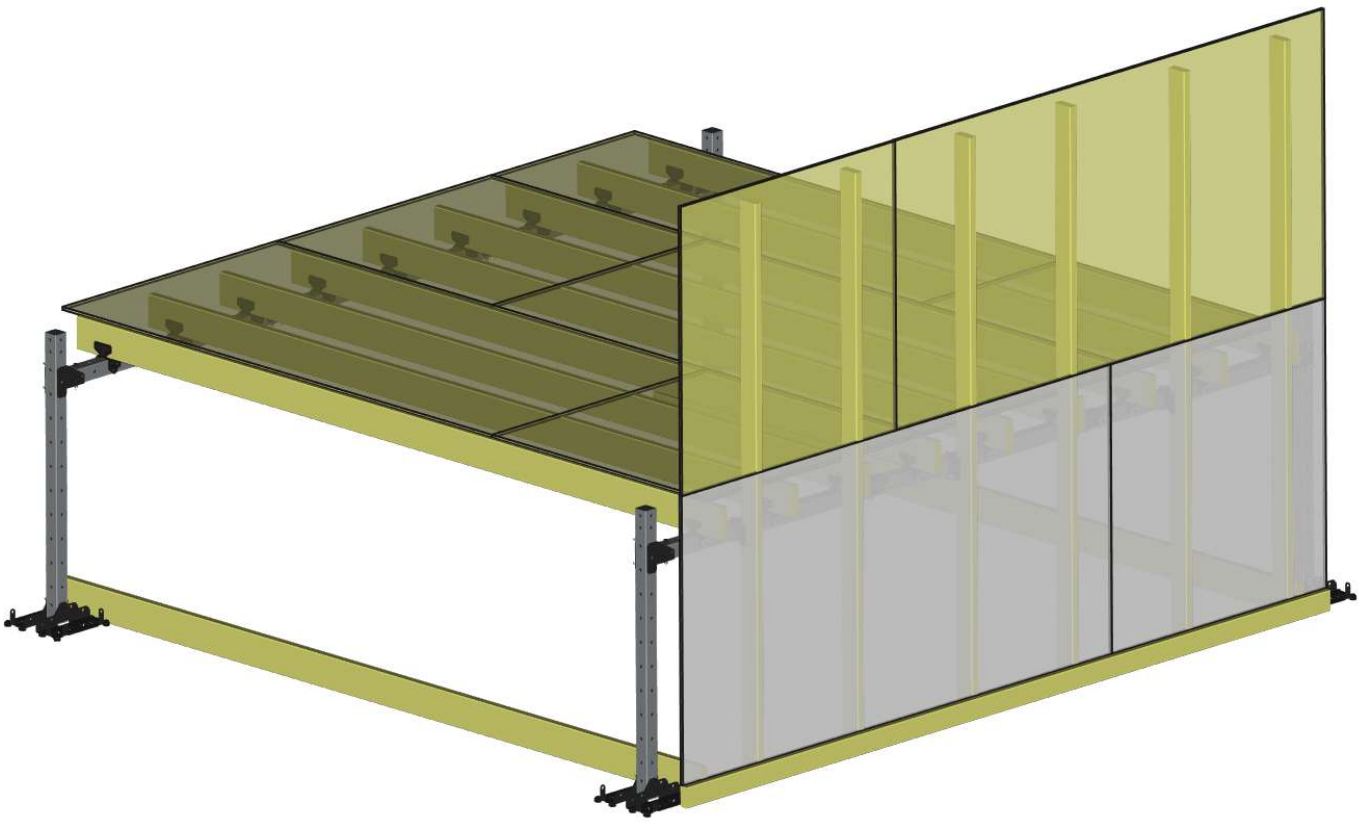
VULKA

FIRE EQUIPMENT

VTS Field Guide:

Flat Roof, Floor, Crawlspace



SAFETY PRECAUTIONS

ALWAYS Use Personal Protective Equipment

Always wear appropriate P.P.E. including helmet, gloves, and eye protection when setting up and operating this equipment. Wear hearing protection during the operation of powered equipment.

