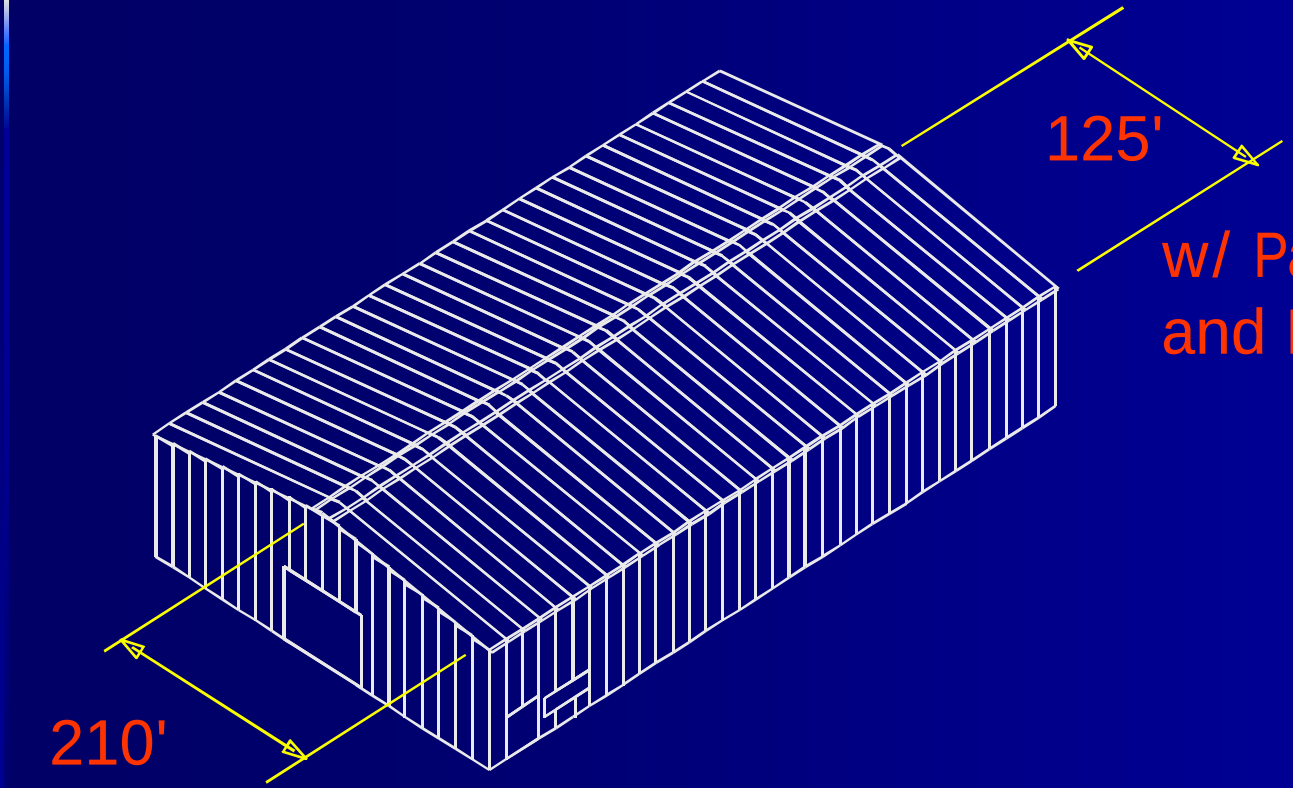
Additional System Applications

Expansion & Contraction Roof Systems



Expansion & Contraction Roof Systems

Expansion Joint Types to be used when the ridge to eave dimension is exceeded

	Panel and Secondary Type		
	PR	SSR w/ Purlins	SSR w/ WBTP
Type of Expansion Joint to use			
Fixed Centerline	>100'	>210' <420'	>210' <420'
6" Step	NA	>420	>420

VP Roof Expansion Limits

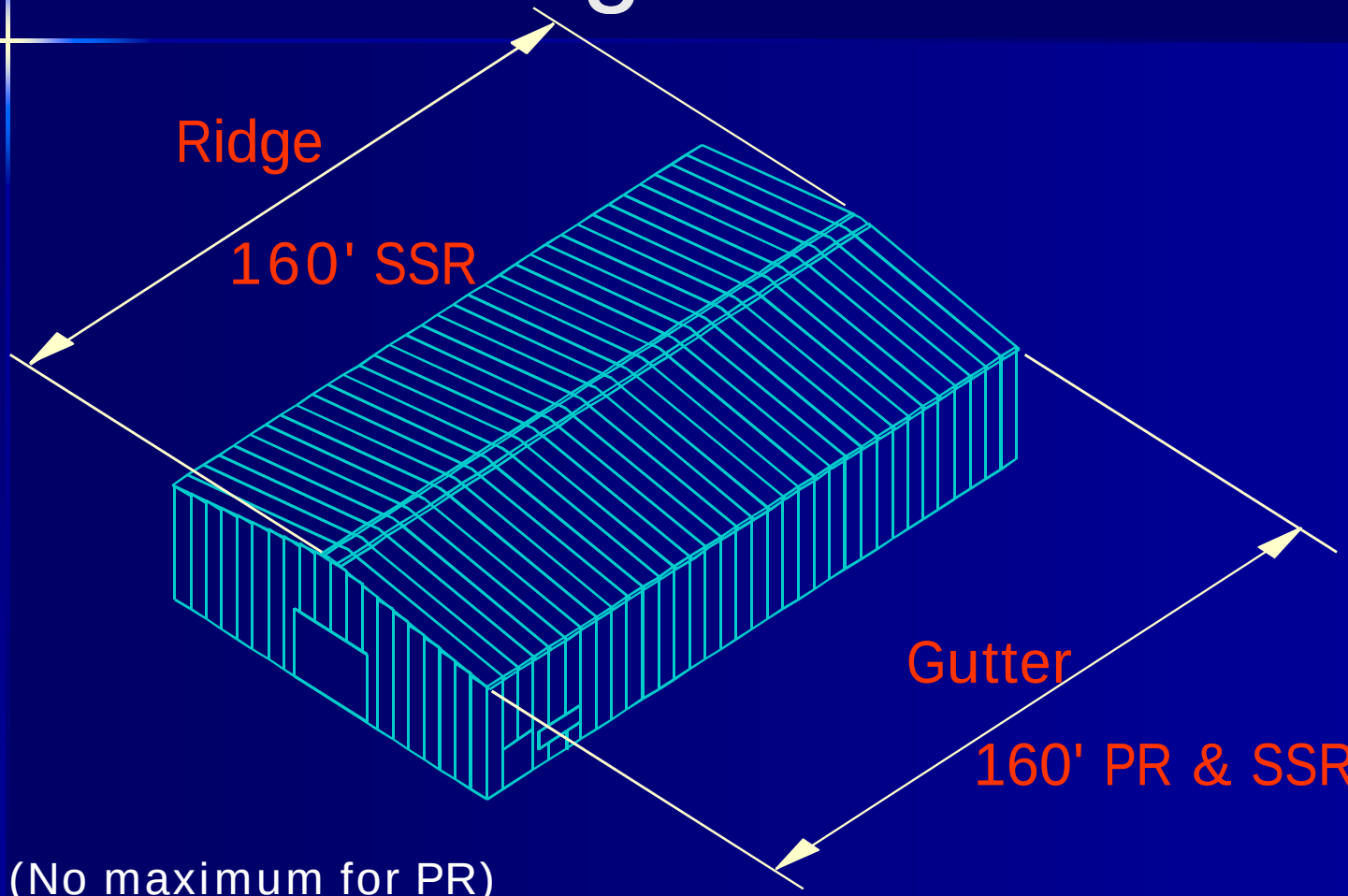
Table 1: Roof Panel Maximum Slope Length Limits

Roof Panel	Structural Support	Expansion Joint Type		
		Standard Eave	Mid-slope Anchorage	Stepped Joint
SSR	Z-Purlins w/ Metal Wall [3]	320'	520'	1040'
	Joist, T/P, WBTP and/or Hardwalls [1, 3]	260'	520'	1040'
SLR II	Z-Purlins w/ Metal Wall [3]	220'	na	320'
	Joist, T/P, WBTP and/or Hardwalls [1, 3]	160'	na	320'
	Braced Purlins [2]	160'	na	320'
Panel Rib	Z-Purlins	150'	na	300'
	Joist, T/P or WBTP [1]	Not permitted	Not permitted	Not permitted
	Braced Purlins [2]	120'	na	240'
Roof Deck[1]	All	Since roof decks are not exposed to elements (i.e.- steel is below insulation), expansion criteria is governed by Sec C below.		

Notes:

1. **Joists, Truss Purlins (T/P) or Wide Bay Trussed Purlins (WBTP)** have restricted lateral movement and thermal stress relief from lateral movement cannot be relied on. For these applications screw-down roofs are "not permitted" and Standing Seam roofs have been limited to the maximum movement of their sliding clips.
2. **Continuously Braced Purlins** from eave-to-ridge limit the amount of purlin lateral movement that can be relied on for thermal stress relief. Screw-down roof limits have been lowered and Standing Seam roofs have been limited to the maximum movement of their sliding clips.
3. **Metal Walls** as referred to here does NOT include foam panels. Foam panels should be treated as hardwalls.

Expansion & Contraction Ridge & Gutter



(No maximum for PR)

Longitudinal (Length) Expansion

B1. Longitudinal Expansion and Contraction

Metal buildings are particularly tolerant of expansion and contraction of the structural system. Bolted connections with oversized holes minimize accumulation of the thermal effects, particularly when non-continuous roof secondaries are used. And flexible materials are able to absorb thermal movement that actually occurs. However, some guidelines are required.

Table 1: Basic Building Length Limits (Pinned base columns and symmetrical longitudinal stiffness)

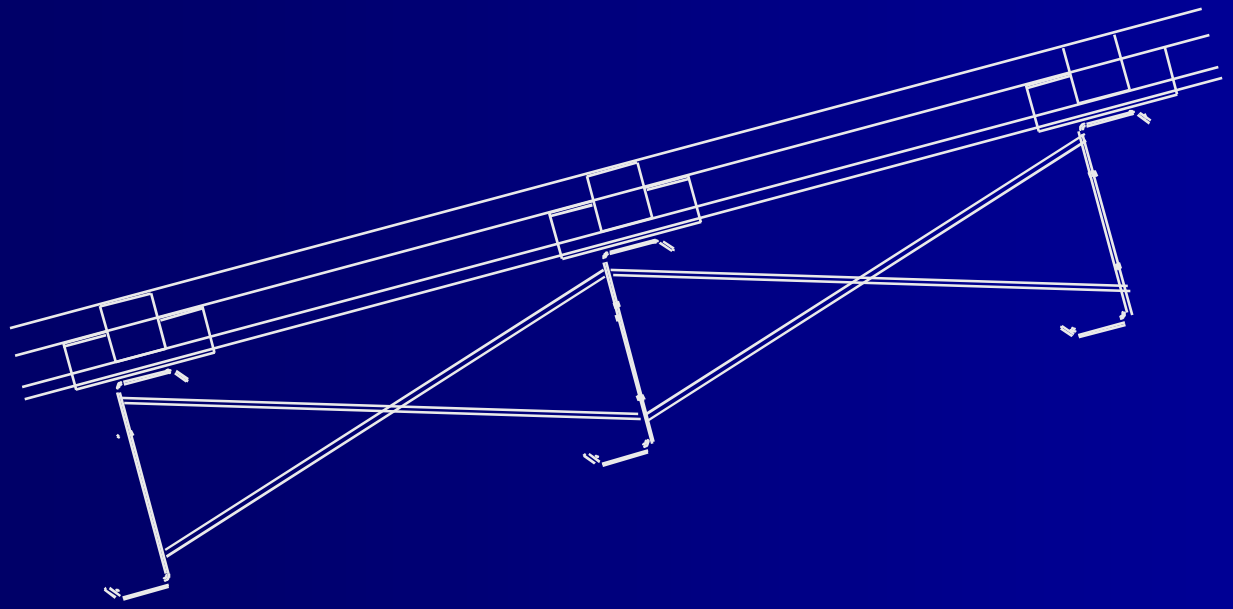
Wall Type*	Heated?	Cooled?	Roof Structural**	Length Limit
Metal	Yes	Yes	Simple Span	1500***
	Yes	No	Simple Span	1230
	No	No	Simple or Cont	720
	Yes	Yes	Continuous	1370
	Yes	No	Continuous	1030
Non-Metal	Yes	Yes	Simple Span	820
	Yes	No	Simple Span	620
	No	No	Simple or Cont	360
	Yes	Yes	Continuous	680
	Yes	No	Continuous	510

* Metal Walls include single skin and foam panels

** Simple Span structurals include Simple Span Z's, C's, Truss Purlins, WideBay Trussed Purlins and Bolted Bar Joists.

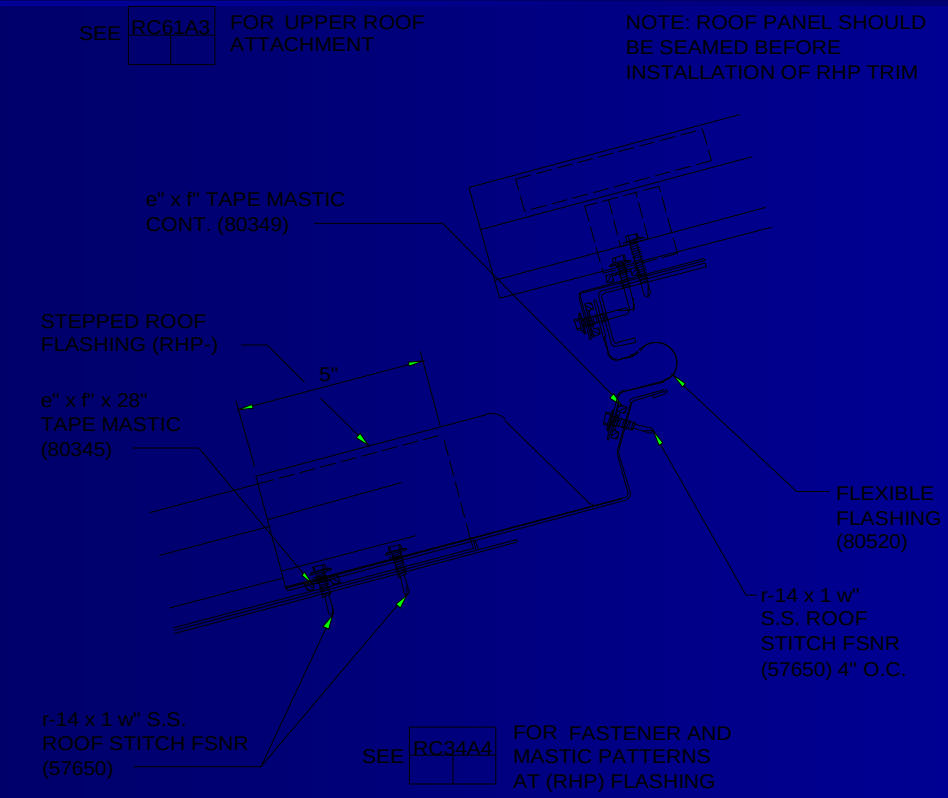
*** Limited by upper limit of 1500' length. See comments on page 3

Expansion & Contraction



SSR Fixed Center Line

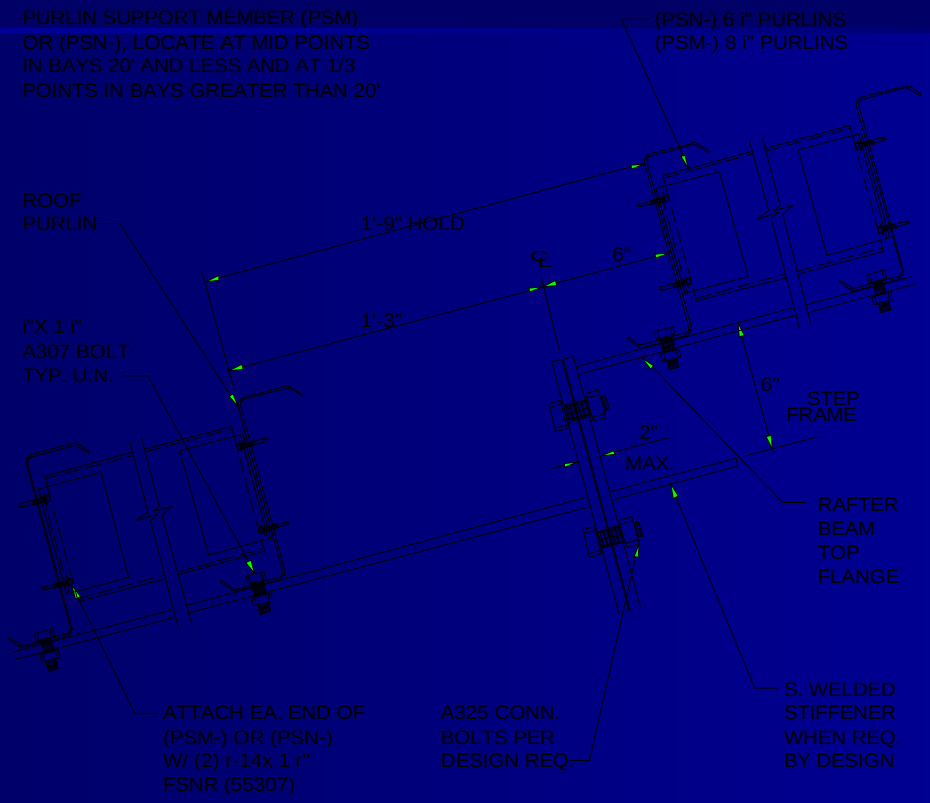
Expansion & Contraction



SSR STEPPED EXPAN. JOINT TRIM

LESS THAN 25#L.L.

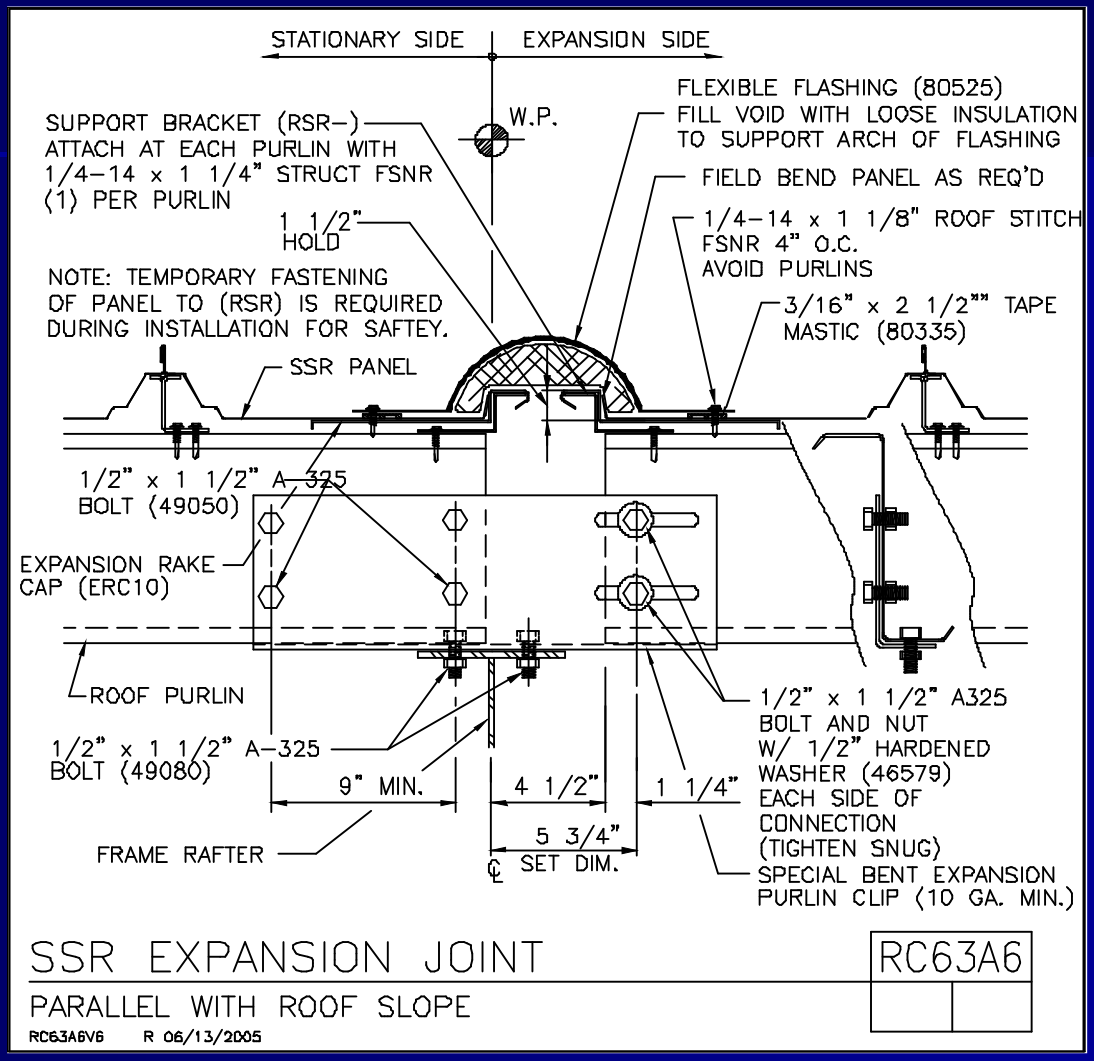
Expansion & Contraction



EXPANSION JOINT FRAME STEP

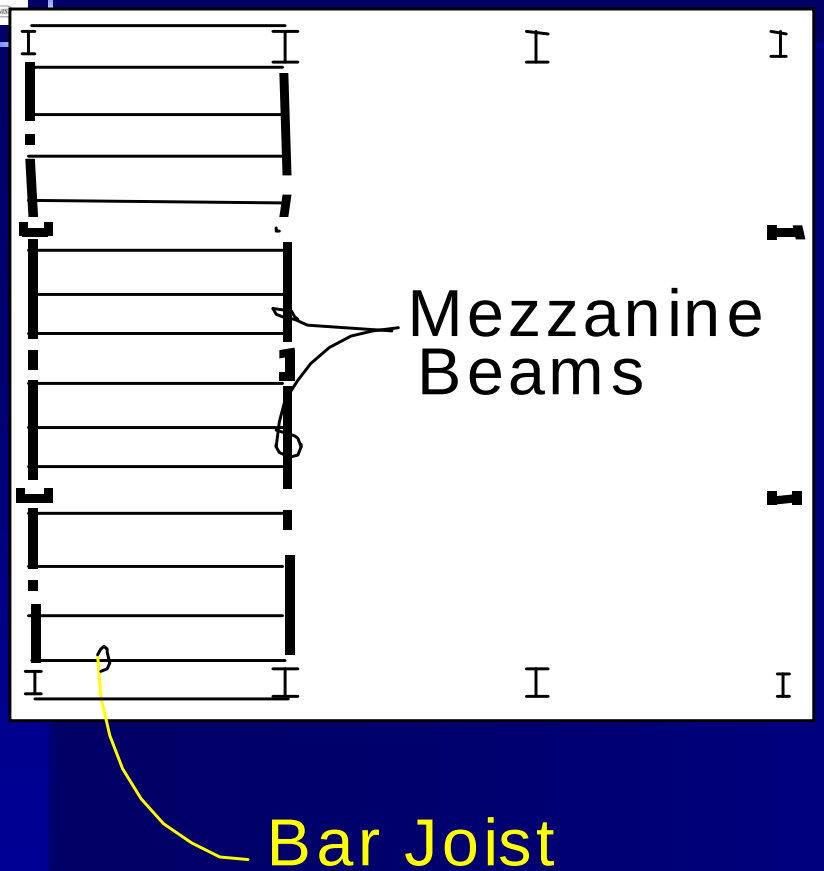
WITH PURLINS

Expansion & Contraction



Structural Longitudinal Expansion Joint w/ SSR (PR Similar)

