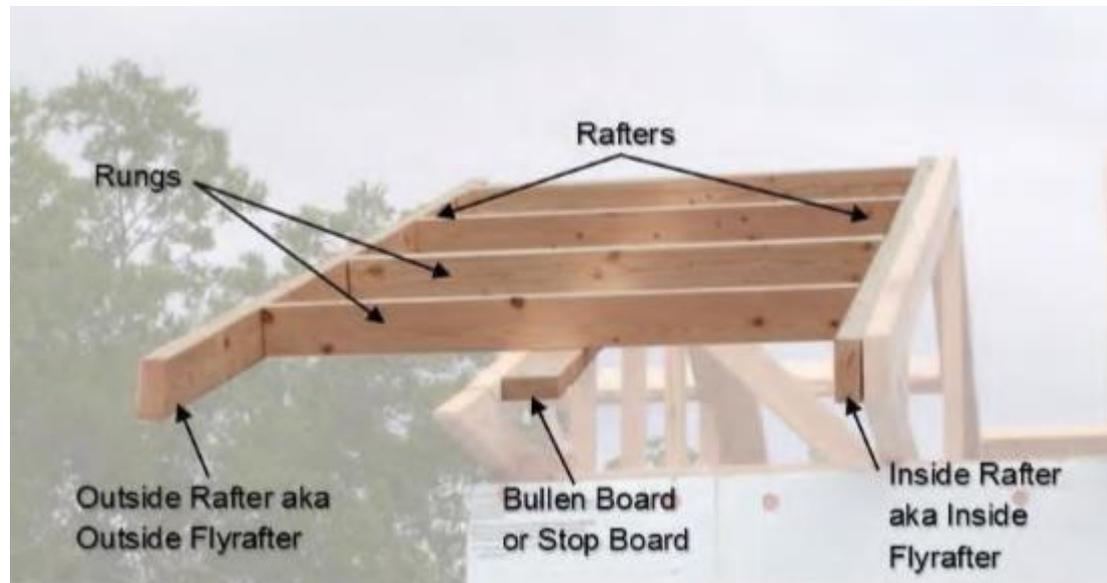
- 🏠 Gable for plumb and Rat Run bracing



# 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

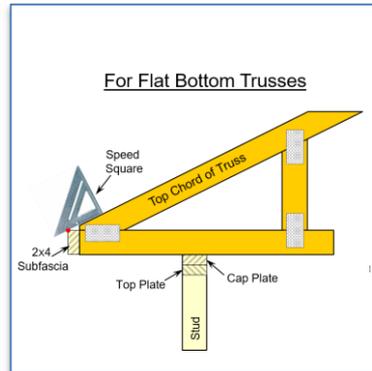
- 🏠 Permanent truss tail bracing enabling fascia and soffit installation and support to the roof deck