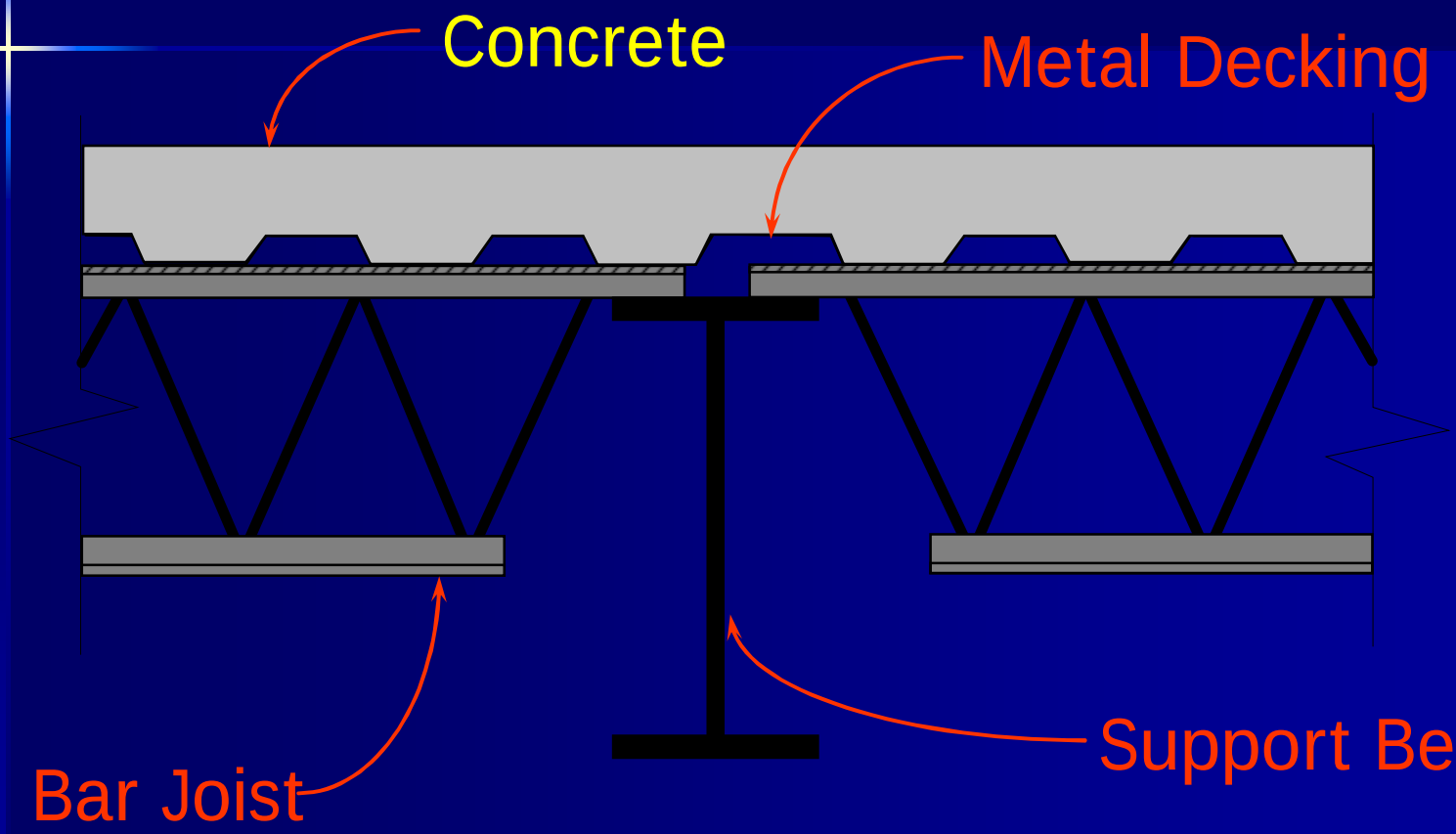
Mezzanines



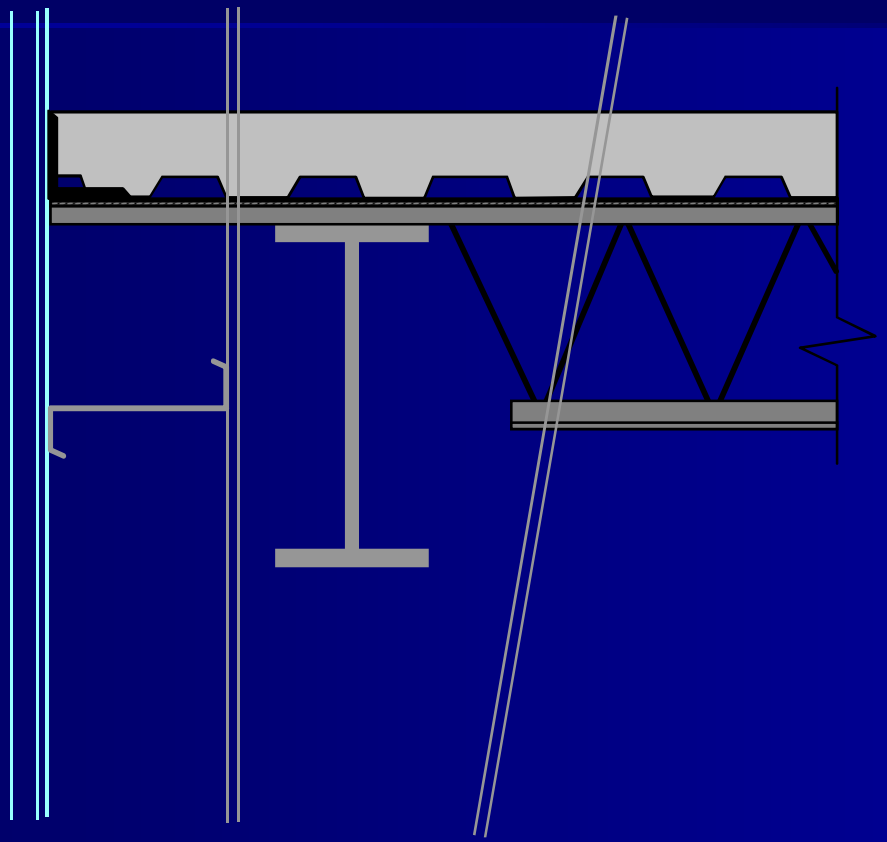
VP can provide:

- Design for loads into building system
- Support columns
- Support beams
- Joist

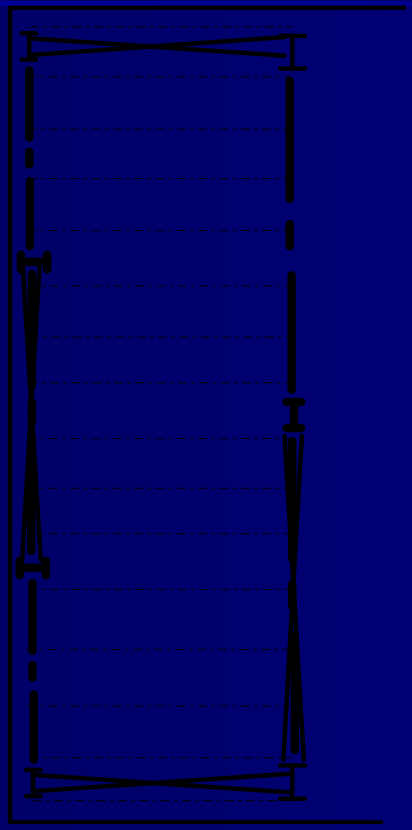
Mezzanines



Mezzanines

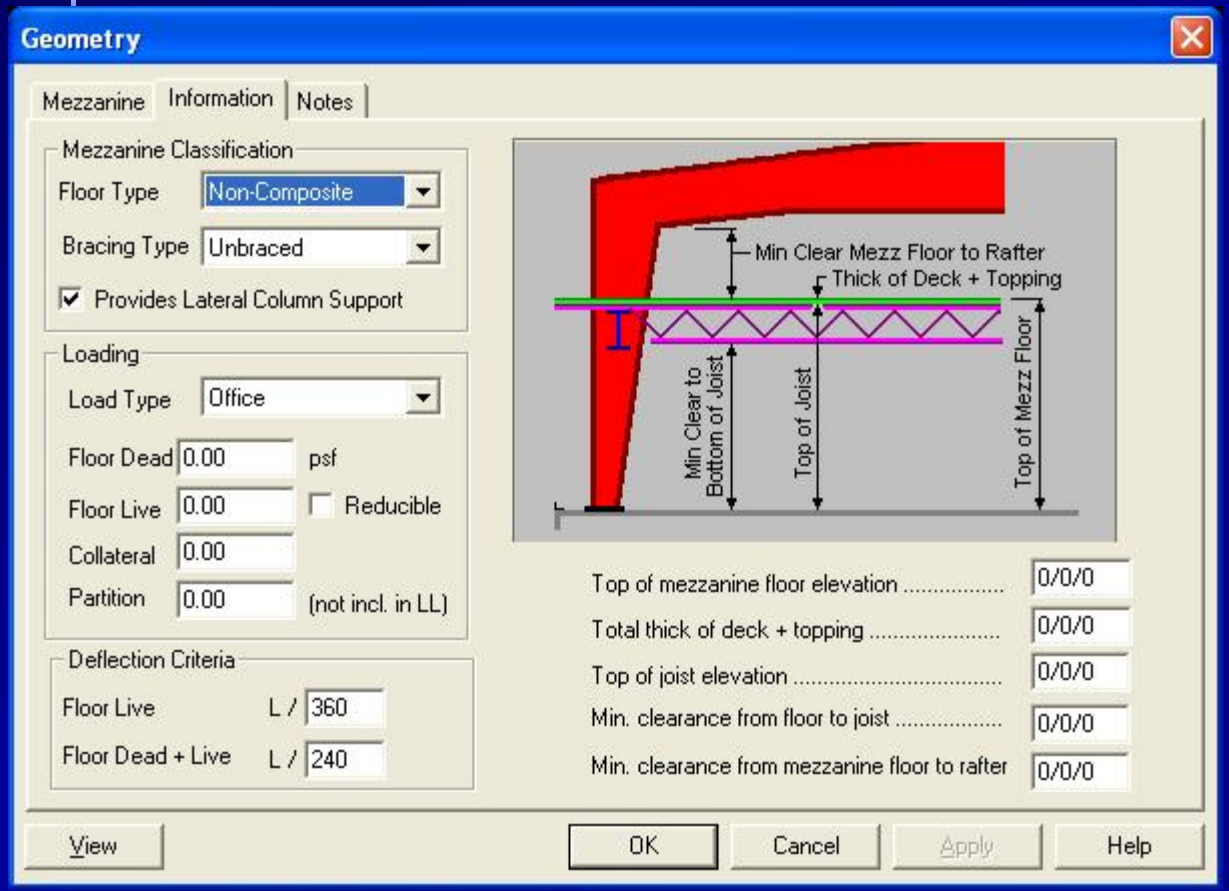


Mezzanines



For areas in high seismic zones - locations for diagonal bracing should be considered on as many sides as possible.

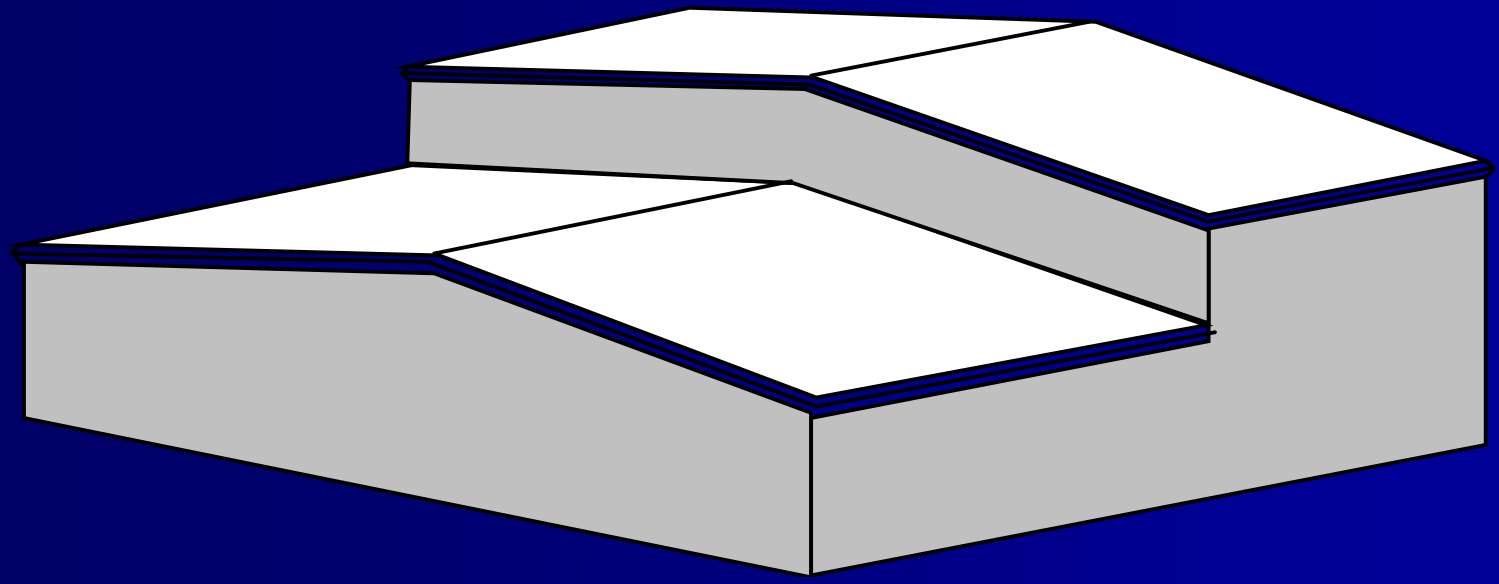
Mezzanines



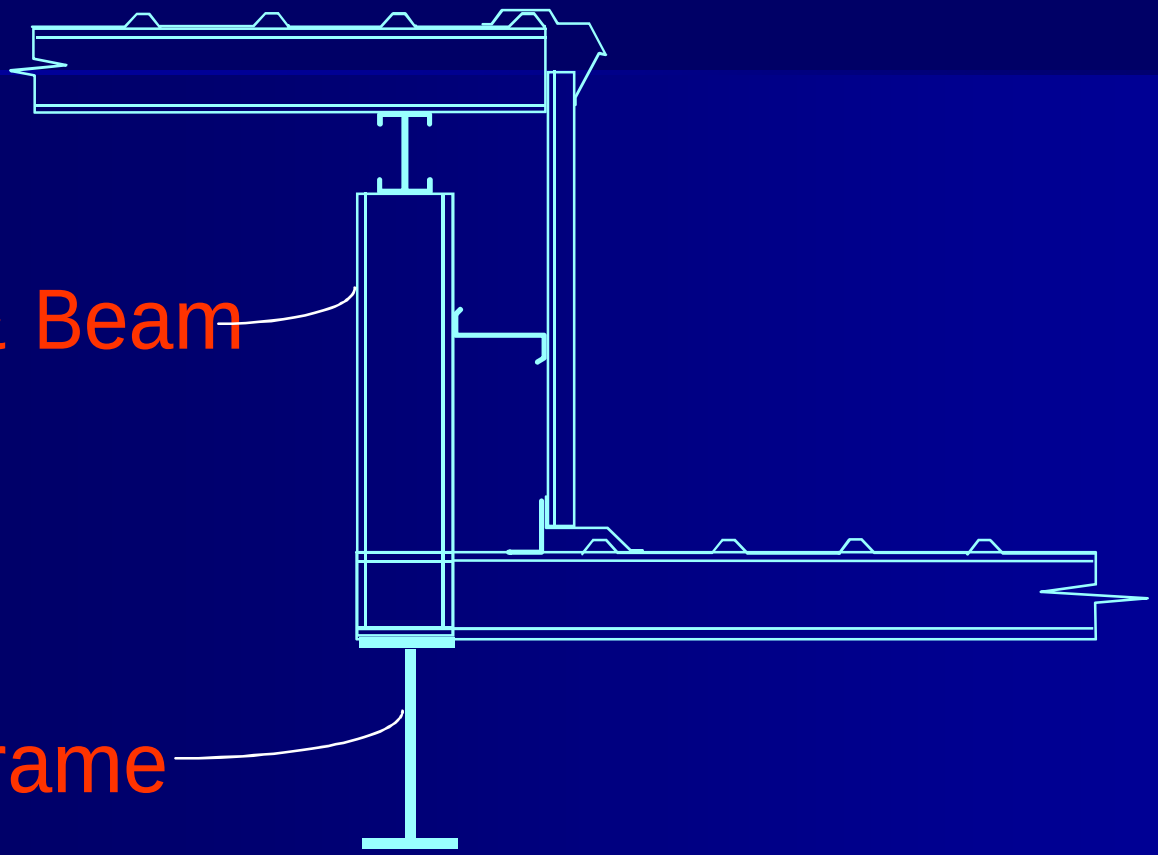
Input into VP Command

Mezzanine

Roof Height Changes



Roof Height Change



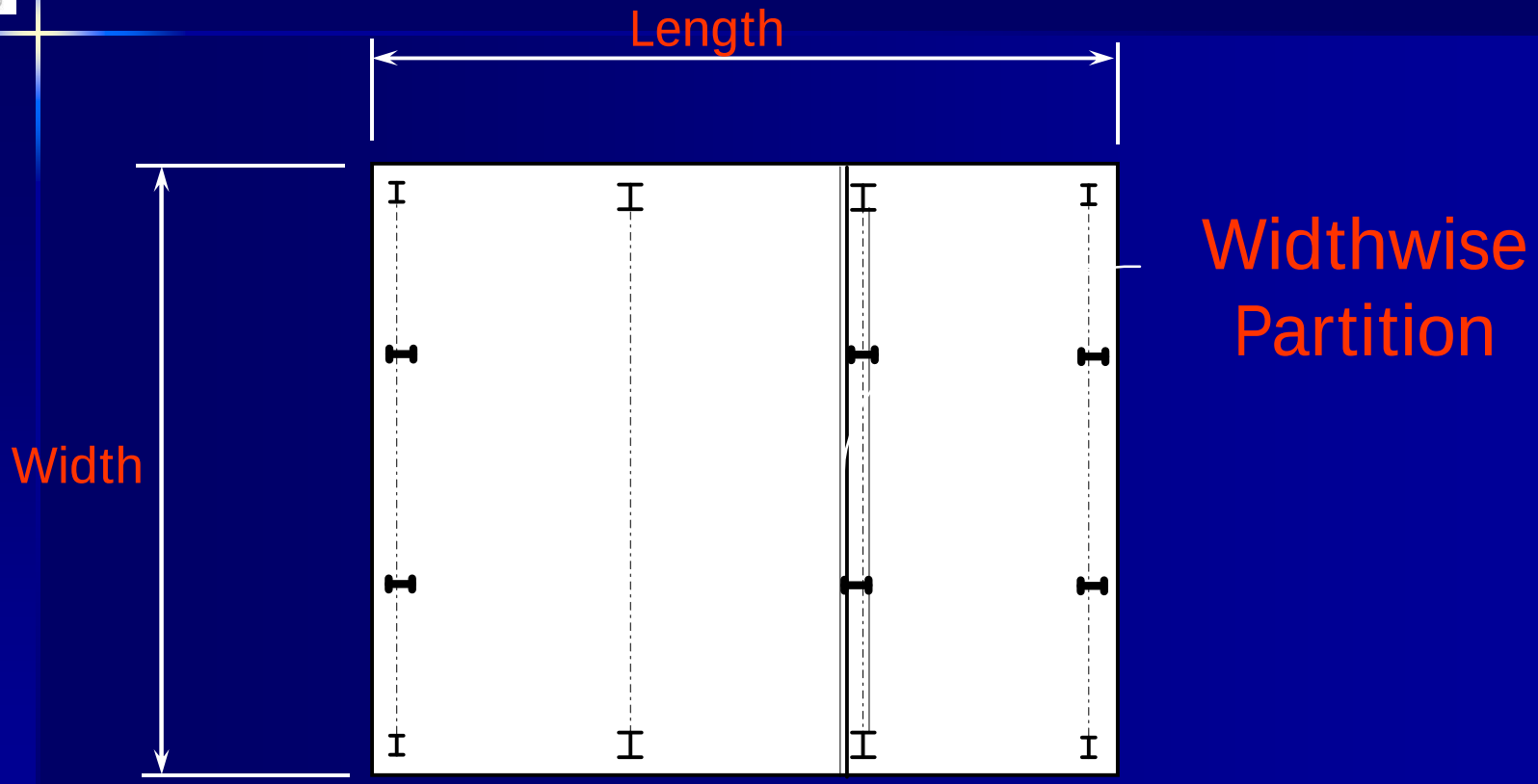
Post & Beam

Full Frame

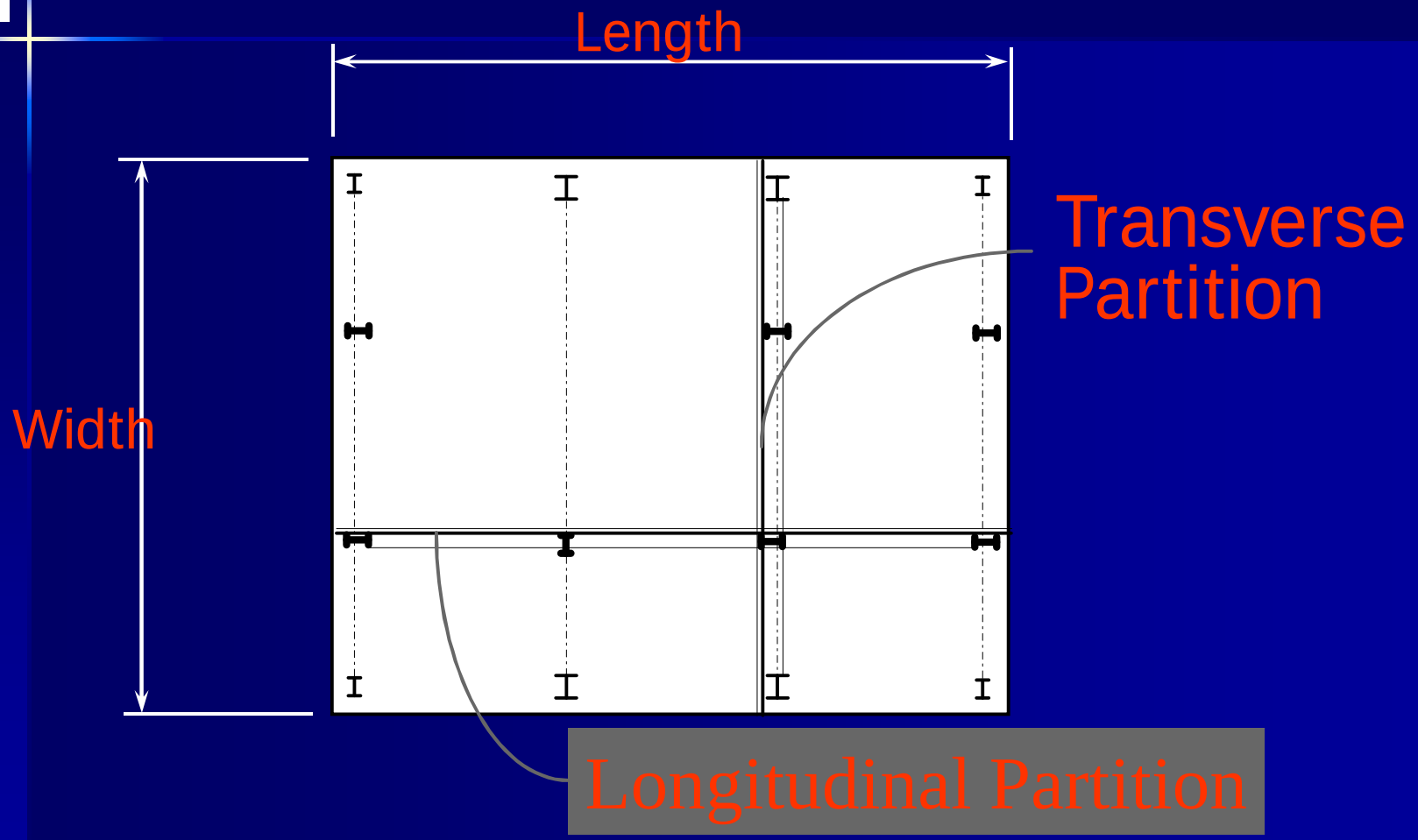
Piggy Back P&B on Full Frame

Roof Height Change

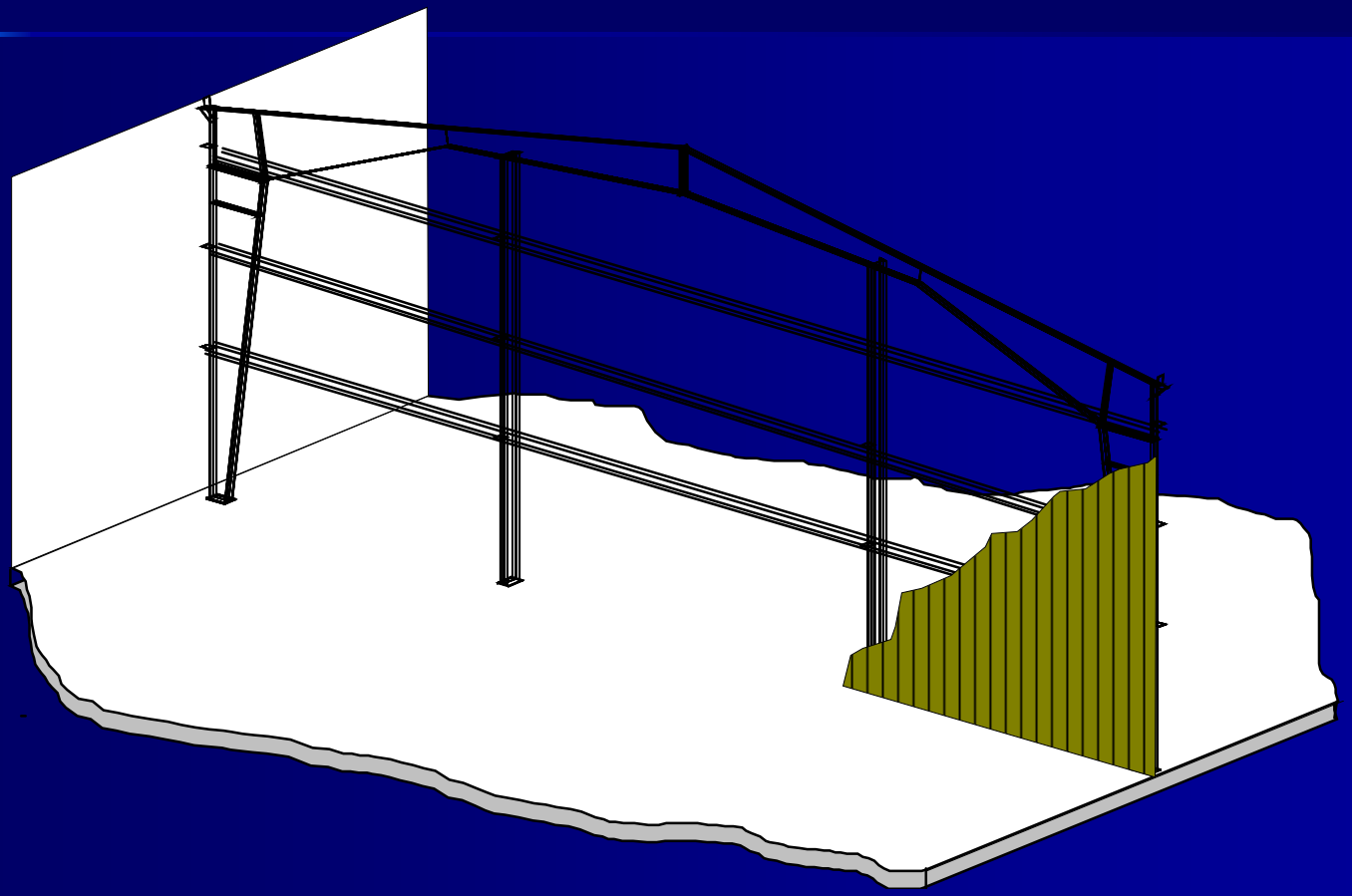
Metal Partitions



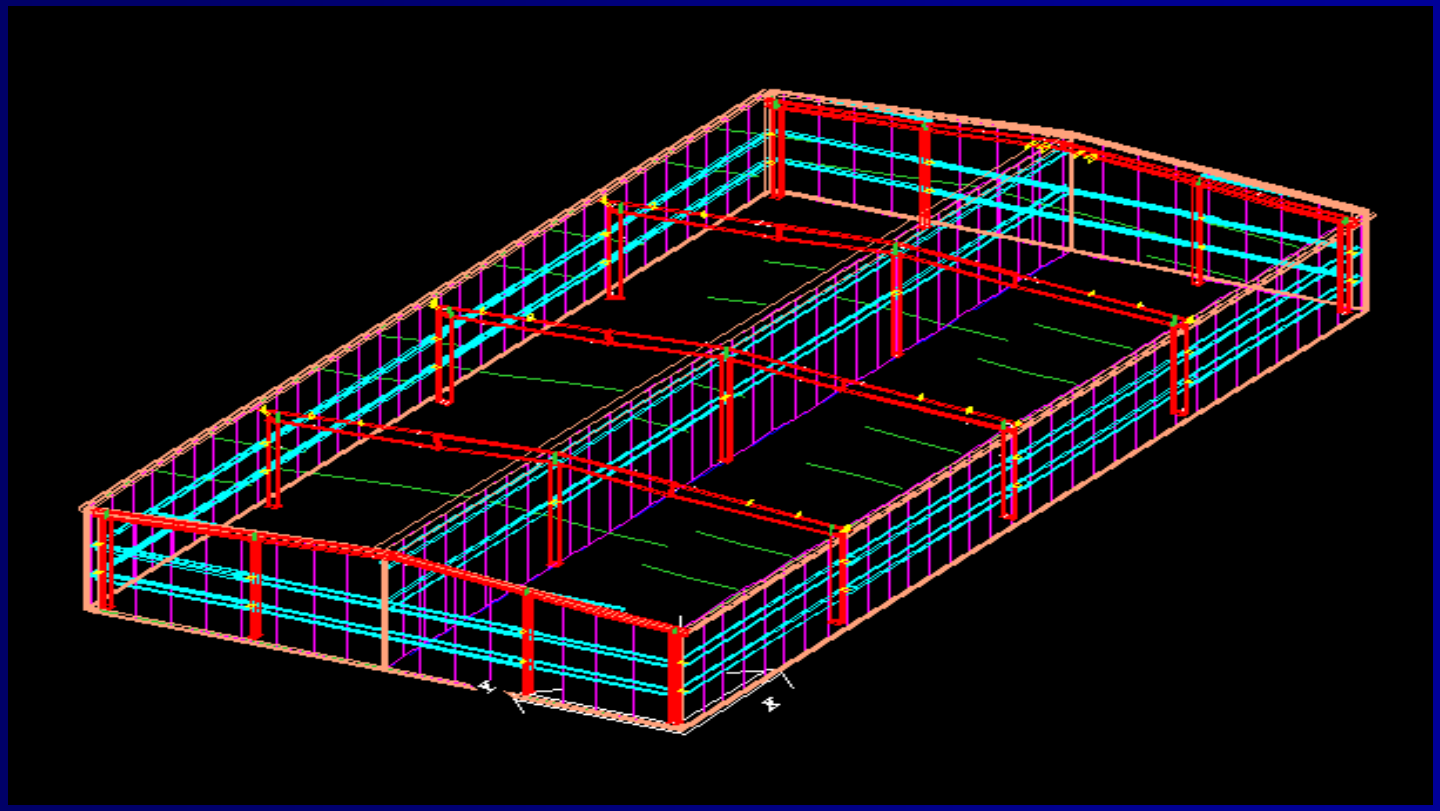
Metal Partitions



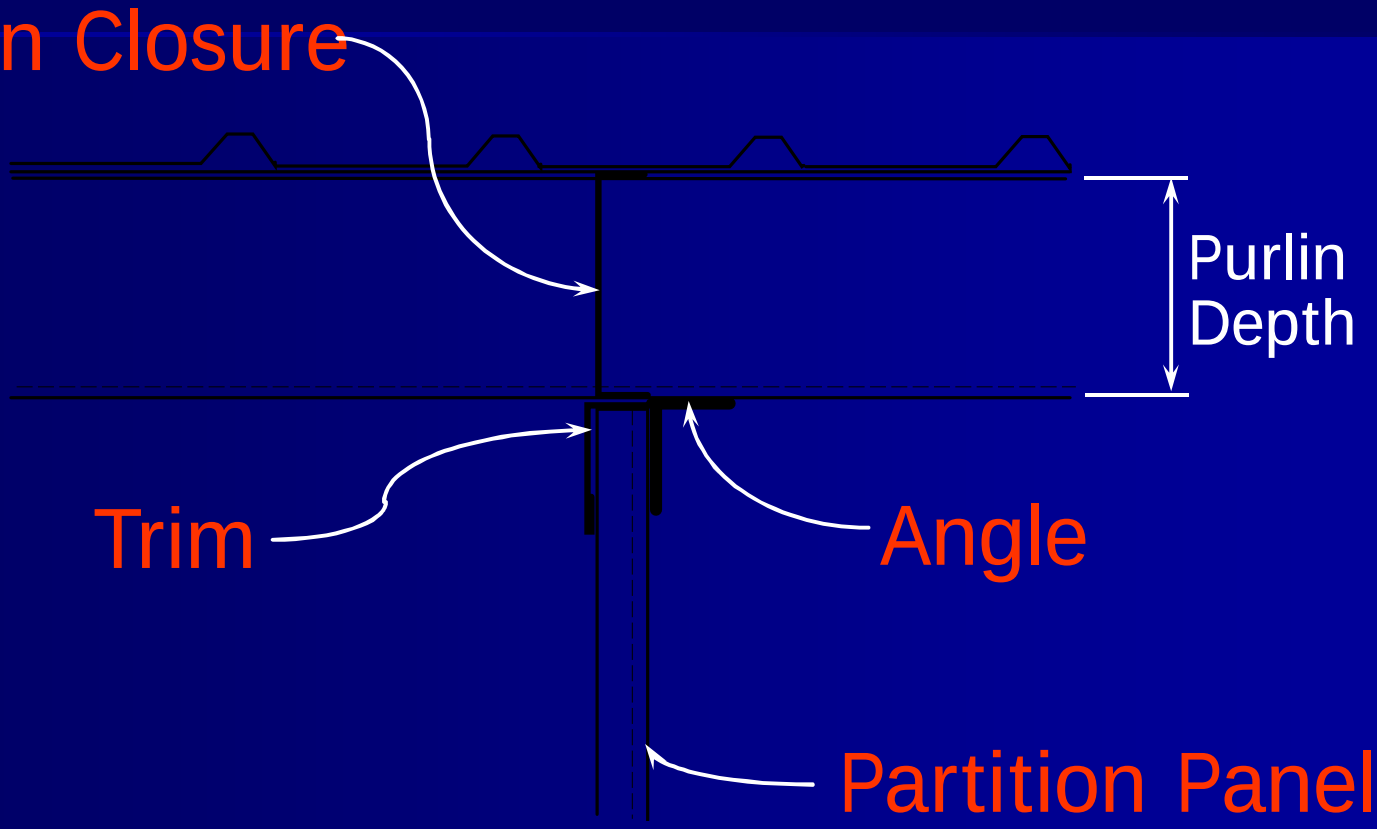
Metal Partitions



Partition

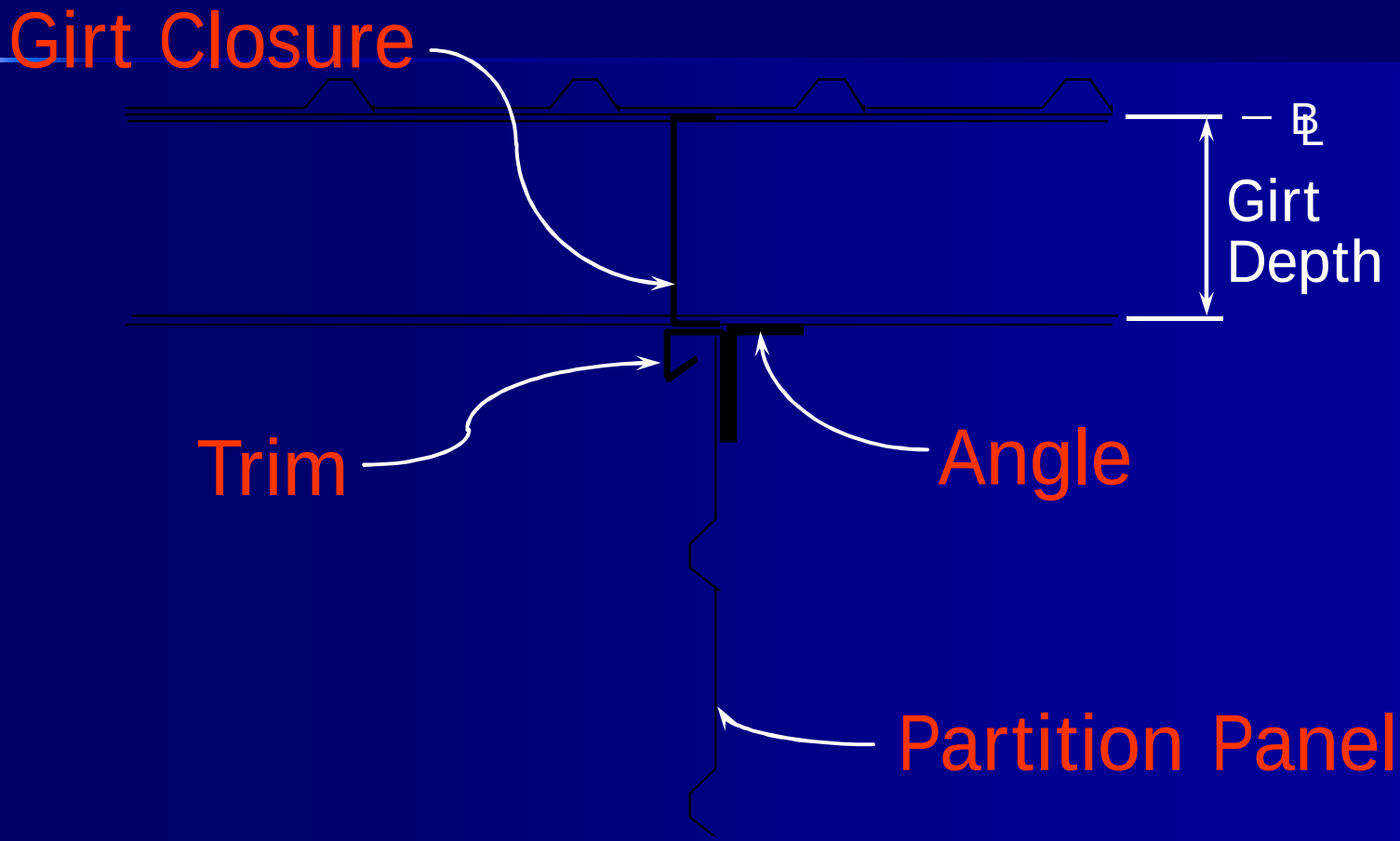


Metal Partitions



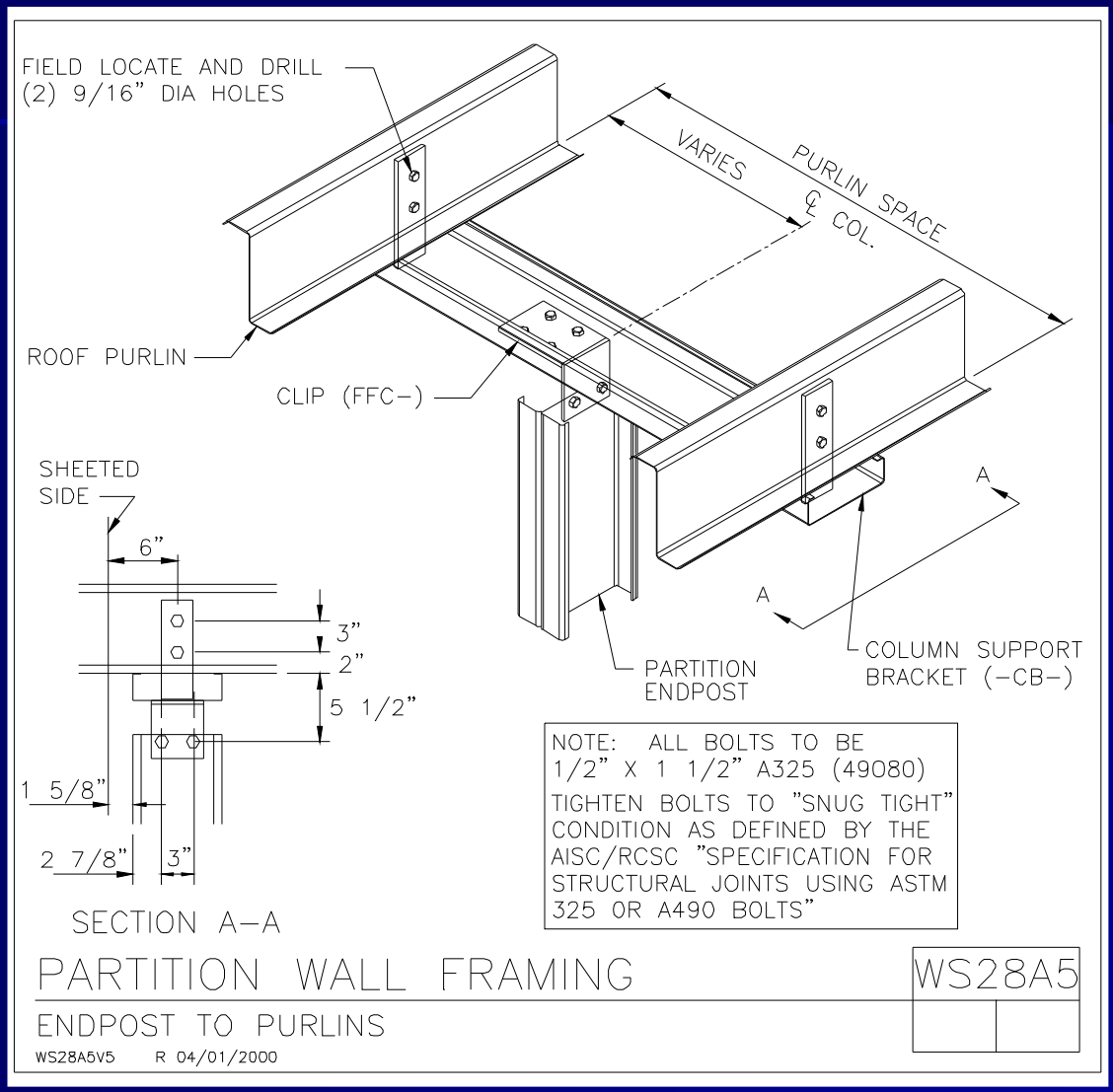
Partition to Roof Transition

Metal Partitions



Partition to Wall Transition

Partition Post Connection

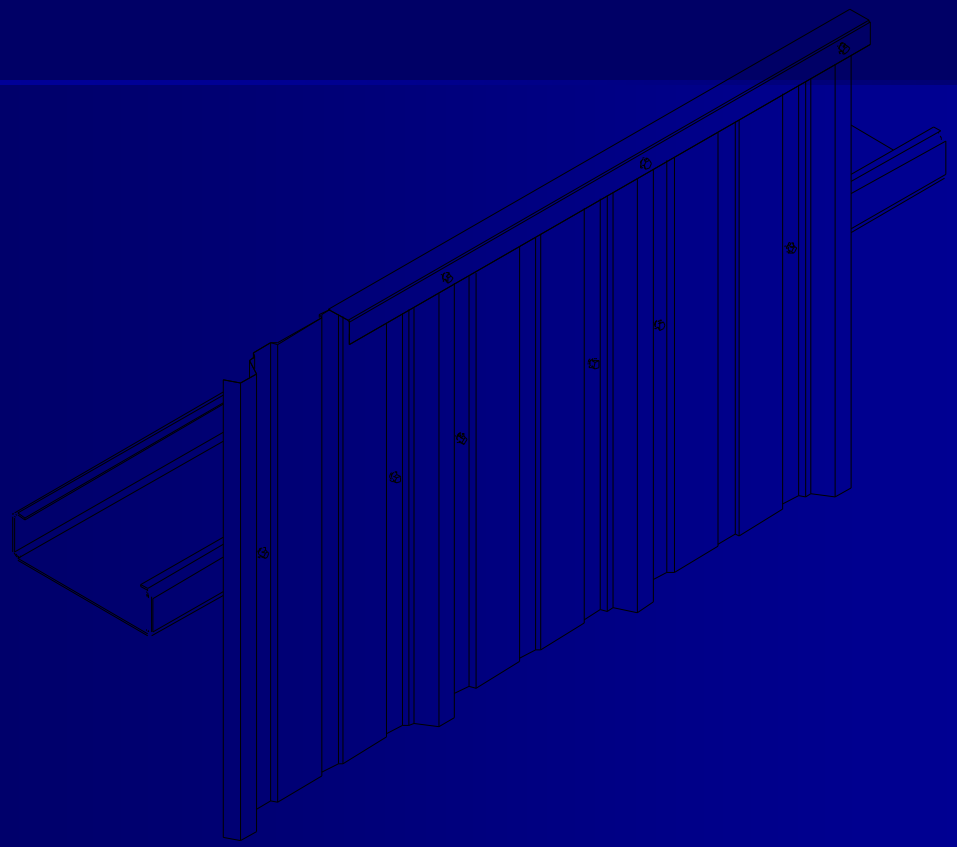


Liner

Liner Types:

- Full Height Liner
  - Floor to roof
- Partial Height Liner
  - Girt height plus 12” maximum
- Wainscot
  - Terminates under first girt (7’ - 6”)
  - 4” from Building Line