## 🏠 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



**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?



Dallas Area  
**Habitat**  
for Humanity®

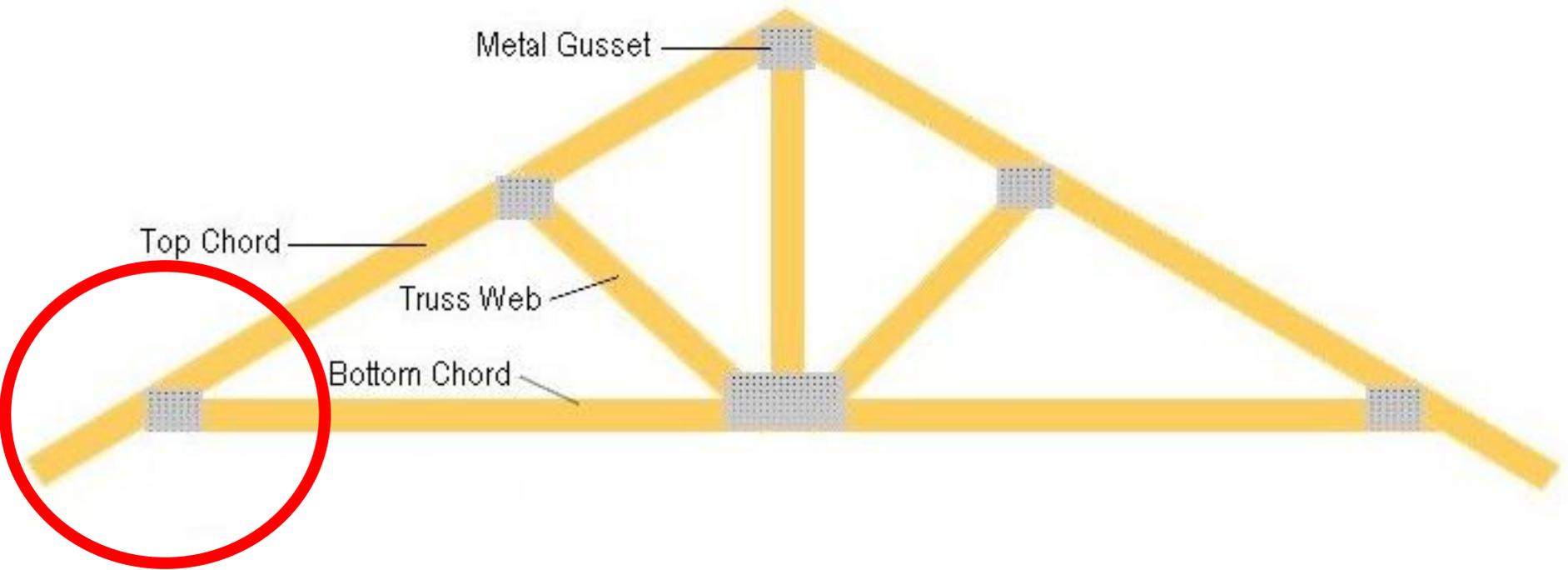
**Thanks!**

**Mike Proch**

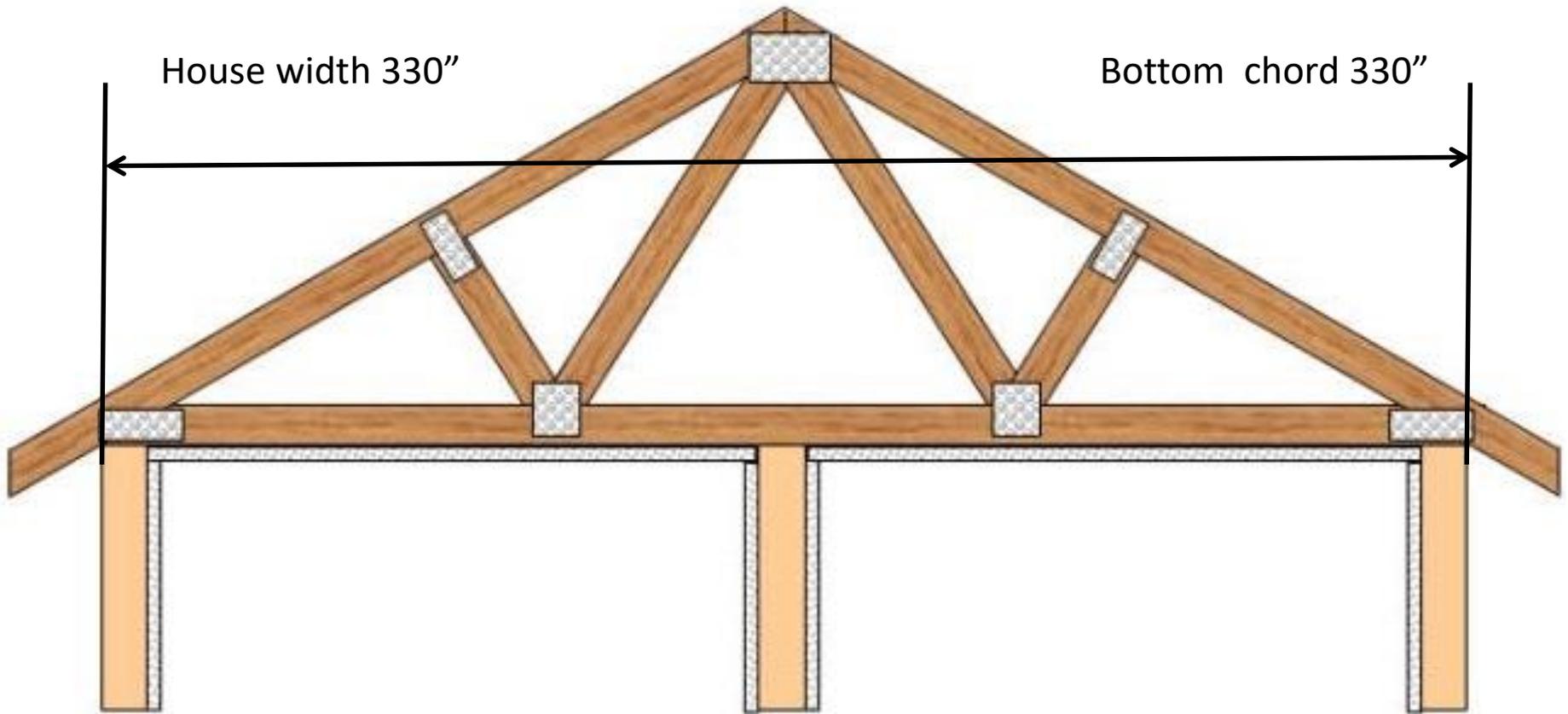
[mlproch@att.net](mailto:mlproch@att.net)