Liner

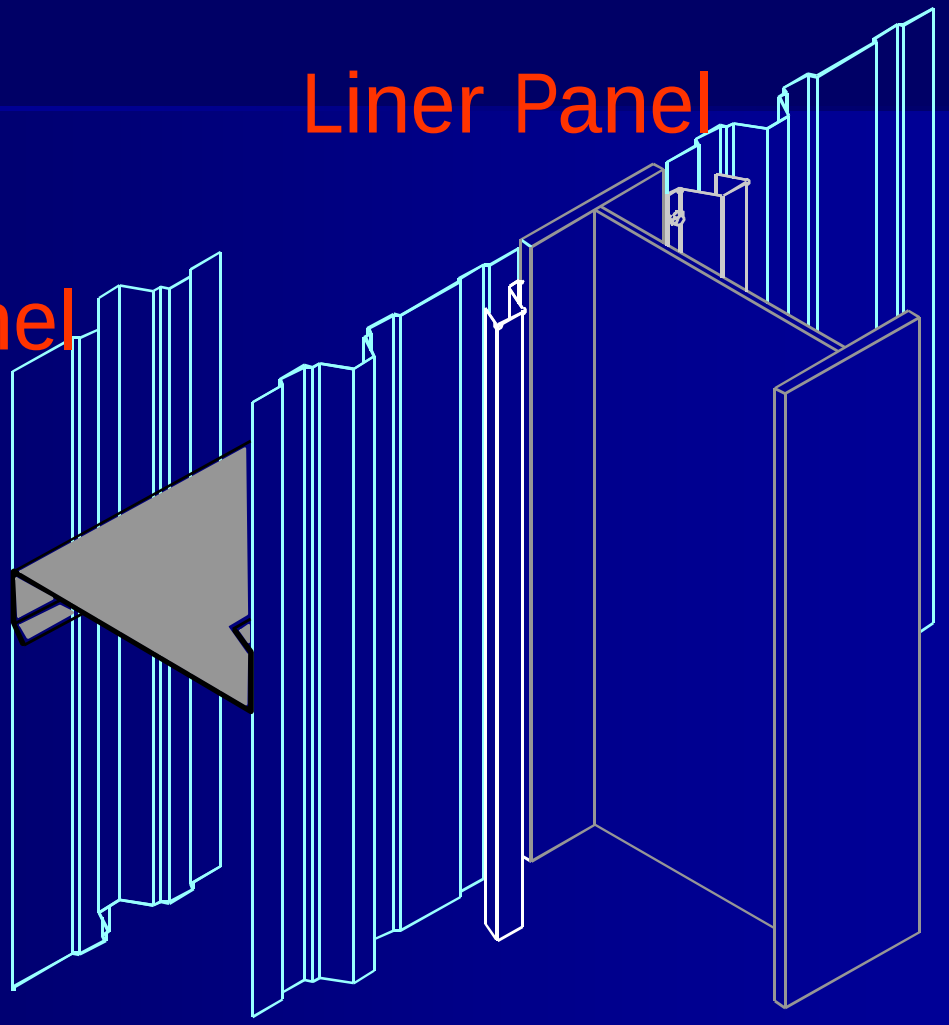


Partial Height Liner

Liner

Liner Panel

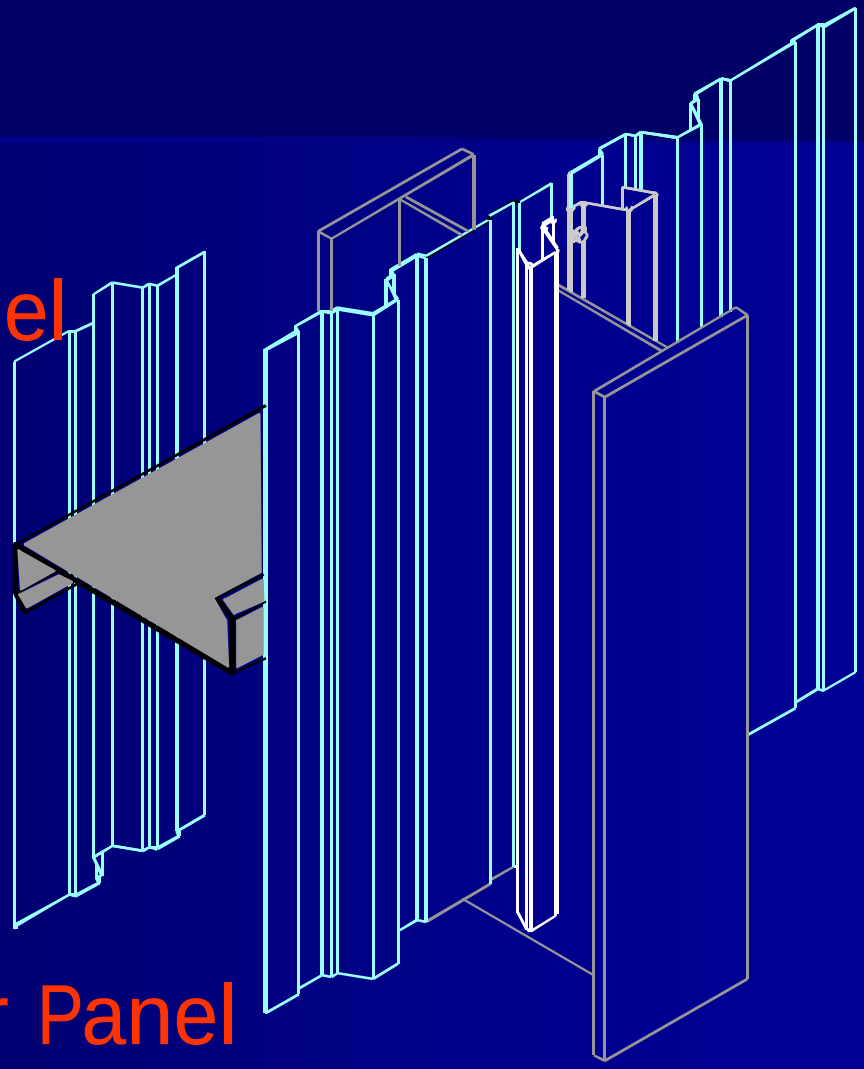
Exterior
Wall Panel



Liner Trim at Columns

Liner

Exterior
Wall Panel

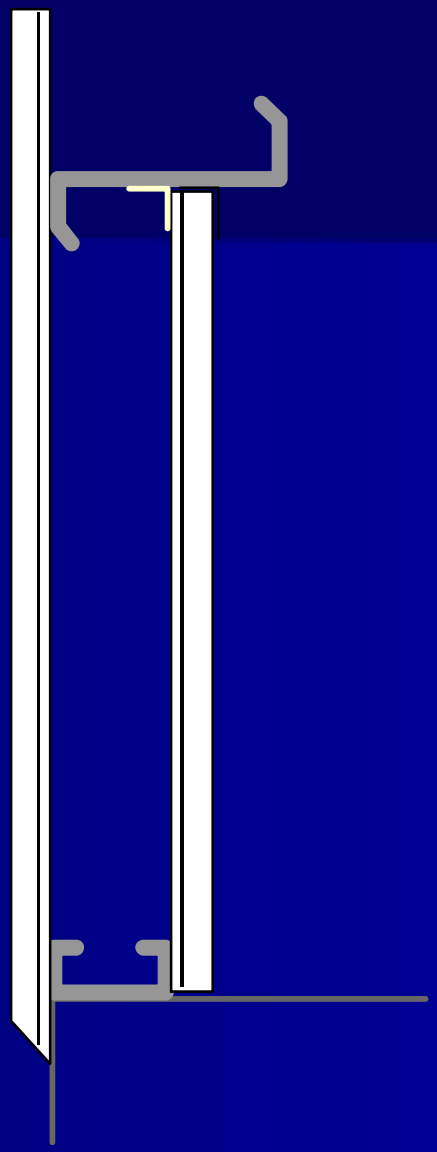


Liner Trim at
Columns

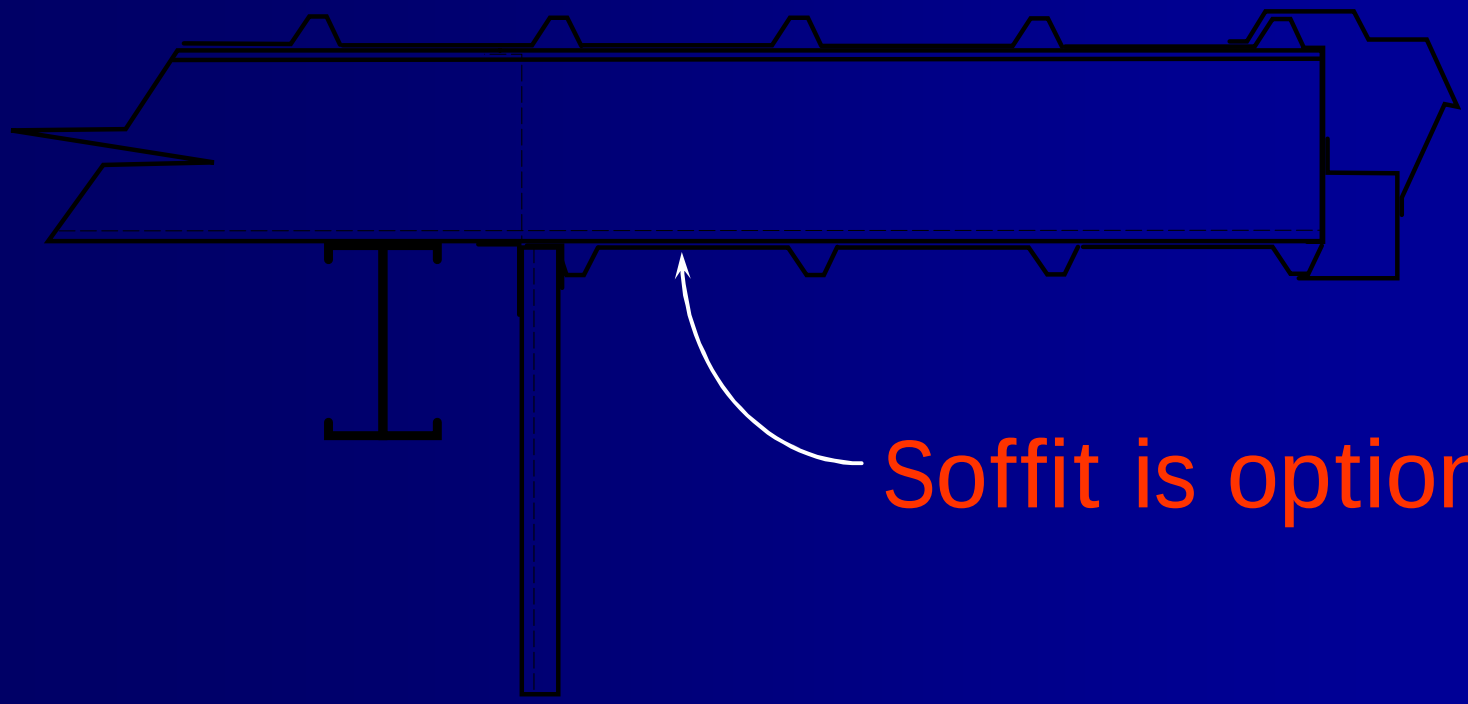
Liner Panel

Liner

Liner - Wainscot



Endwall Roof Extension



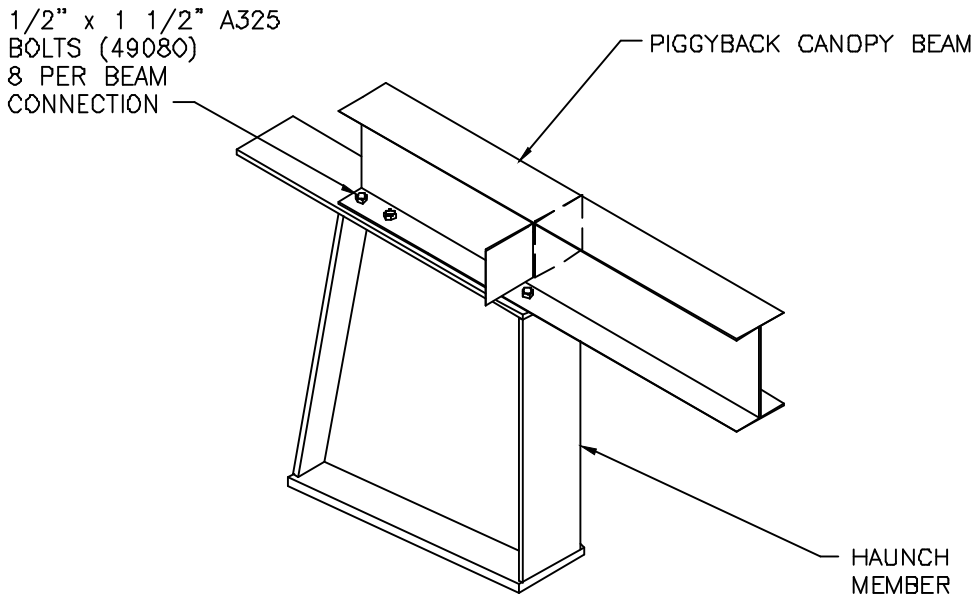
Roof/Rake Extension

Canopies

Canopy Types:

- Piggy Back Sidewall Canopy
- Built-Up Eave Canopy
- Built-Up Below Eave Canopy

Piggy-Back Canopy



NOTE: WHEN INSTALLING ROOF PANEL STRUCTURAL FASTENERS, AVOID FASTENING THRU PIGGYBACK CANOPY BEAMS.

PIGGYBACK CANOPY BEAM

ATTACHMENT TO INTERIOR FRAME

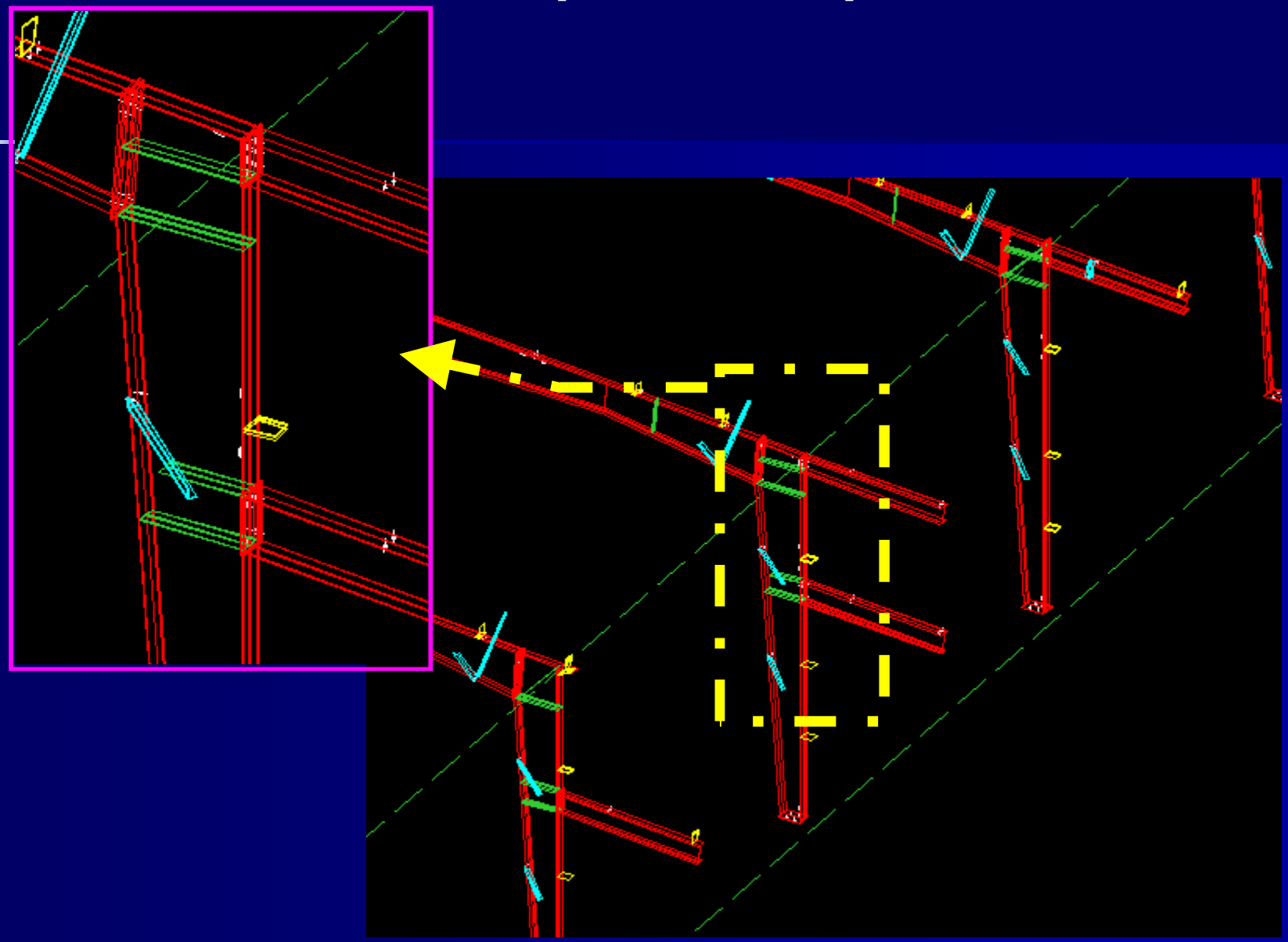
PF20C1V4 R 06/04/2001

PF20C1

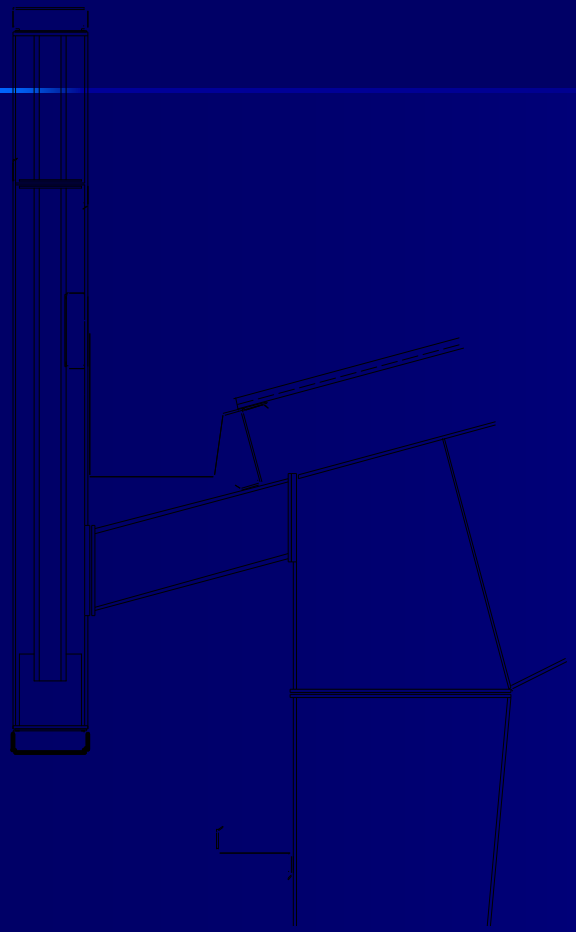
Piggy-Back Canopy

Piggy-back Canopy

Built-Up Canopies

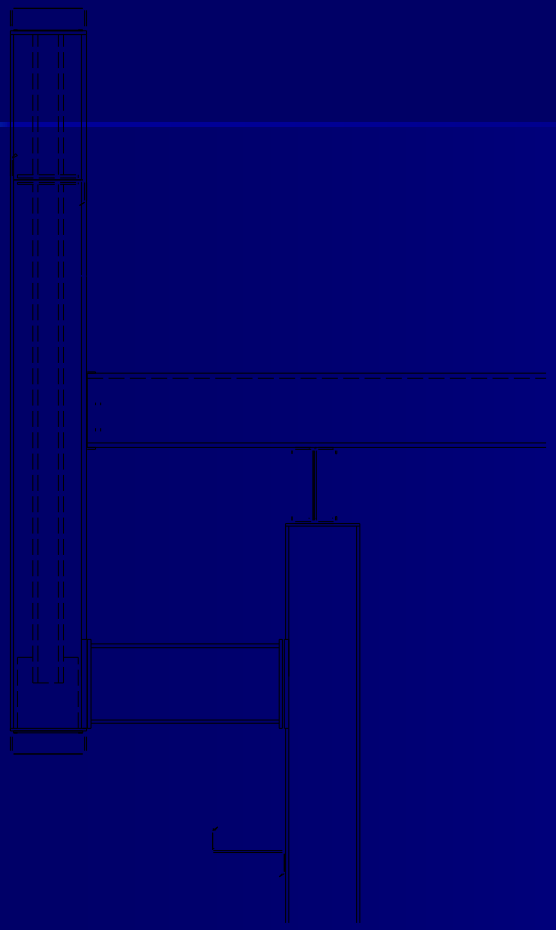


Facades



Closed Vertical
Facade at Sidewall

Facades

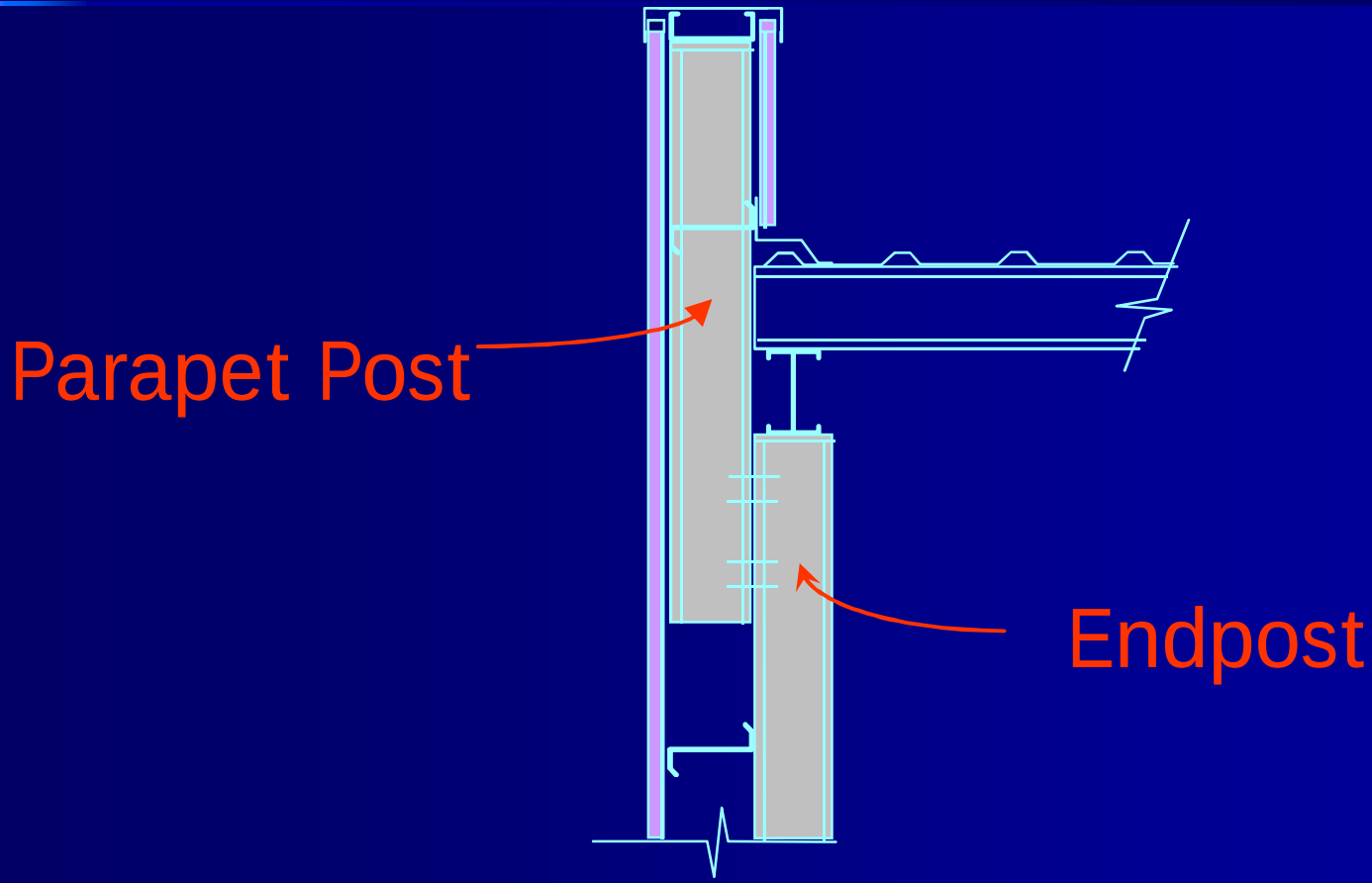


Closed Vertical Facade at Endwall

Facade

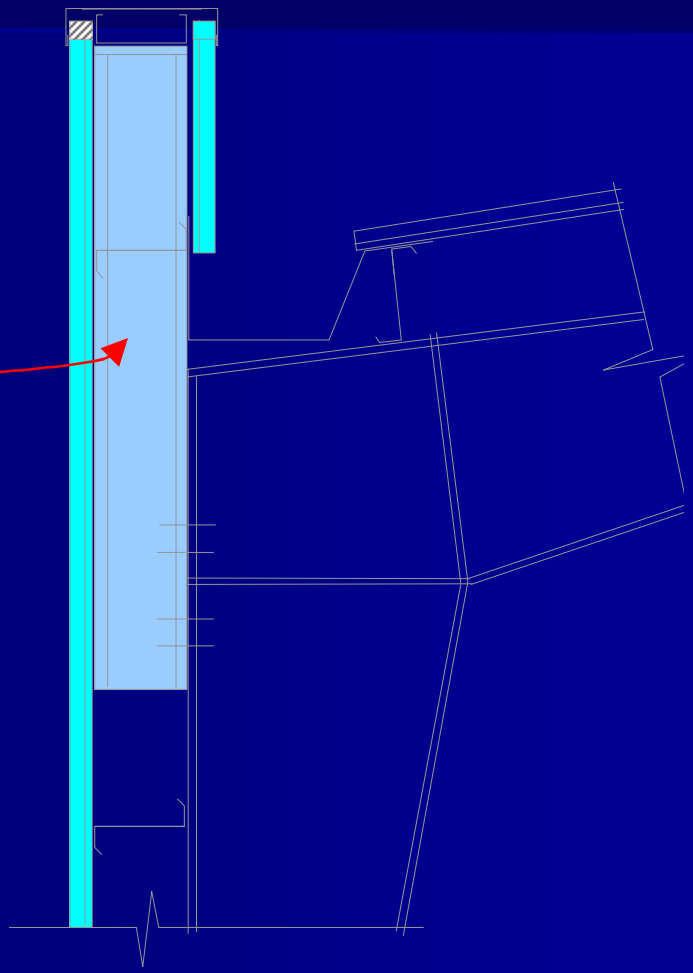
Facade

Parapet Endwalls



Sidewall Parapet

Parapet Post



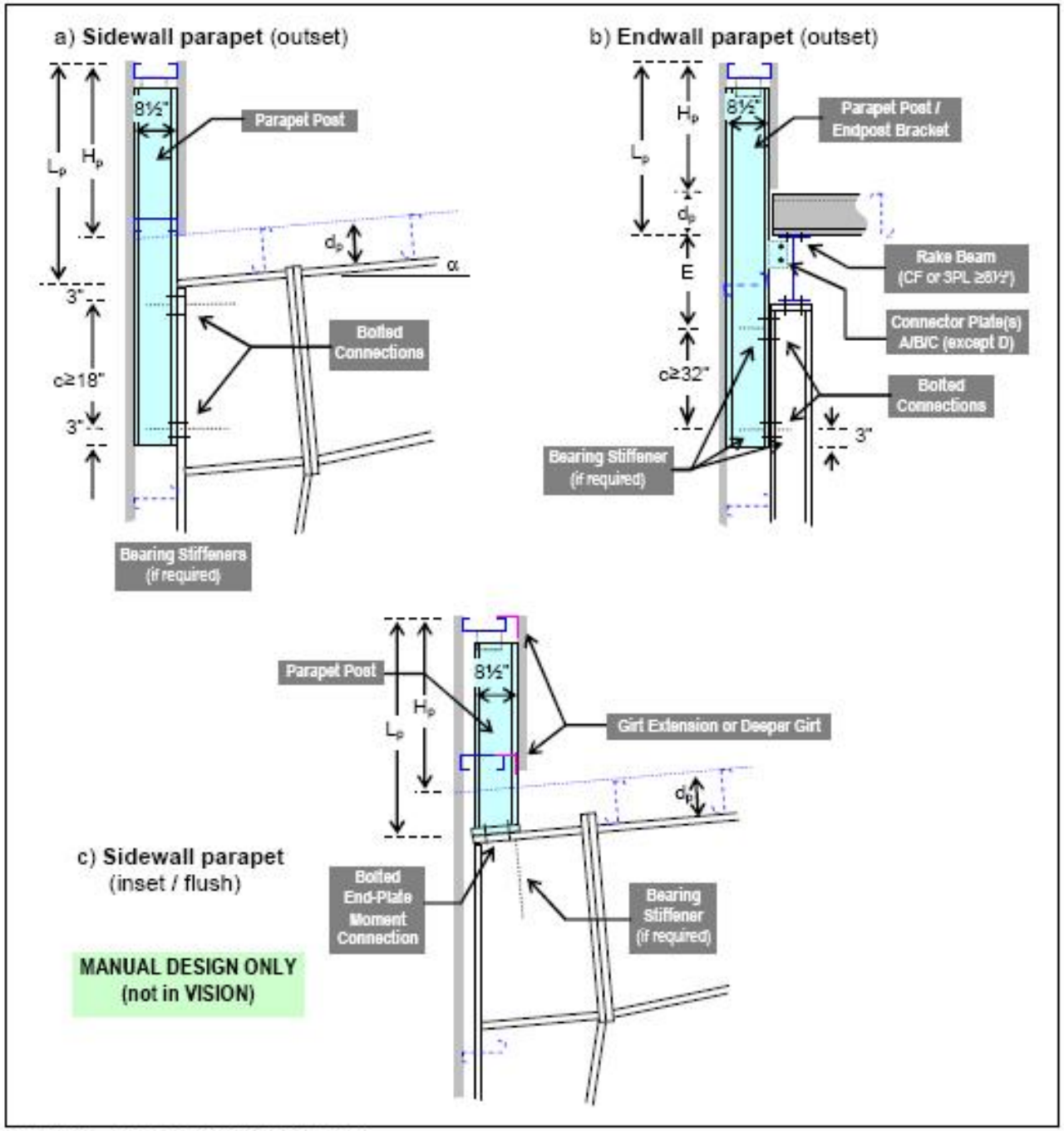


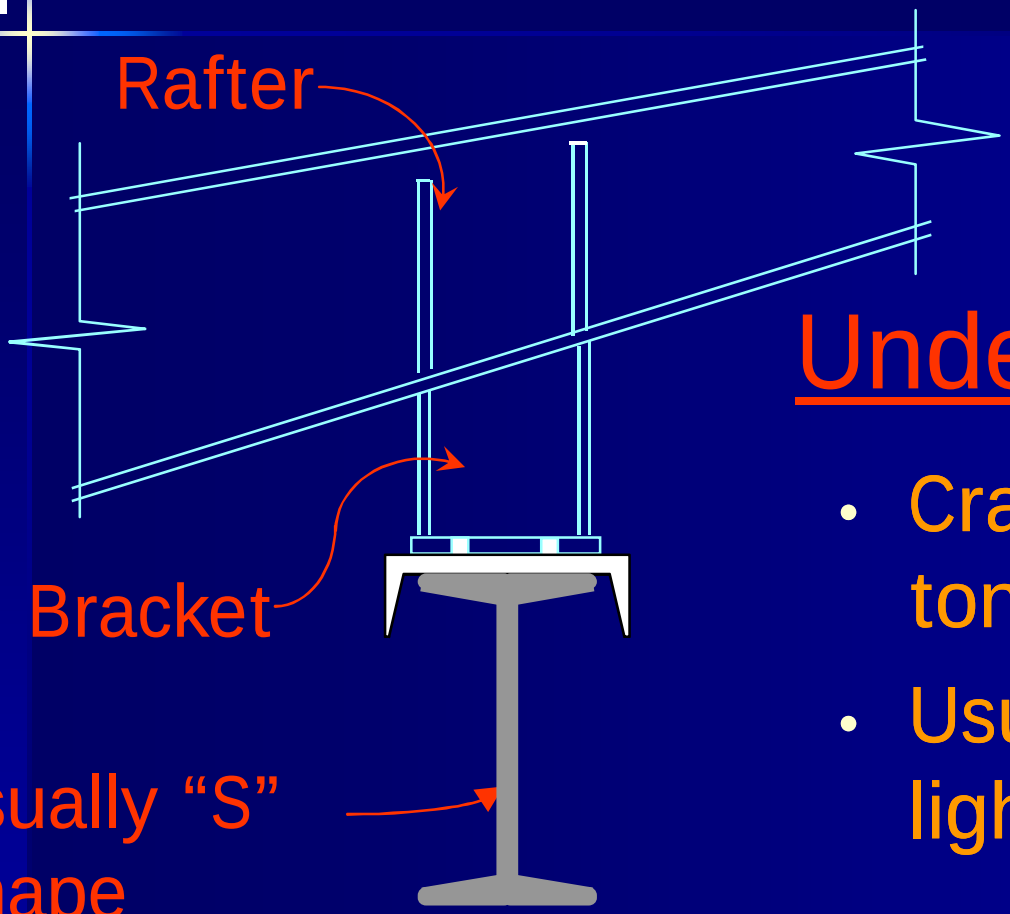
Figure 1 Parapet configurations

Crane Systems

VP can provide:

- Design of building and support system
- Support system
  - Brackets
  - Crane Beams
  - Channel Cap

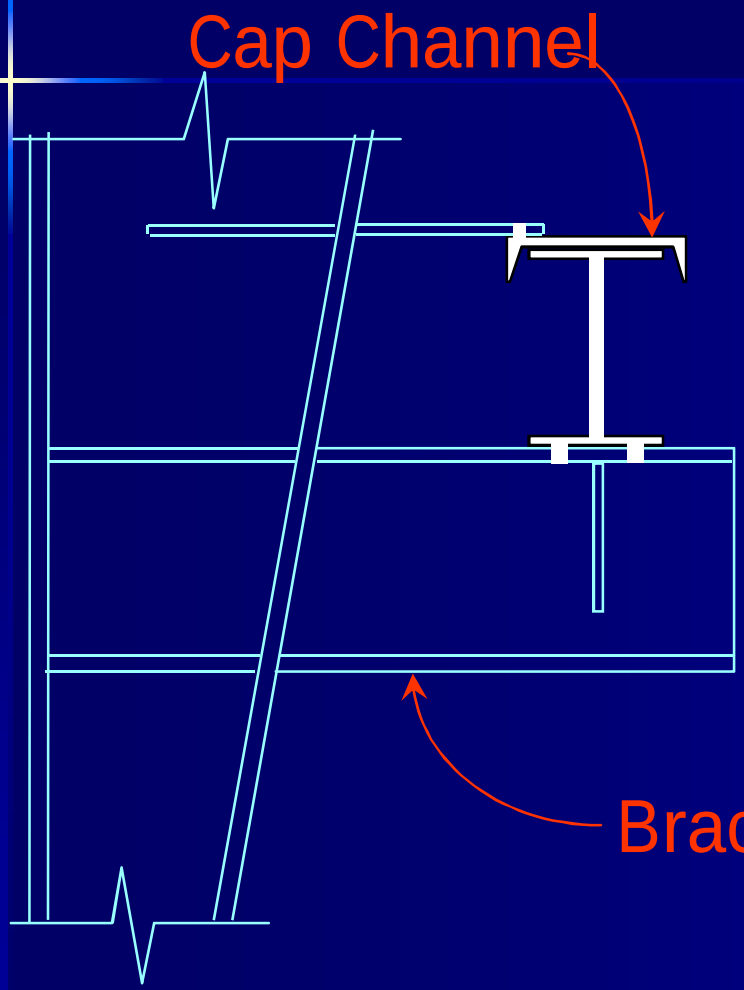
Crane Systems



Underhung Cranes

- Cranes up to 10 tons
- Usually small span, light crane systems

Crane Systems

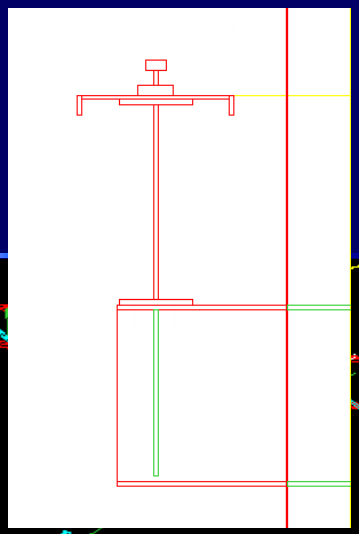


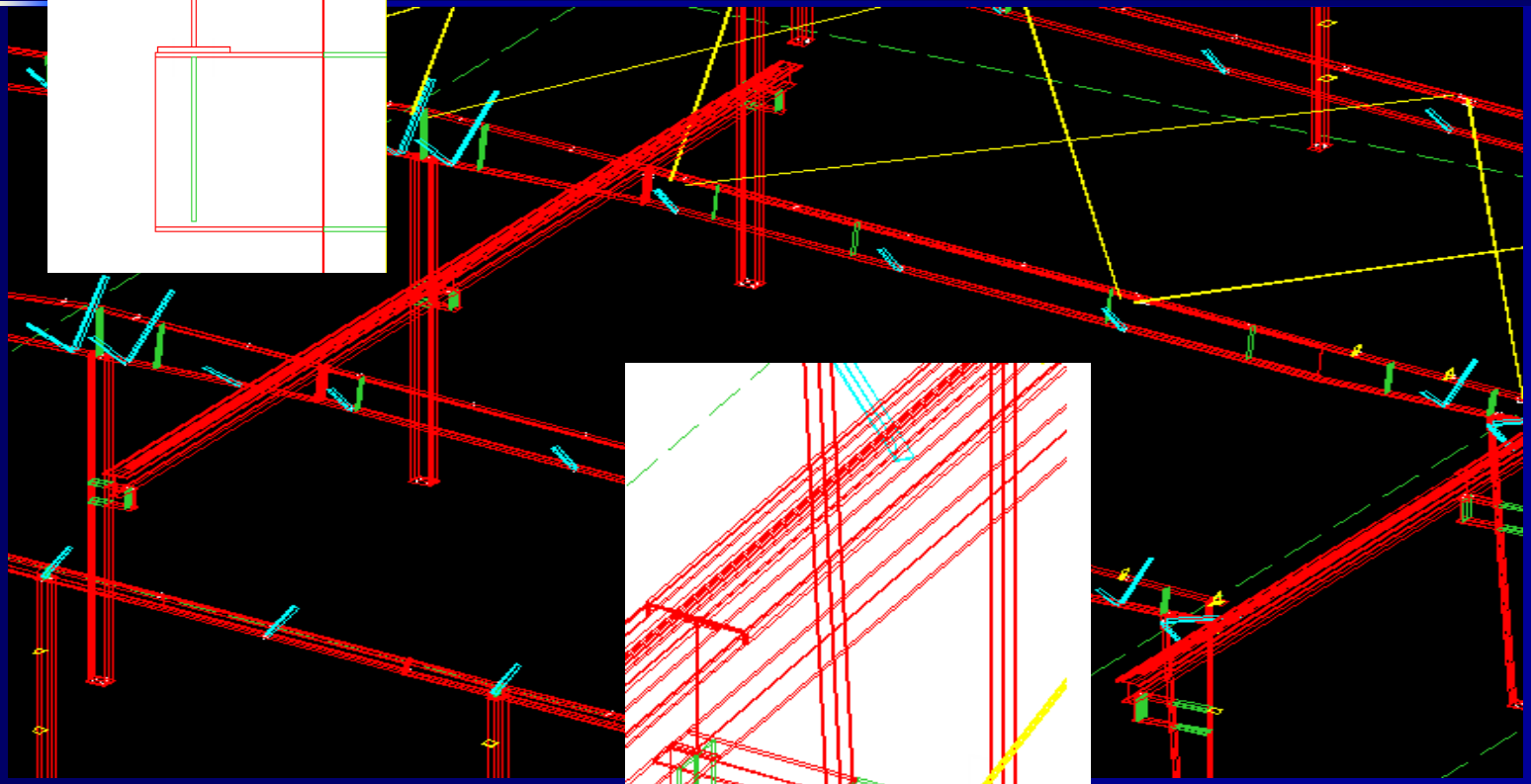
Top Running Cranes

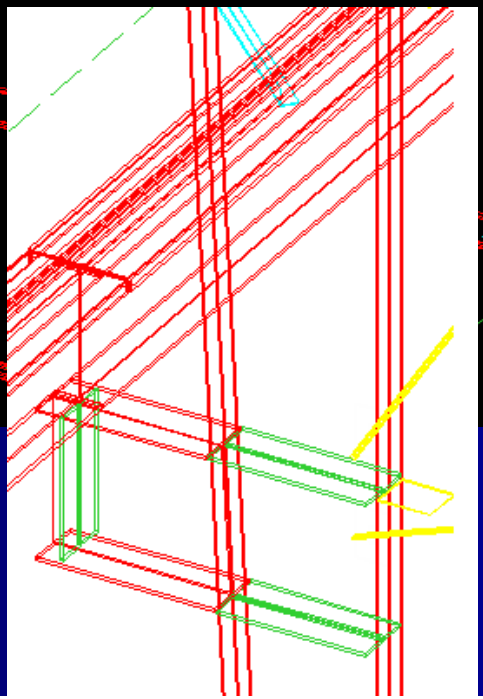
- Cranes up to 15 tons

Crane Systems

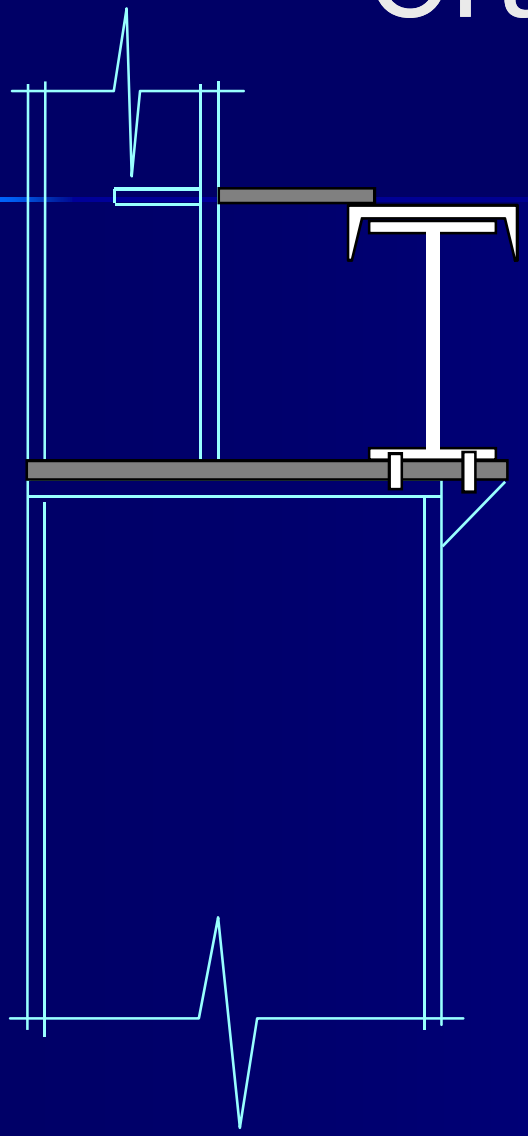
Crane







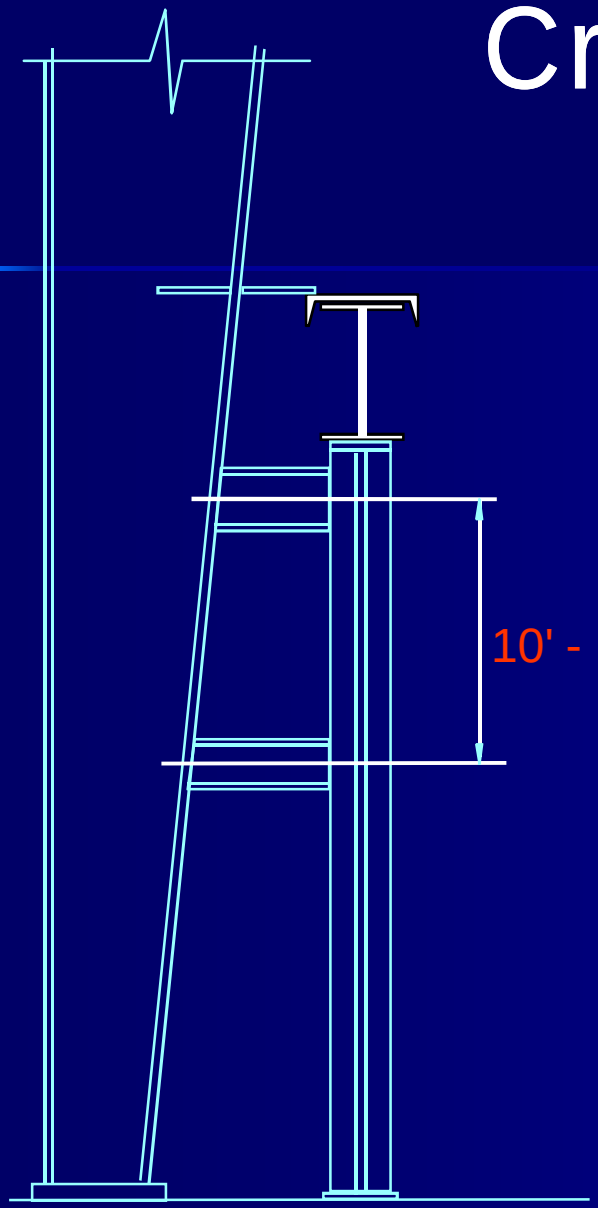
Crane Systems



Top Running Cranes w/ Stepped Column

- Cranes up to 30 tons
- Fixed Base columns sometimes required

Crane Systems

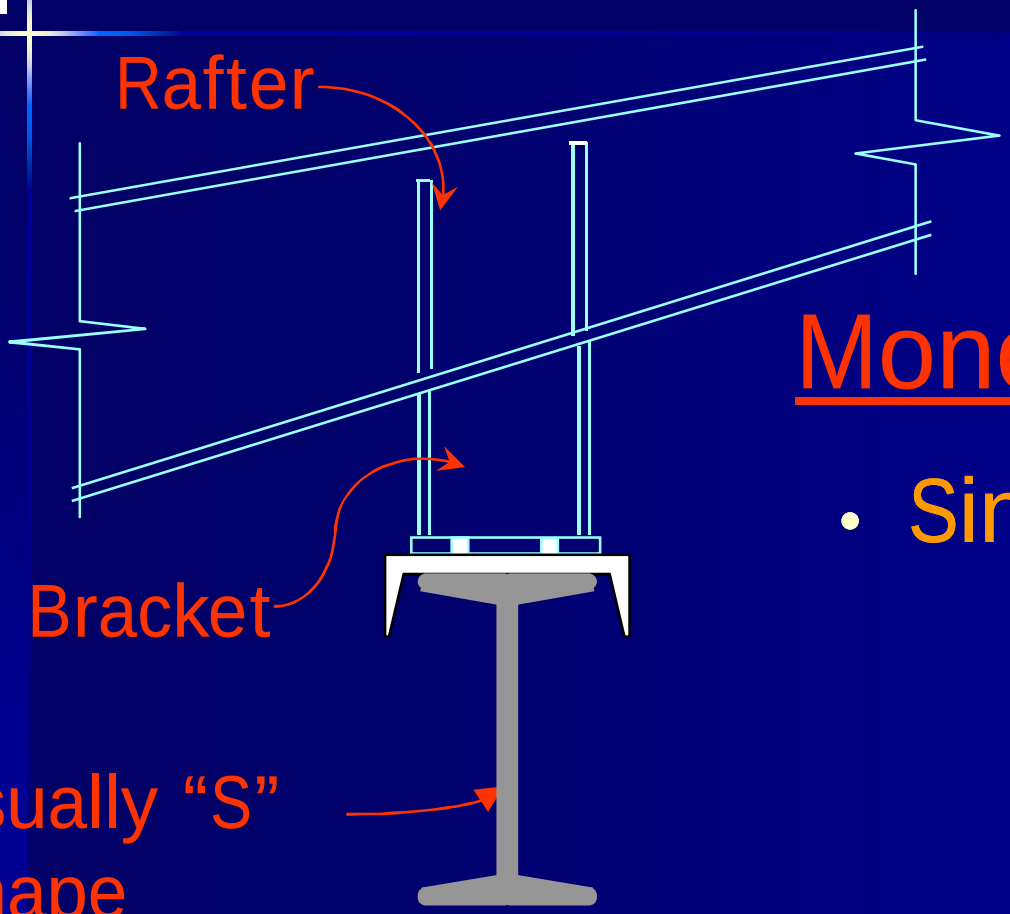


Top Running Cranes w/ Auxiliary Column

- Cranes over 30 tons


P&H
P&H
P&H

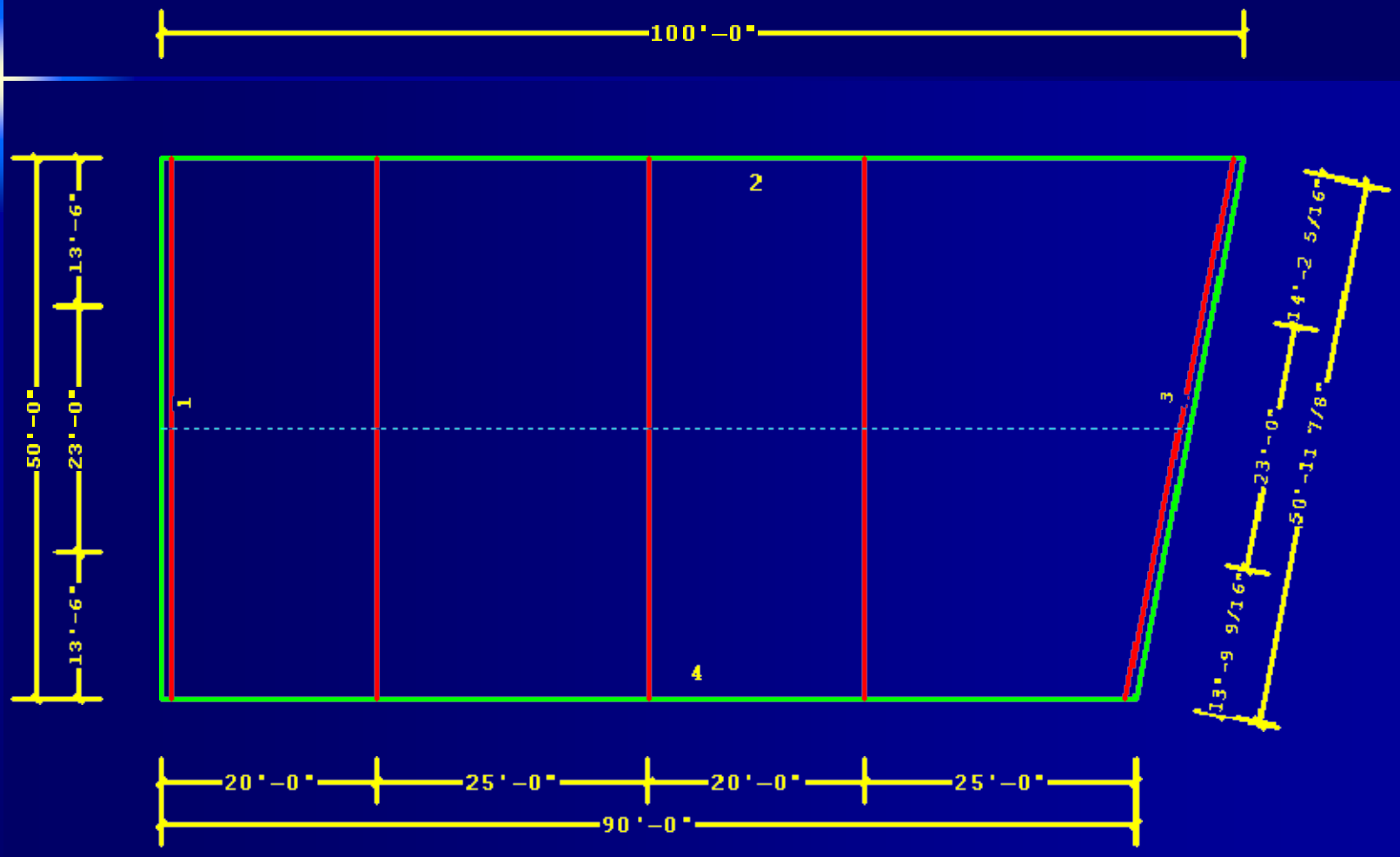
Crane Systems



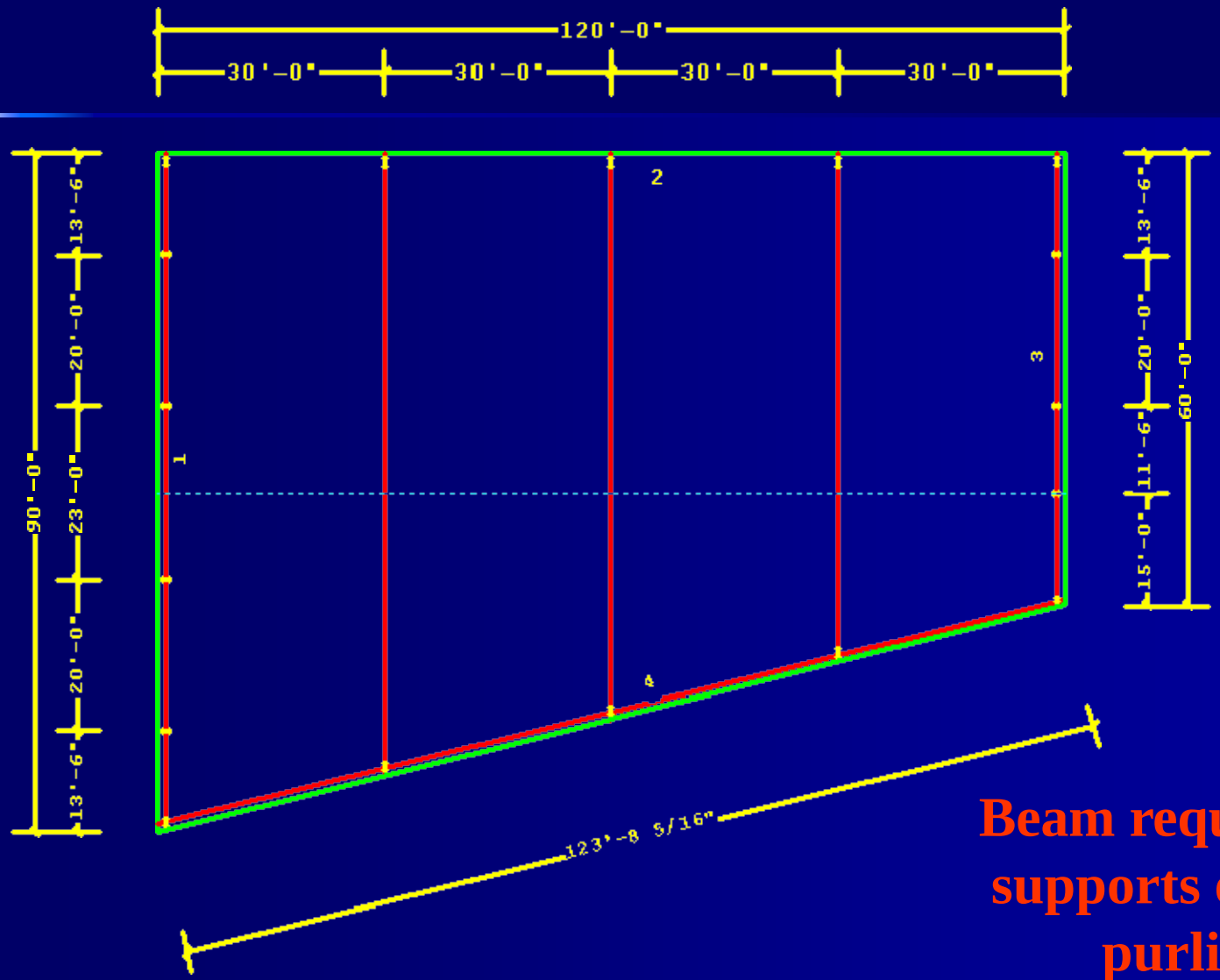
Mono-rail Cranes

- Single rail hoists

Skewed Endwalls



Skewed Sidewalls



Beam required to supports ends of purlins

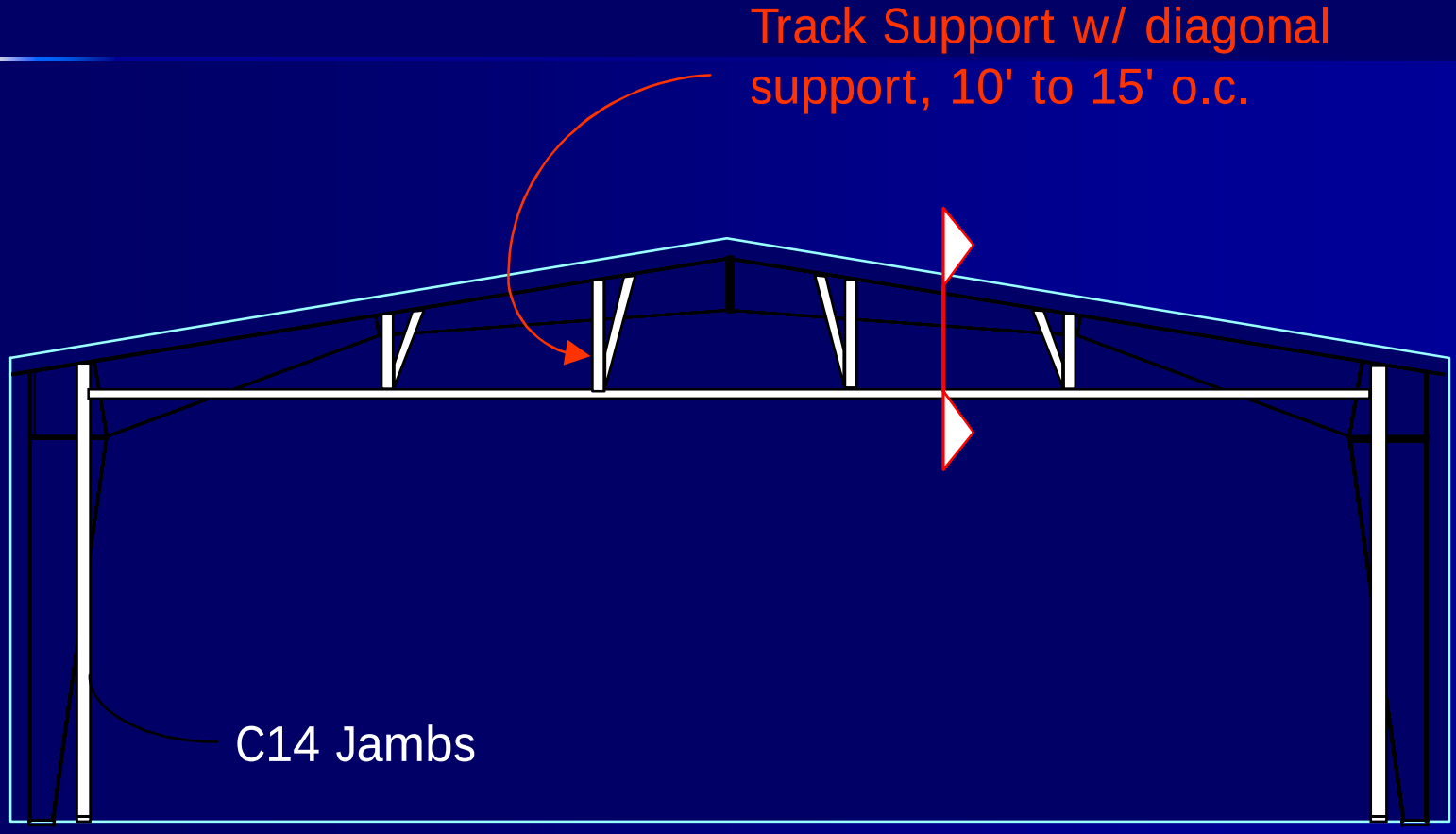
Skewed Sidewall

Hangar Buildings

Hangar Door Types:

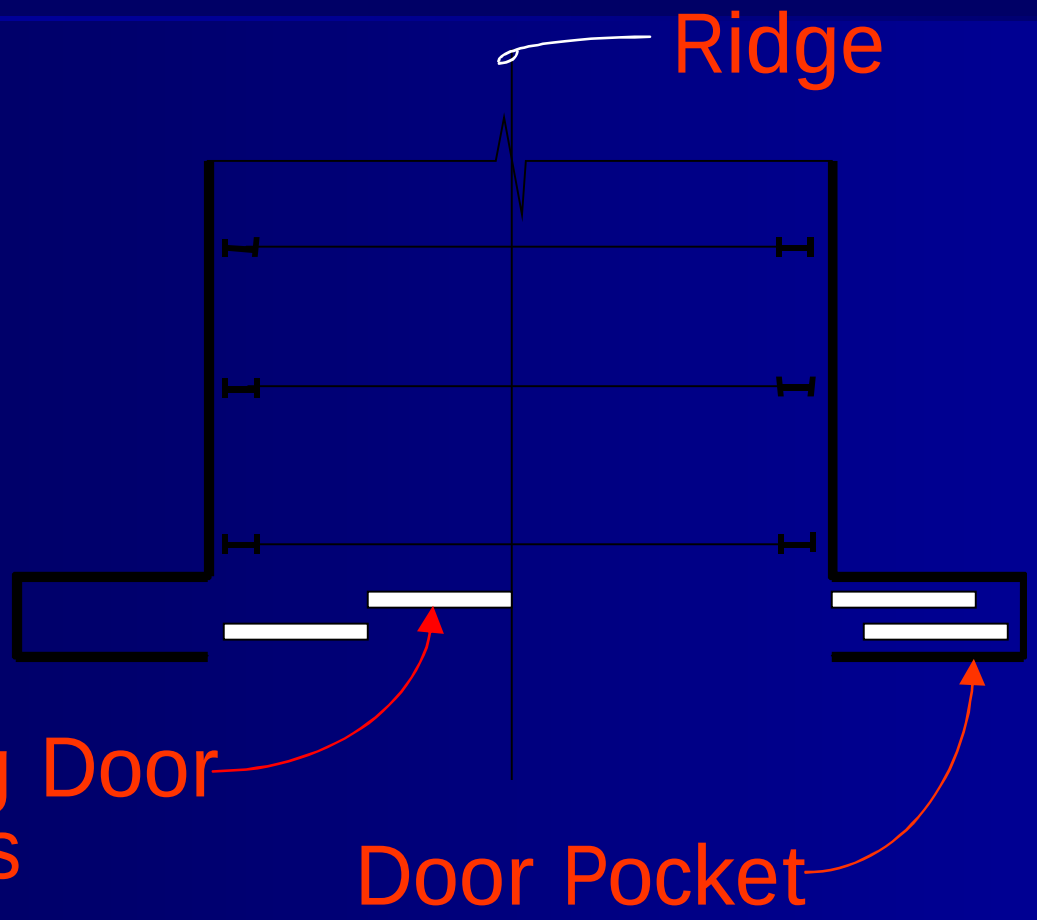
- Sliding Door Leaves
  - With or without door pockets
- Bi-Fold Doors
- Stack Doors

Sliding Hangar Doors

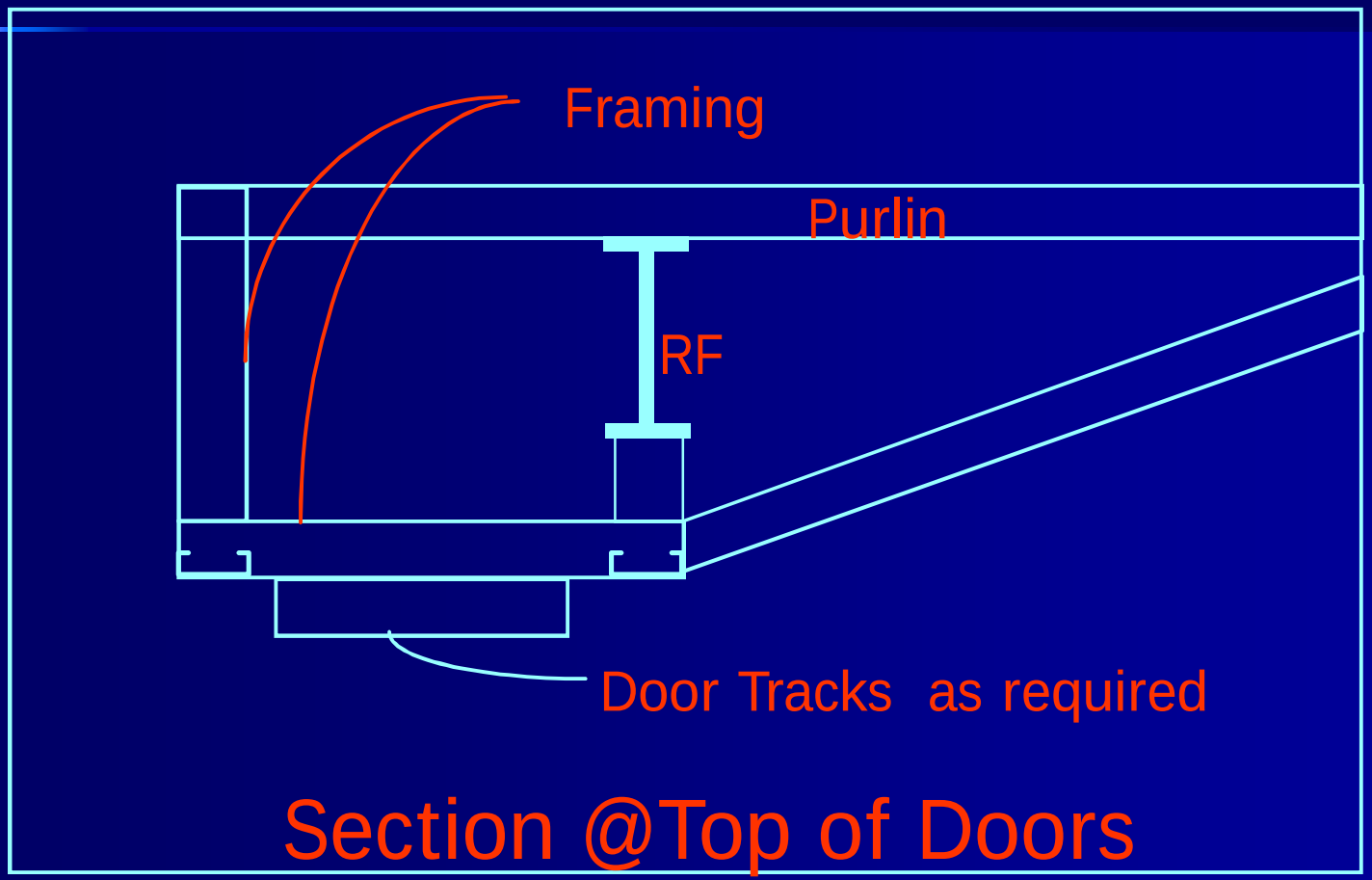


Sliding Hangar Doors

Sliding Doors with Pockets

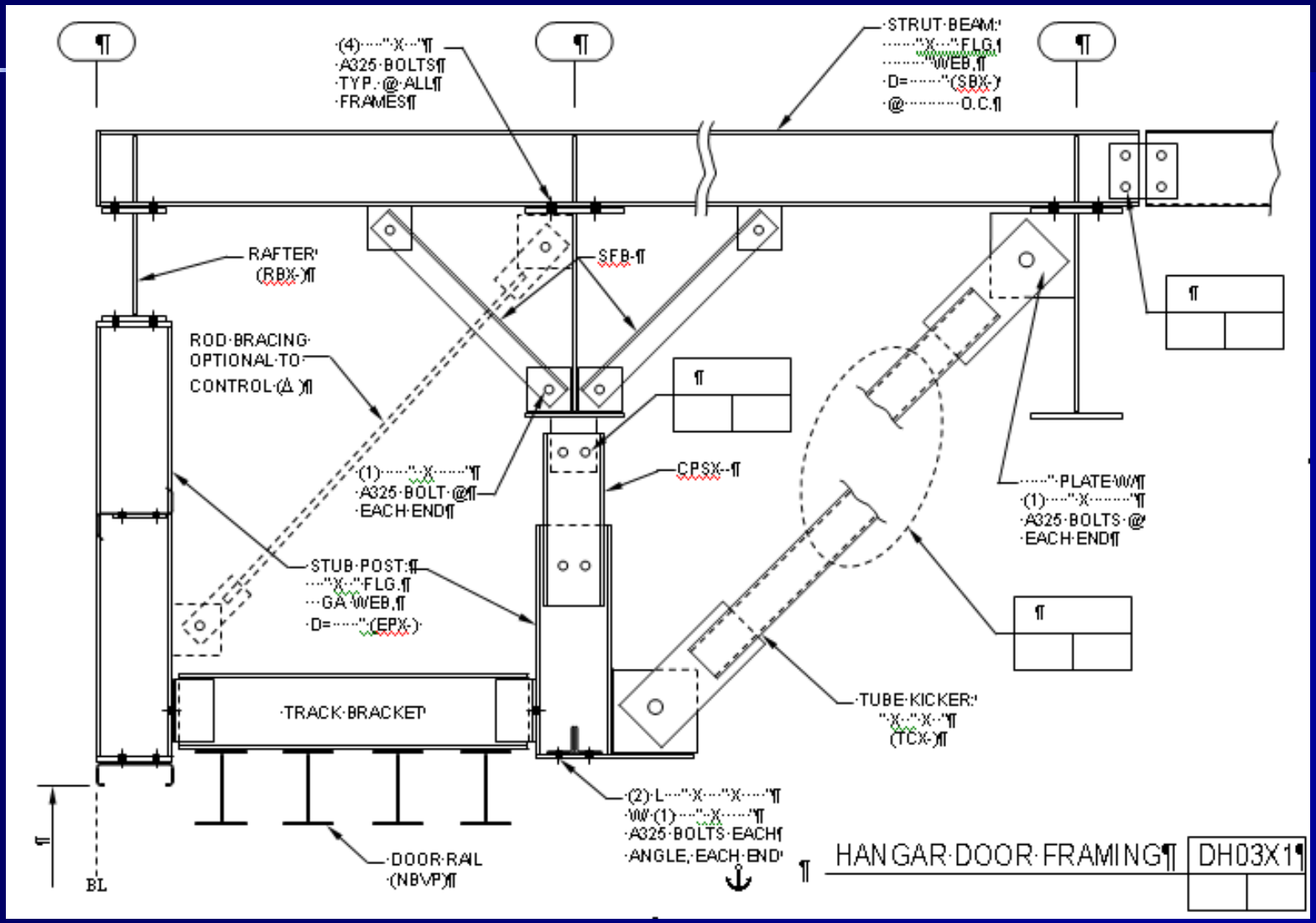


Section at Sliding Door Header

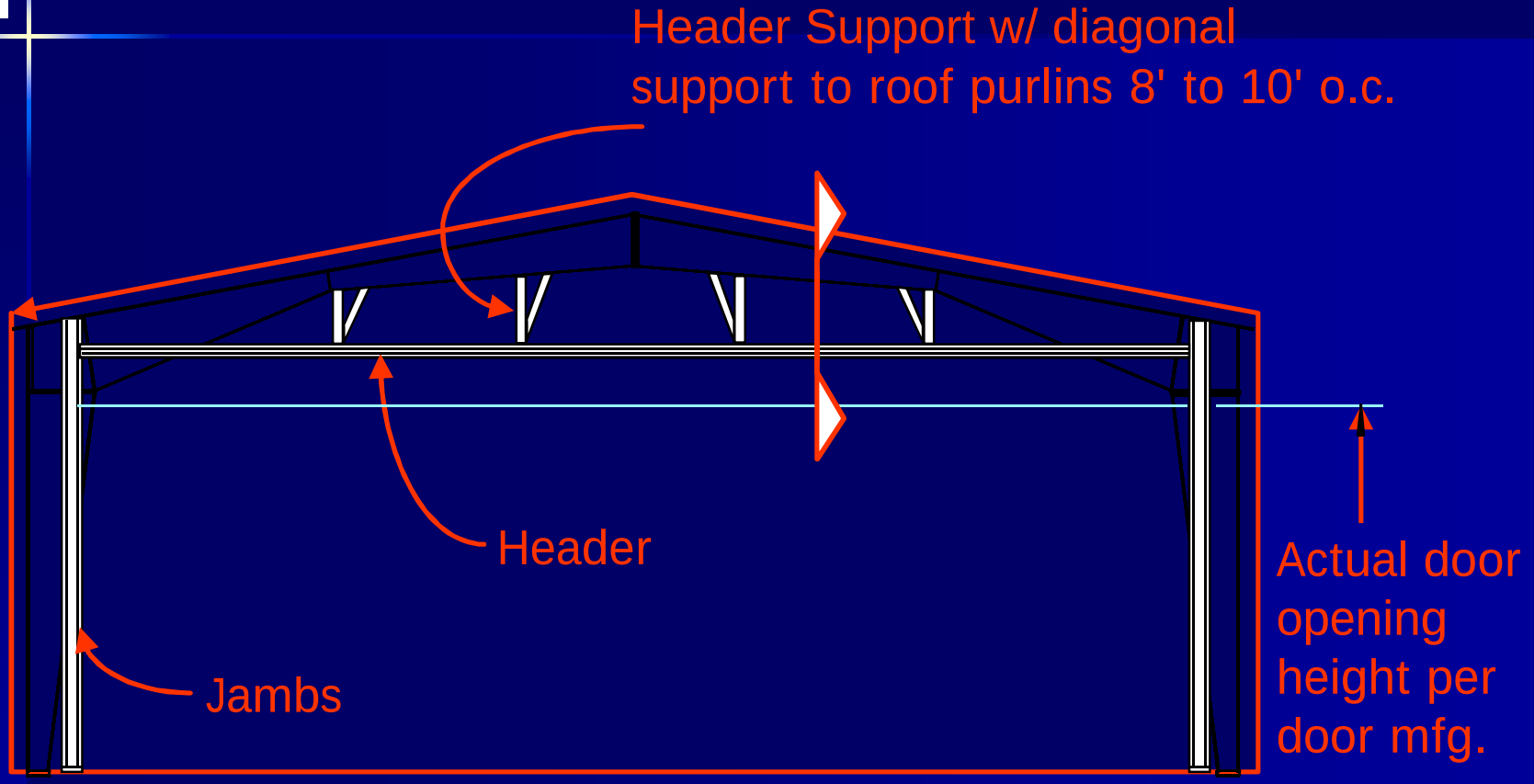


Section @Top of Doors

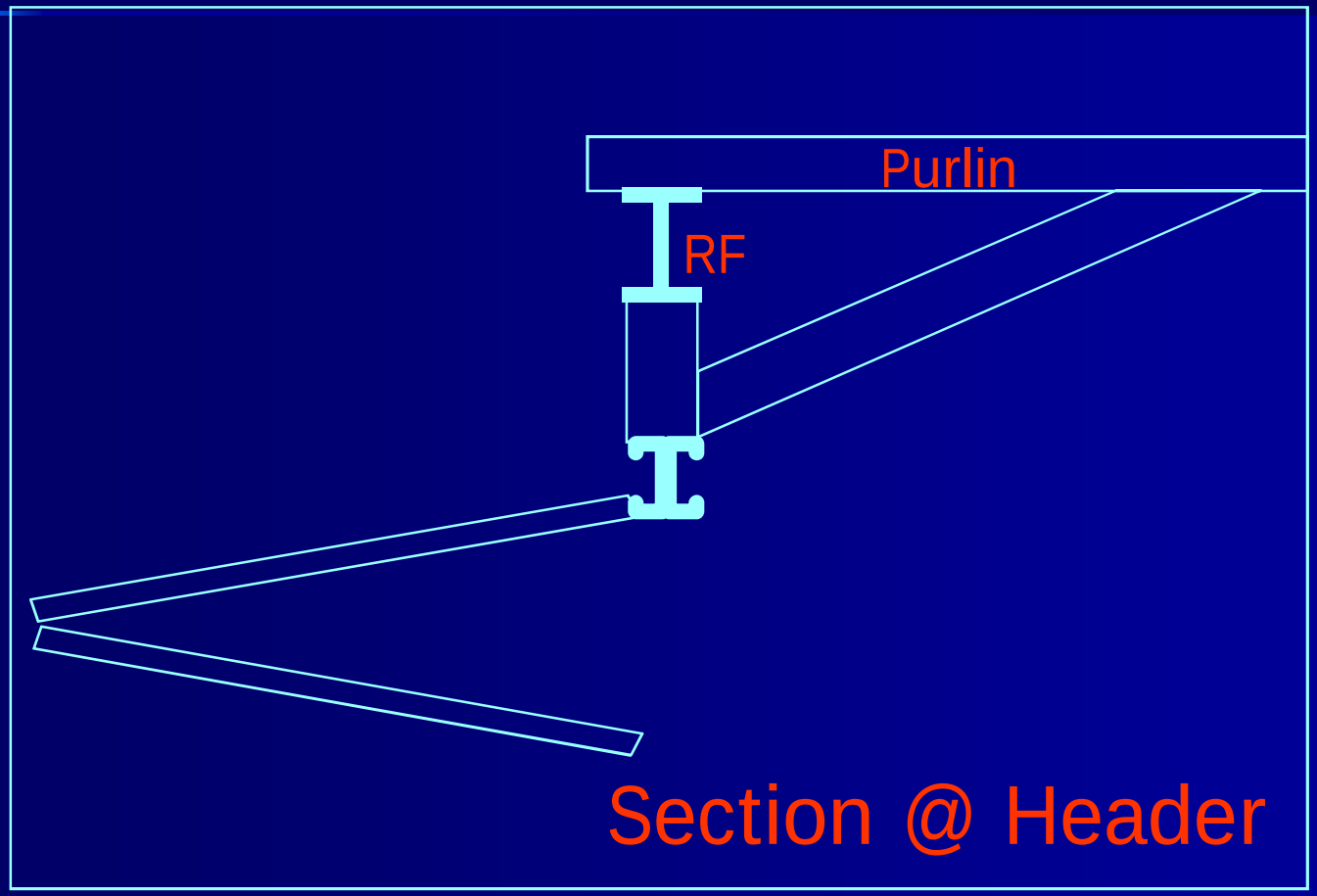
Sliding Doors with Pockets



Bi-Fold Hangar Doors



Section at Bi-Fold Header

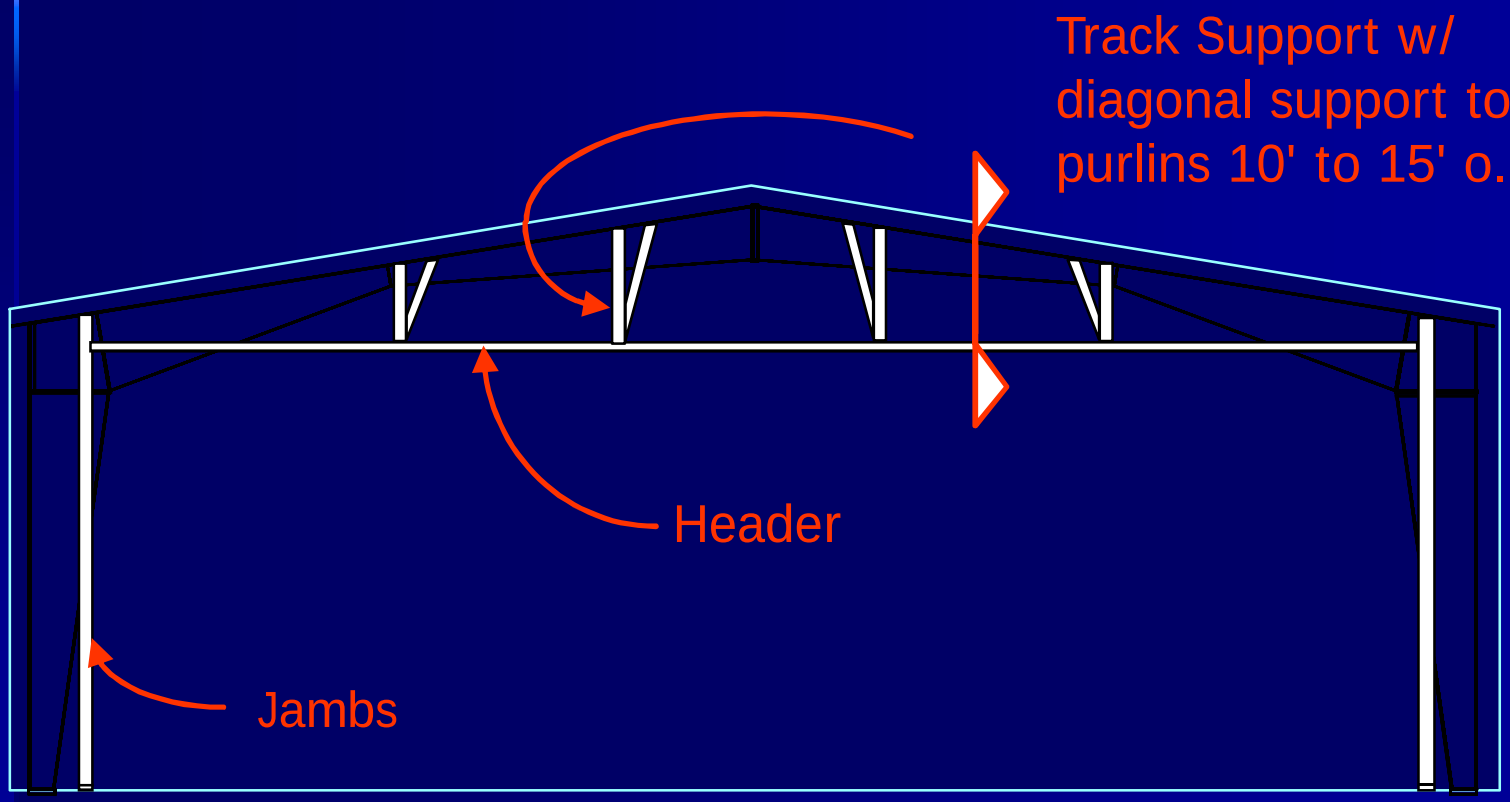


Weighing in at 16,000 pounds and measuring 80' x 27', Schweiss bifolds were the choice of several hangars that were part of a Varco Pruden real estate development project at the Morristown Municipal Airport, Morristown, New Jersey.