214-415-0063

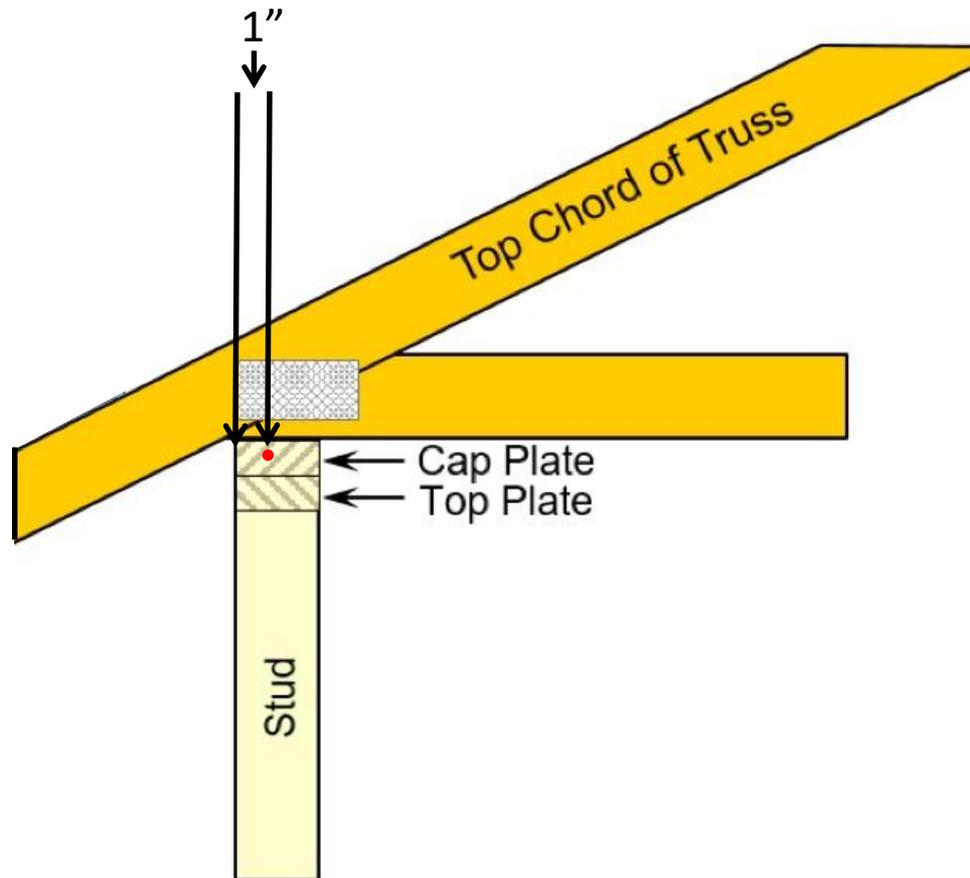
# Slope tailed common truss



# Slope tailed truss overhang



# Marking slope tailed truss overhang



# Marking slope tailed truss overhang