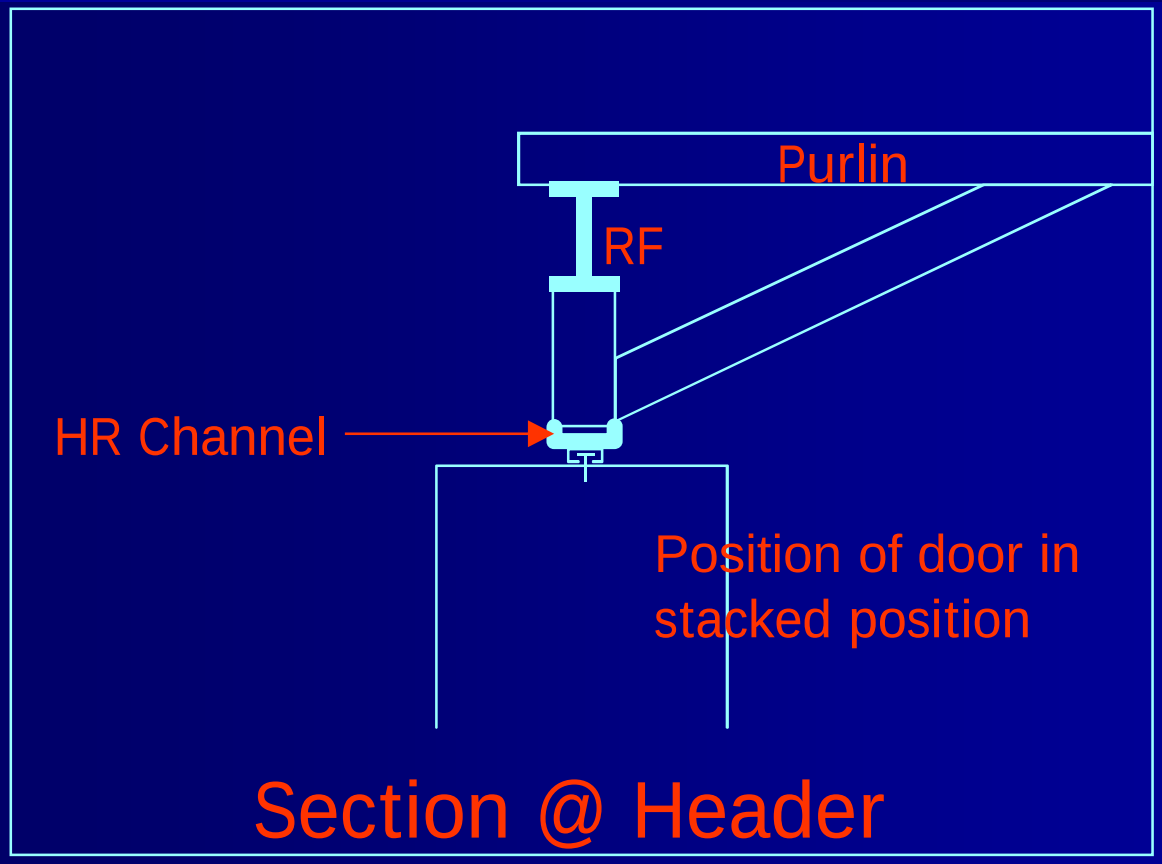
From: http://www.bifold.com/assets/morristown-1.jpg

Bi-Fold Door

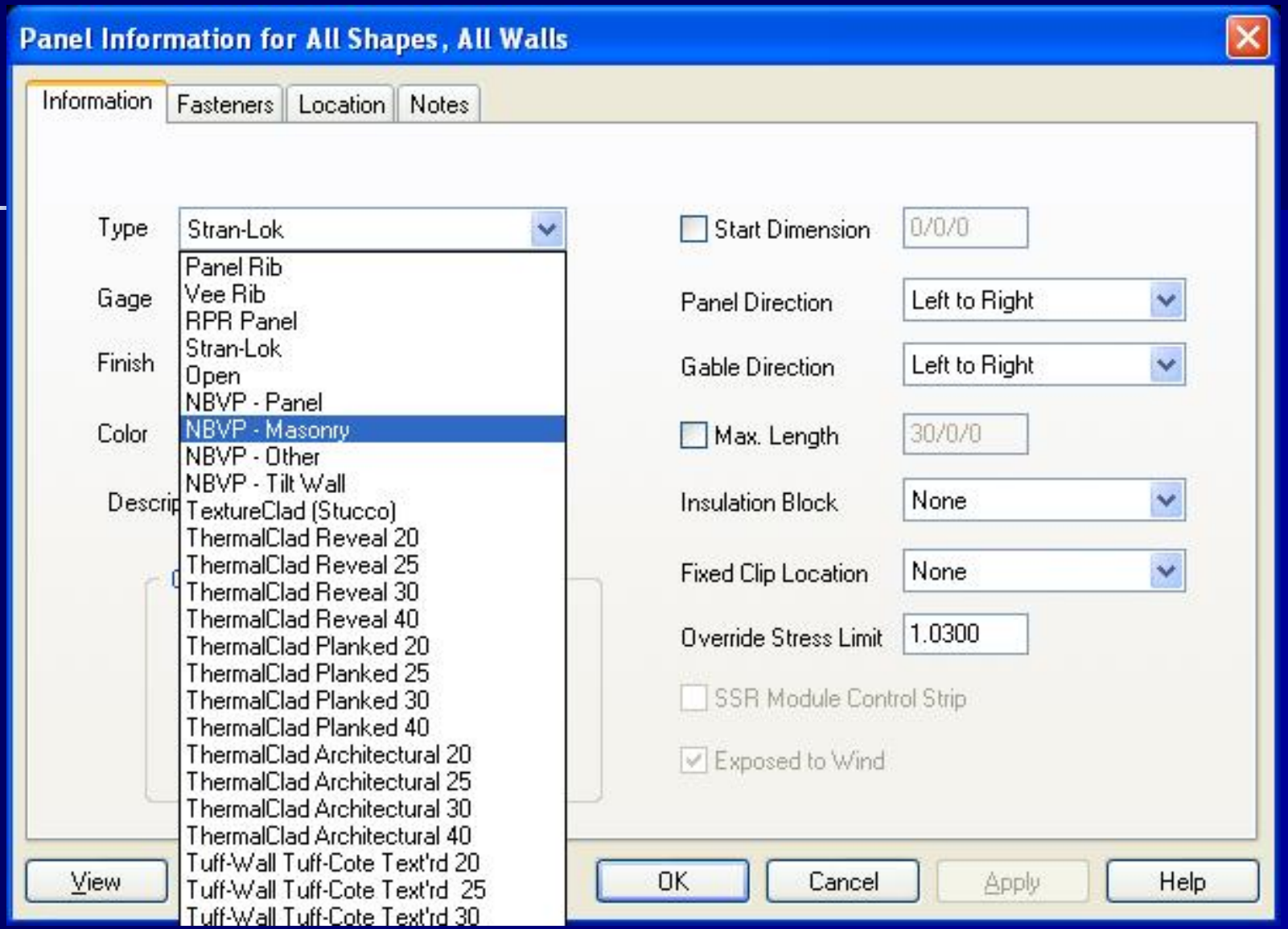
Stacking Hangar Doors



Section of Stacking Hangar Door



Support of Masonry


Panel Information for All Shapes, All Walls
Information
Fasteners
Location
Notes
Type
Stran-Lok
Gage
Finish
Color
Descrip
Panel Rib
Vee Rib
RPR Panel
Stran-Lok
Open
NBVP - Panel
NBVP - Masonry
NBVP - Other
NBVP - Tilt Wall
TextureClad (Stucco)
ThermalClad Reveal 20
ThermalClad Reveal 25
ThermalClad Reveal 30
ThermalClad Reveal 40
ThermalClad Planked 20
ThermalClad Planked 25
ThermalClad Planked 30
ThermalClad Planked 40
ThermalClad Architectural 20
ThermalClad Architectural 25
ThermalClad Architectural 30
ThermalClad Architectural 40
Tuff-Wall Tuff-Cote Text'rd 20
Tuff-Wall Tuff-Cote Text'rd 25
Tuff-Wall Tuff-Cote Text'rd 30
Start Dimension
0/0/0
Panel Direction
Left to Right
Gable Direction
Left to Right
Max. Length
30/0/0
Insulation Block
None
Fixed Clip Location
None
Override Stress Limit
1.0300
SSR Module Control Strip
Exposed to Wind
View
OK
Cancel
Apply
Help

Covering Type Selection	Results
Panel Rib	***Leaves*** sheeting, secondary, insulation, and/or liner unless removed elsewhere.
Vee Rib	***Leaves*** sheeting, secondary, insulation, and/or liner unless removed elsewhere.
Open	***Removes*** all material; sheeting, secondary, insulation, and liner unless defined elsewhere and applies loading as if that portion is open for wind access.
Not by VP - Masonry	***Removes*** sheeting, secondary, and insulation, unless defined differently elsewhere and applies loading as if that portion is covered. If this type is selected and "Supported by Others" is NOT selected, you must provide VP Buildings with additional information regarding the material type.
Not by VP – Tilt Wall	***Removes*** sheeting, secondary, and insulation unless defined differently elsewhere and applies loading as if that portion is covered. If this type is selected and "Supported by Others" is NOT selected, you must provide VP Buildings with additional information regarding the material type.
Not by VP - Panel	***Removes*** covering and ***leaves*** secondary, insulation, and liner unless defined differently elsewhere.
Not by VP - Other	***Removes*** covering and ***leaves*** secondary, insulation, and liner unless defined differently elsewhere.

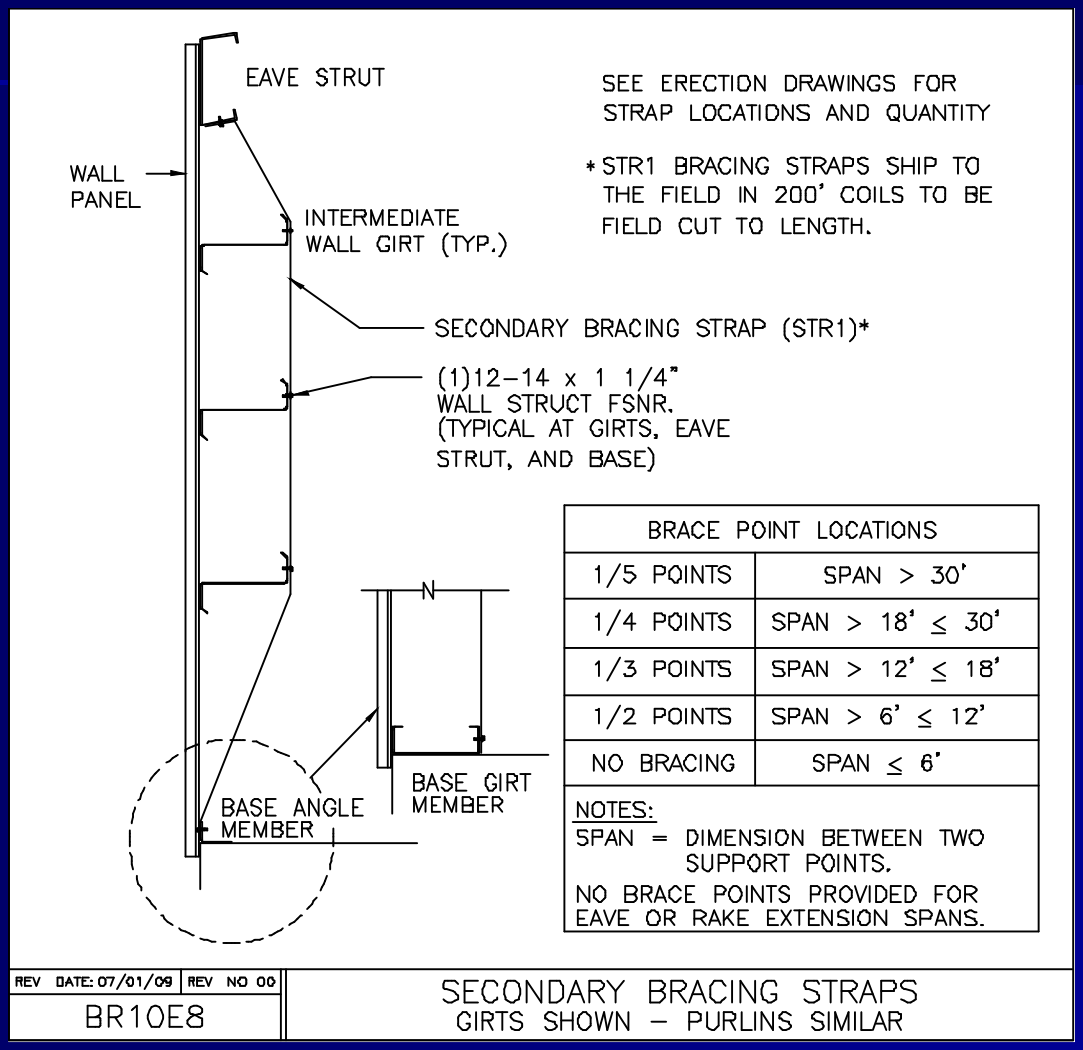
Wall / Roof Material NBVP

The builder is must supply the actual weight of these materials.
The weights on this page are only for reference.

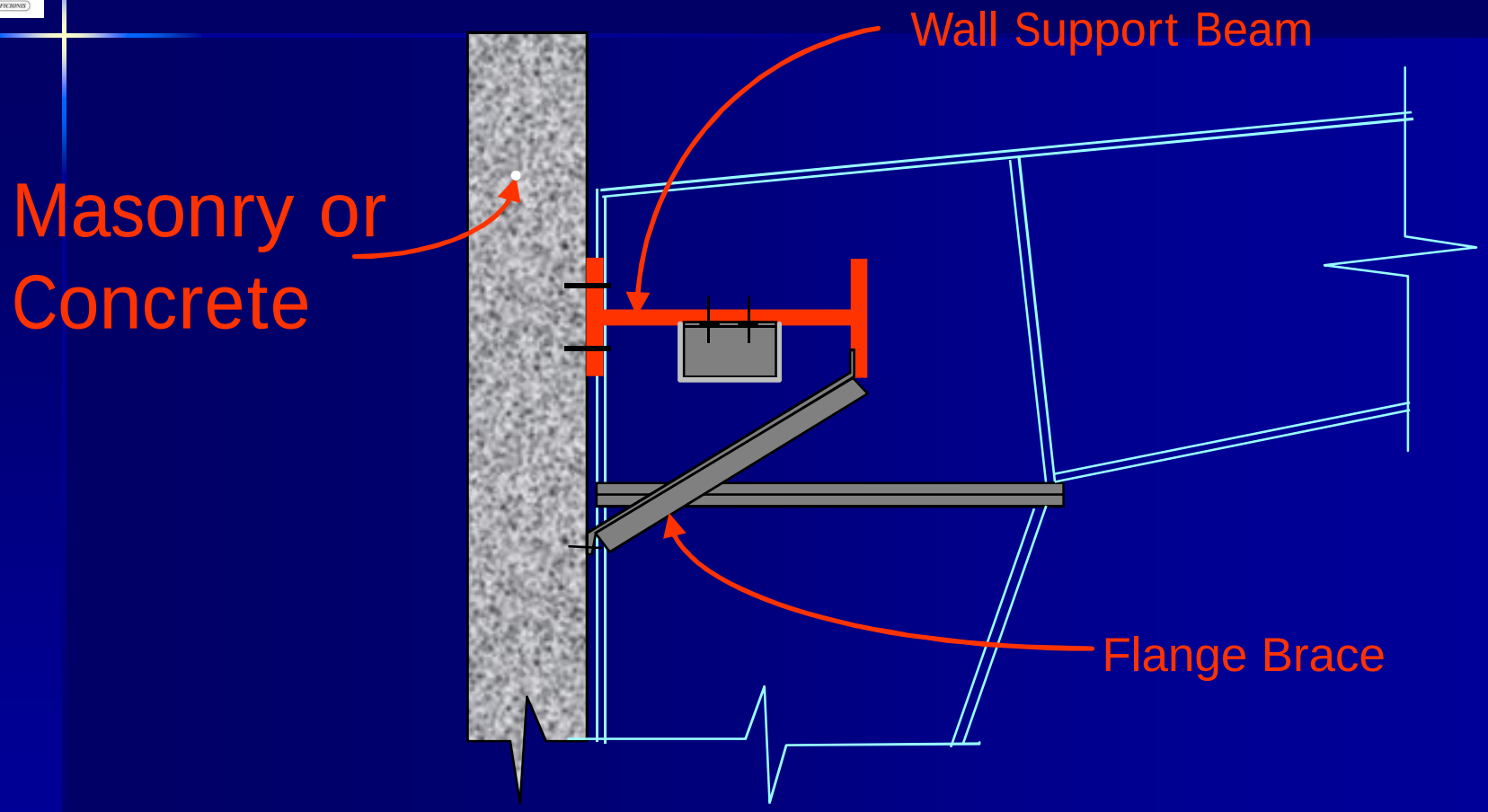
WALLS	
Brick	
4"	40 psf
8"	80 psf
12"	120 psf
Hollow Concrete Block (Heavy Aggregate)	
4"	30 psf
6"	43 psf
8"	55 psf
12 1/2"	80 psf
Hollow Concrete Block (Light Aggregate)	
4"	21 psf
6"	30 psf
8"	38 psf
12"	55 psf
Miscellaneous	
Window, glass, frame, & sash	8 psf

ROOFS	
Copper or tin	1 psf
Corrugated steel	See Manufacture
3-ply ready roofing	1 psf
3-ply felt and gravel	5 1/2 psf
5-ply felt and gravel	6 psf
Shingles	
Wood	2 psf
Asphalt	3 psf
Clay tile	9 - 14 psf
Slate 1/4"	10 psf
Sheathing	
Wood 3/4"	3 psf
Gypsum 1"	4 psf
Insulation (per 1" thick)	
Loose	1/2 psf
Poured-in-place	2 psf
Rigid	1 1/2 psf

Girt Strapping for Panel NBVP

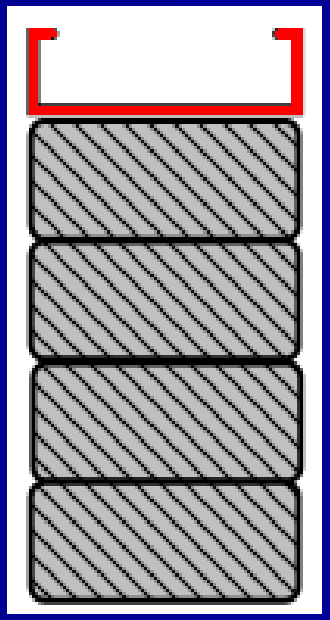


Wall Support Beams



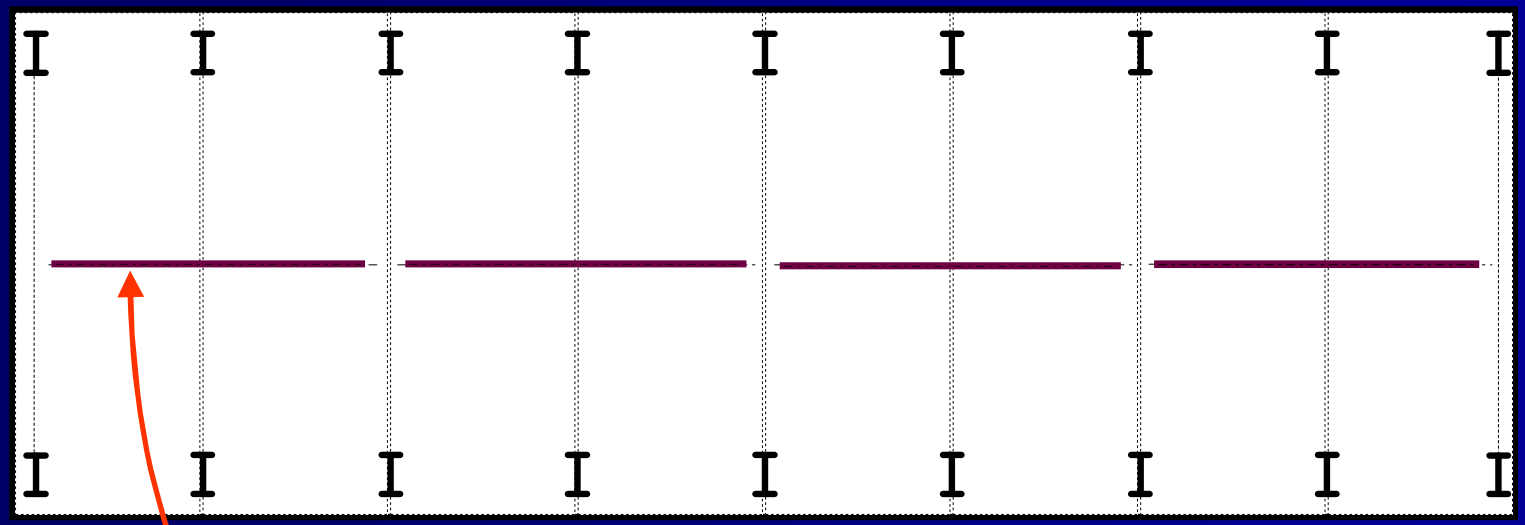
Support of Masonry

- Wind Beam / Wind Girt

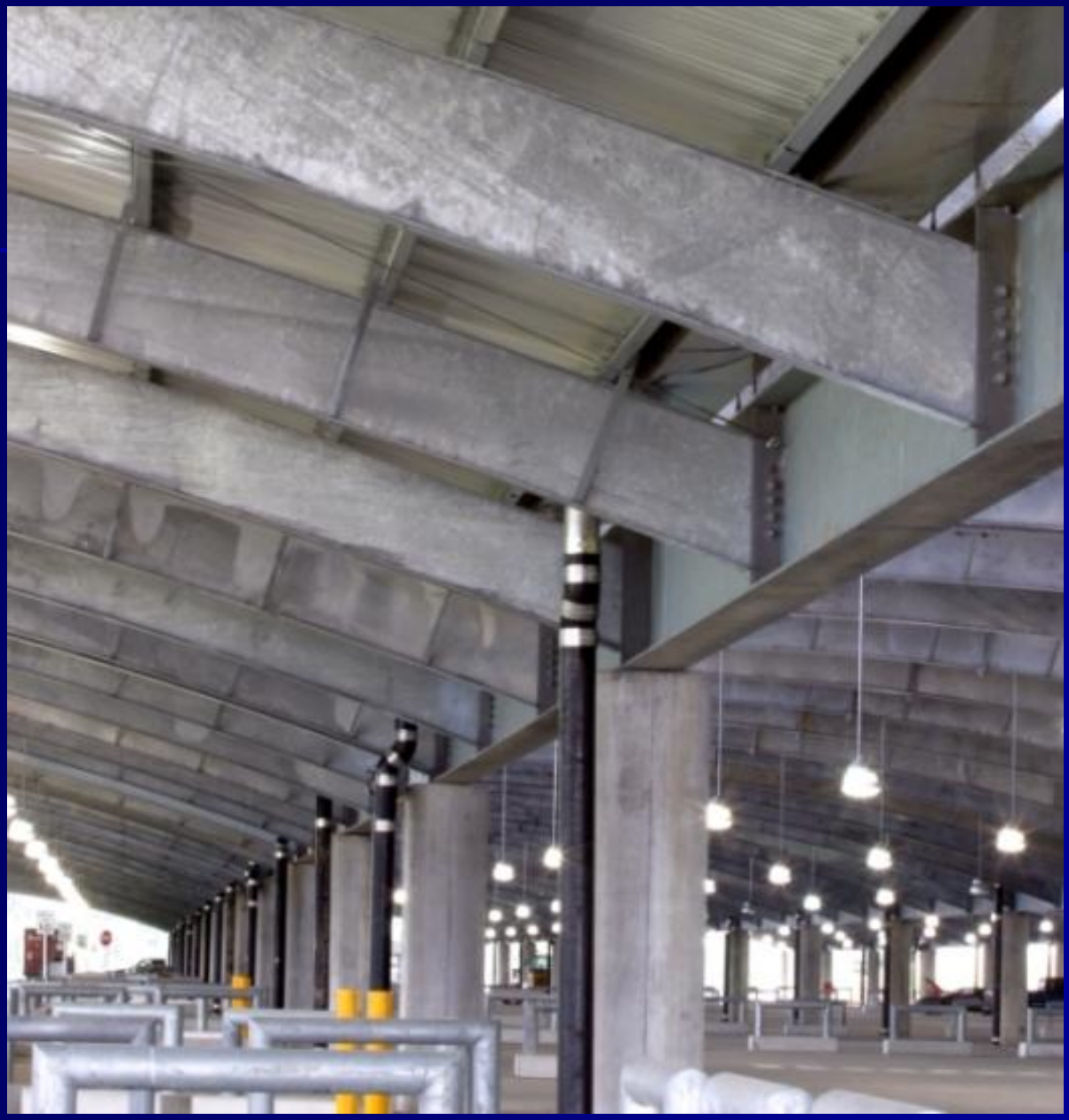


Carrier / Jack Beams

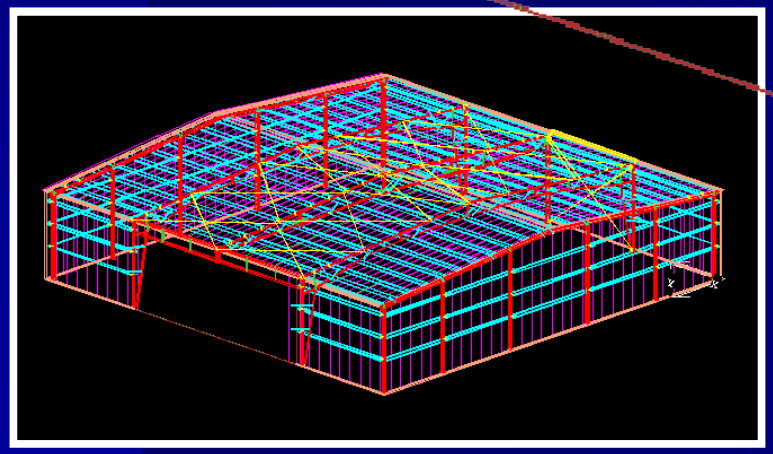
Carrier / Jack Beams



Carrier Beams eliminates the need for every other interior column



Jack Beam at Sidewall



Self-Storage Buildings

- Provided by Trachte Building Systems.
- www.trachte.com

Product Features

- Galvanized structural
- 18 gauge flush jamb and header system with no exposed fasteners
- 24 gauge flush hallway systems
- Bolted connections on structural

Self-Storage Buildings

Product Features (con't)

- Full height partitions
- Door openings are typically 8" wider
- Trac-Rite® Door
  - Sealed bearings, tensioners and stainless steel latch.

Self-storage Buildings

Product Features (con't)

- Wedge anchors and drill bits are included for columns
- Sealed foundation plan/Permits

Self-storage Buildings

Structural is pre-punched
and connections bolted.
Jambs are pre-punched to receive roll up door.

Self-storage Buildings

VP flush 18 gauge jamb and header system with no exposed fasteners.

Self-storage Buildings

VP unit with full height partitions and galvanized structural.

Self-storage Buildings

VP 20 and 24 gauge flush hallway system with no exposed fasteners.

Self-storage Buildings

Jamb at foundation notch.
Notch should overhang by ½”

Self-storage Buildings

Low profile ¼:12 pitch.

Self-storage Buildings

Typical partially climate controlled building. Unlike many competitors, we provide the complete package.

Self-storage Buildings

Self-storage Buildings

VP Two-story

Self-storage Buildings

Self-storage Buildings

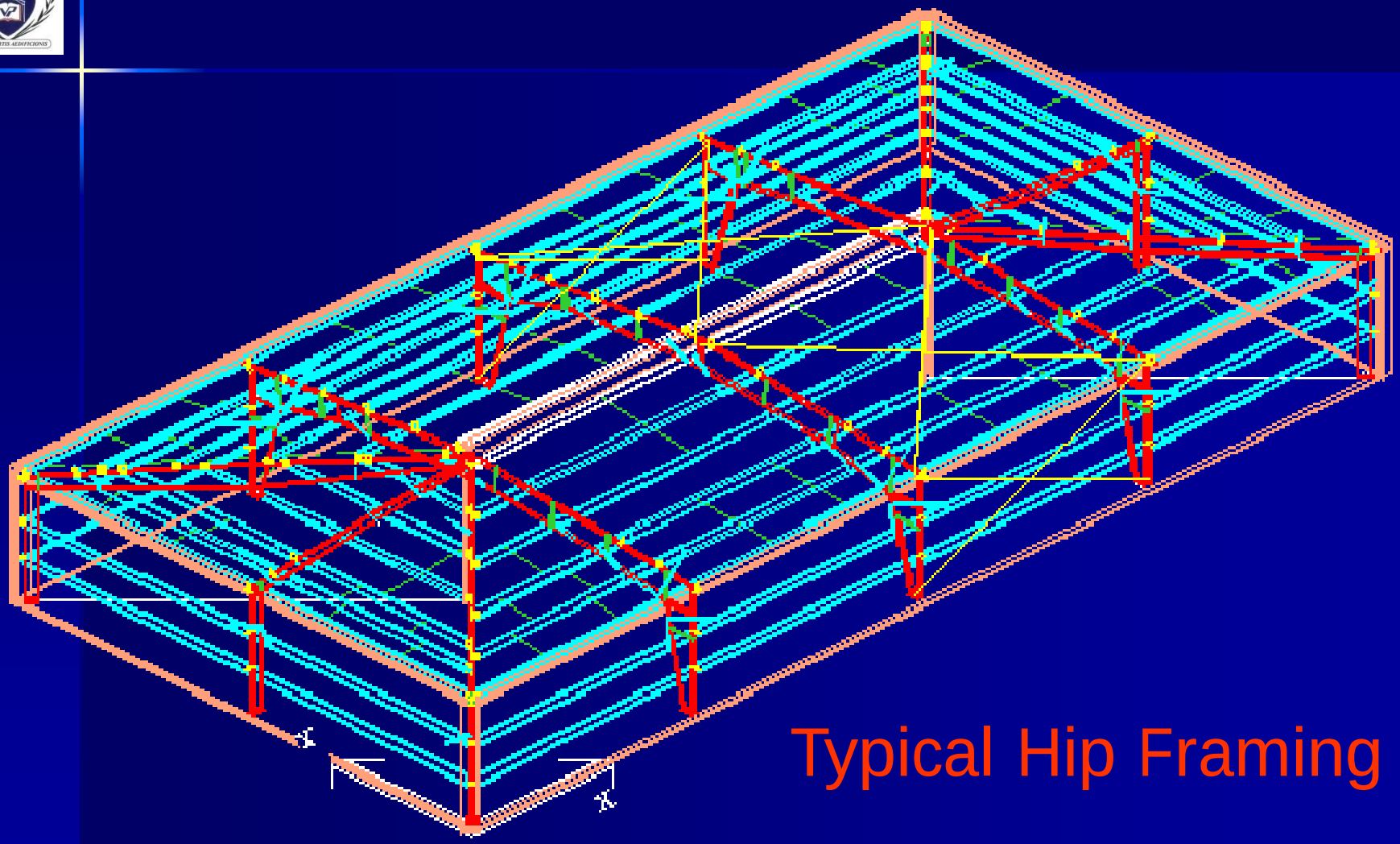
Self-storage Buildings

Mike Stanley VP – WI office

phone: 608-882-5000

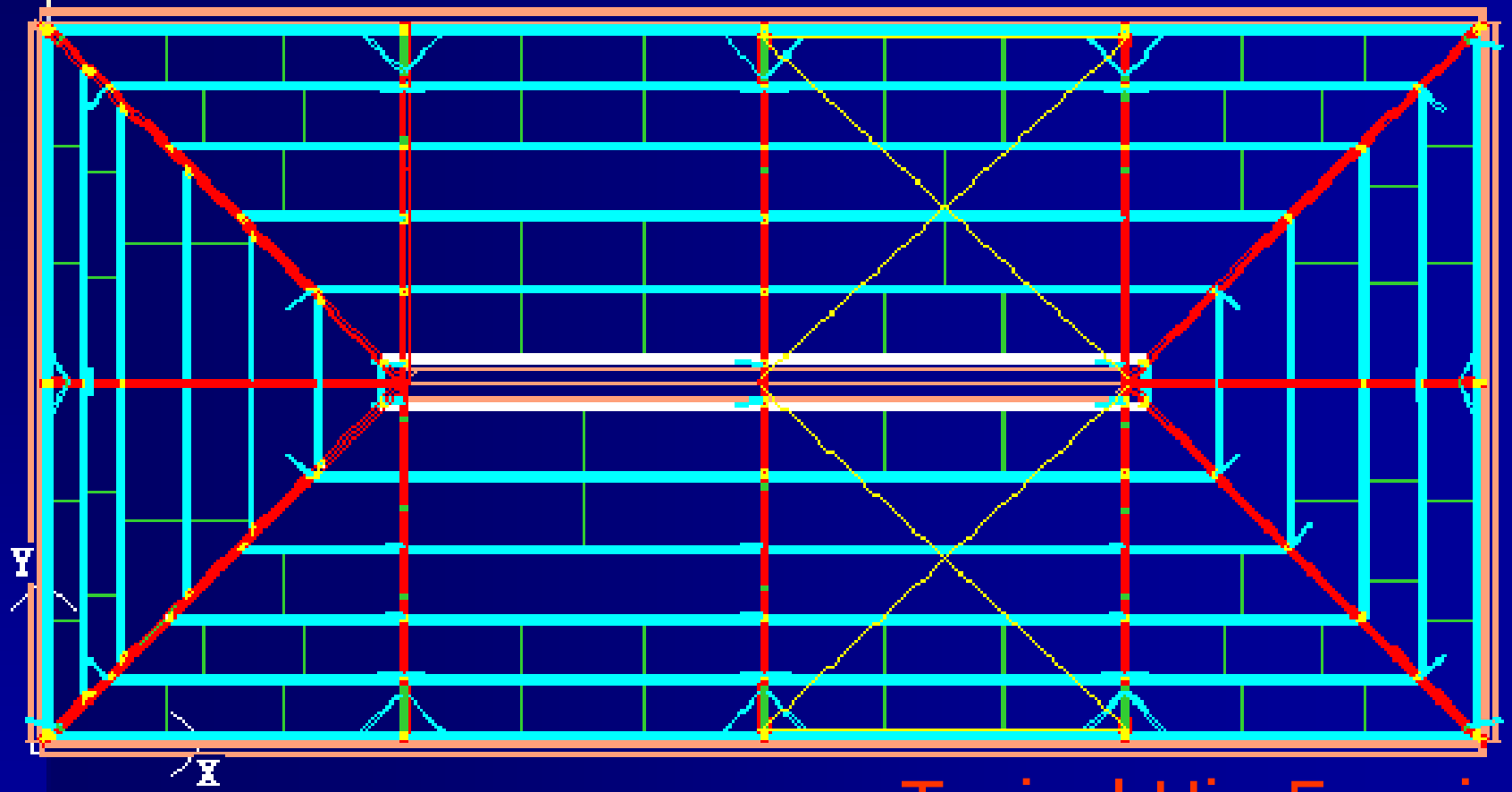
email: mstanley@vp.com

Hip Roofs



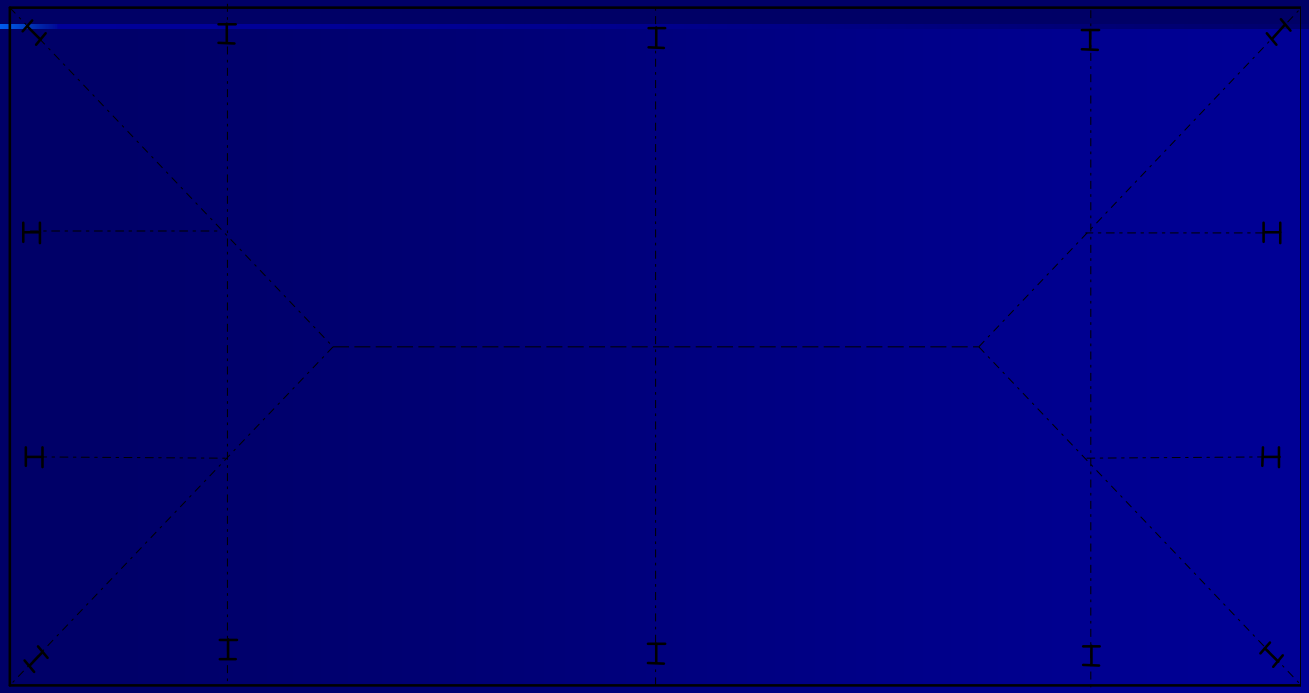
Typical Hip Framing

Hip Roofs



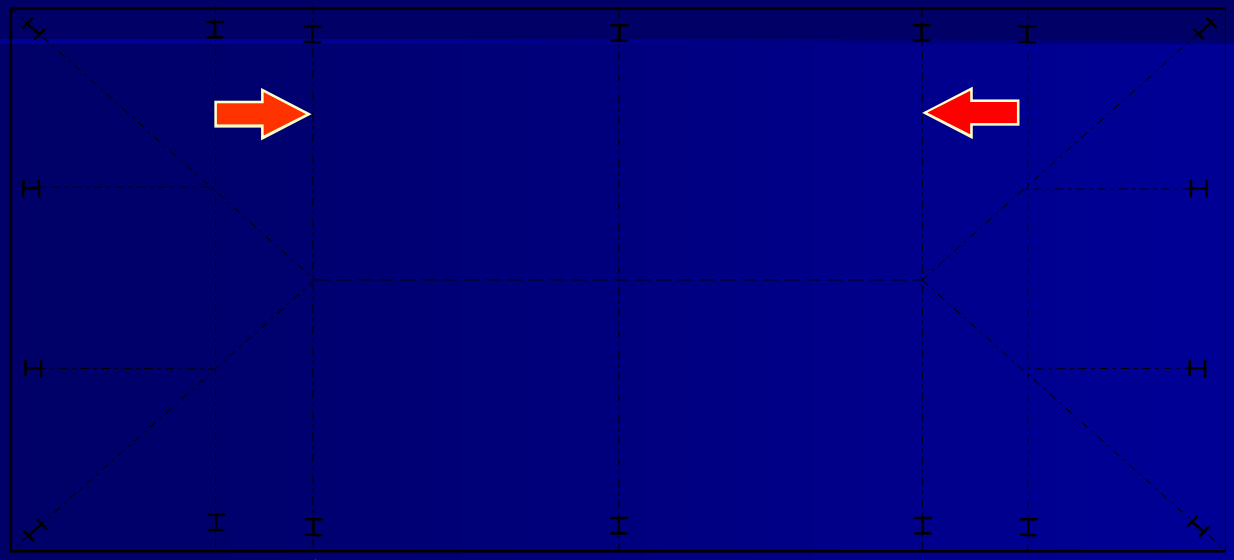
Typical Hip Framing

Hip Roofs



Difficult Hip Framing

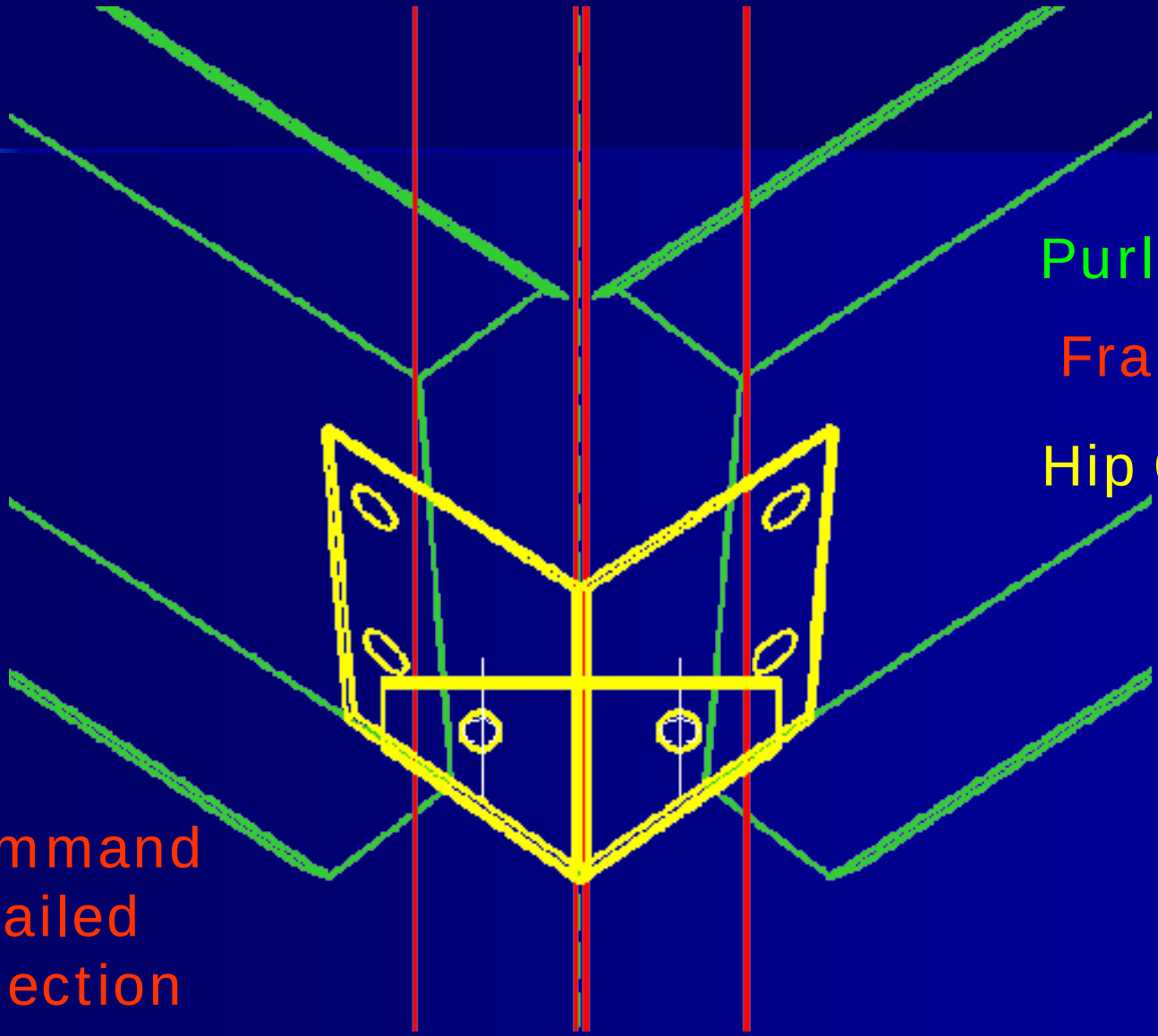
Hip Roofs



Move frames to line-up

Difficult Hip Framing

Hip Framing



Purlins

Frame

Hip Clip

VPCommand
Detailed
Connection

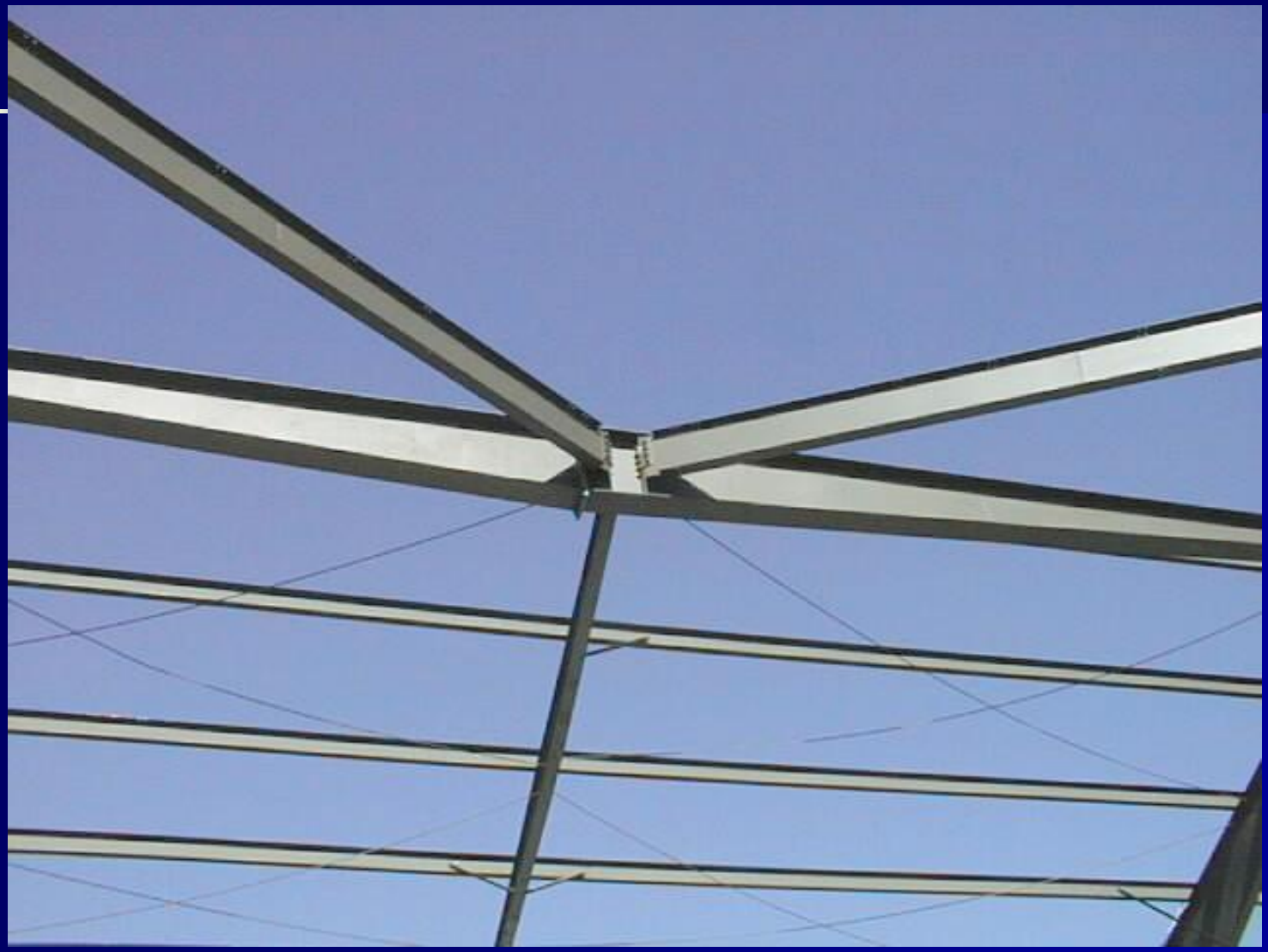
Hip/Valley Framing

Hip Framing

Hip Framing

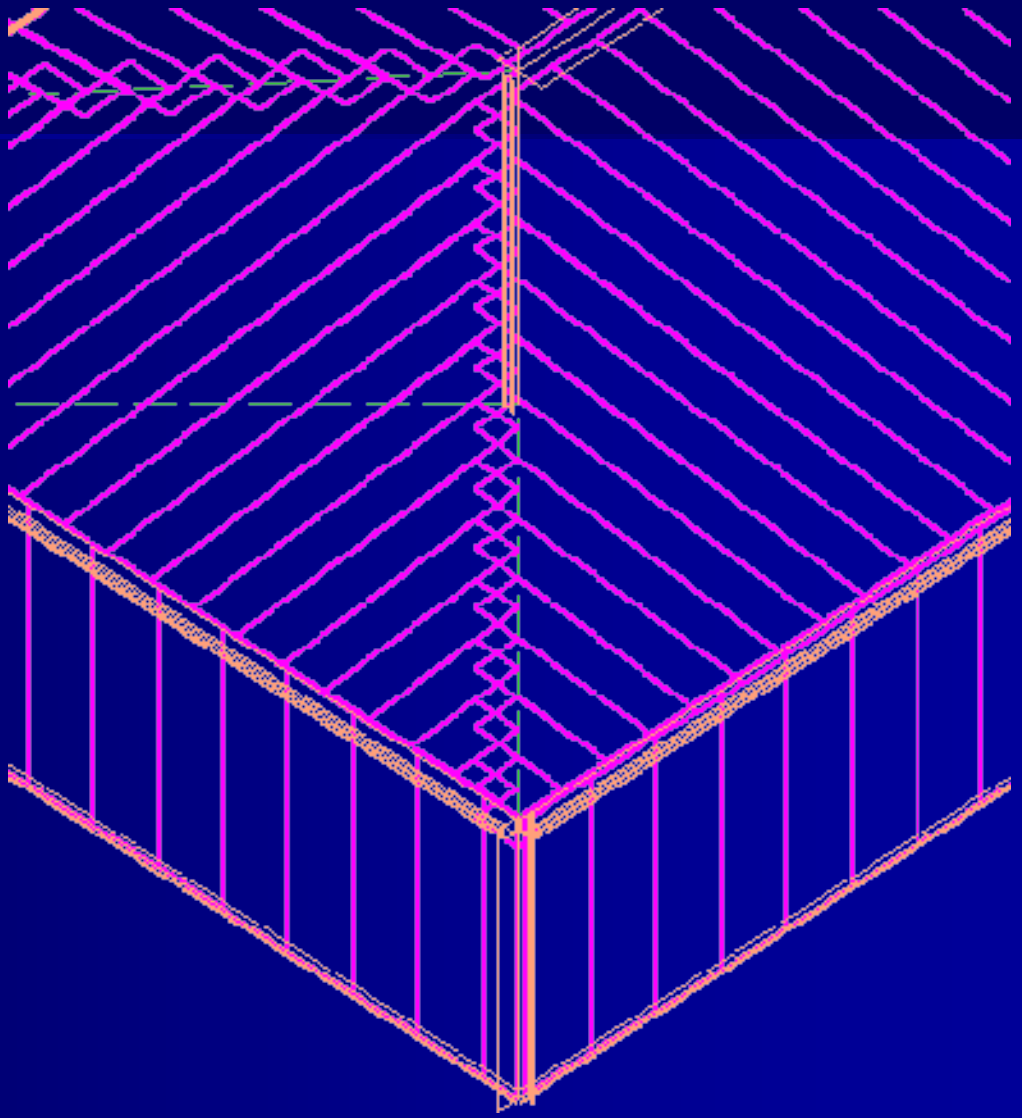
Hip Framing

Hip Framing



Hip and Valley

Field cutting of roof panels required




VP UNIVERSITY
VP
SUPERAE ARTIS AEDIFICIONIS