Never Exceed Weight Limitations

Weight limitations for this equipment are available in this guide. Under most circumstances, this equipment can support 1500 pounds, inclusive of the weight of lumber/sheathing/materials used.

Never Use Damaged Parts

If a part is bent, cut, dented or otherwise damaged, DO NOT use that part. Replacement parts are available by contacting support@vulkafire.com. Paint/powder coat chipping and scratching are expected during normal use and will not affect the equipment operationally.

Always Use Official Vulka Parts and Hardware

Only use parts and equipment designed for this product. Using anything other than Vulka Fire Equipment approved parts will void the warranty and could lead to failure of the system and subsequent injury. Replacement parts are available by contacting support@vulkafire.com.

Do Not Practice Techniques You Have Not Been Trained On

Firefighting is a dangerous job and the techniques involved could lead to injury, even in a controlled environment, if executed poorly or improperly. Always ensure that instructors are trained and competent in the subject matter being practiced and are appropriately trained to instruct.

Do Not Operate Power Tools or Equipment You Are Not Familiar With

Always follow the manufacturer's recommended operating procedures and safety precautions when using power tools and equipment. Failure to do so could result in injury.

Always Use Fall Protection When Operating at Height

Most configurations of this system will not place the user above 4' off the ground. If using a configuration that places personnel above 4', ensure fall protection is provided per OSHA requirements.

Overview

The Vulka Training System provides a customizable flat training structure for several firefighting and RIT scenarios. This includes a traditional flat roof, as well a floor (for training firefighter-through-the-floor scenarios) or a crawlspace with different height settings. A parapet of desired height can also be added for additional realism, or a pitched roof can be added to either side for an additional functionality.

Tools & Materials

The following parts and materials will be needed:

- (1) VTS Unit
- Lumber for rafters. Quantity depends on roof size and desired spacing – typically 16” or 24” on center. Chart below shows required lumber depending on spacing.
    - 2x6 lumber at a minimum
    - See span chart for lumber length
- Sheathing for floor/roof. OSB or plywood. Generally ½” or ¾”. Chart below shows amount needed to cover 1 evolution, depending on system width and lumber length.
- Screws for attaching sheathing to rafters. Drywall screws (2” or greater) are typically okay.
- Screws for attaching lumber to brackets. Metal to wood roofing screws (#8-#14, 1.5” length) are recommended since they provide a gasket to cushion the metal bracket.
- Power drill with bits for roofing screws and drywall screws above.
- Pencil/marker
- Tape measure
- Circular saw with wood cutting blade
- 3/8” hex key (*included in Convenience Pack Add-on)*
- Rubber mallet (*included in Convenience Pack Add-on*)
- OPTIONAL:
    - Vulka Spacing Jig (*included in Convenience Pack Add-on*)
    - Metal decking/roofing materials for added realism

Set Up

This Field Guide will cover how to set this configuration up properly:

- Determine desired width of system (8’ or 12’) desired lumber spacing
    - This determines the size and quantity of lumber
- Set up tube and brackets
- Attach lumber
- Attach sheathing and optional roofing materials
- Add parapet or frame floor hole

See below for more detailed steps and diagrams.

Set Up Time

Set up time should take approximately 20-30 minutes with at least 2 people.

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Material Charts

Most real-world floors and roofs are framed at 16 or 24 inch on center. These charts will help you figure out how much material is needed for these common spacings with 8 and 12 foot long pieces of lumber. Obviously, more evolutions will require more sheathing and it's always a good idea to get about 25% more lumber than expected.

	Amount of Lumber Needed	
System Width	**16" Spacing**	**24"Spacing**
8'	6	4
12'	9	7
Note: add 2 extra pieces of the same length lumber for tying the bases together, and 1 or 2 extra if cross-brace is needed		

	4x8 Sheathing Needed	
Lumber Length	**8' Width**	**12' Width**
8'	2	3
12'	3	4.5

Other spacings (for example, 12" or 20") and different lengths of lumber are possible. Refer to the allowable spans chart in the General Information Field Guide.

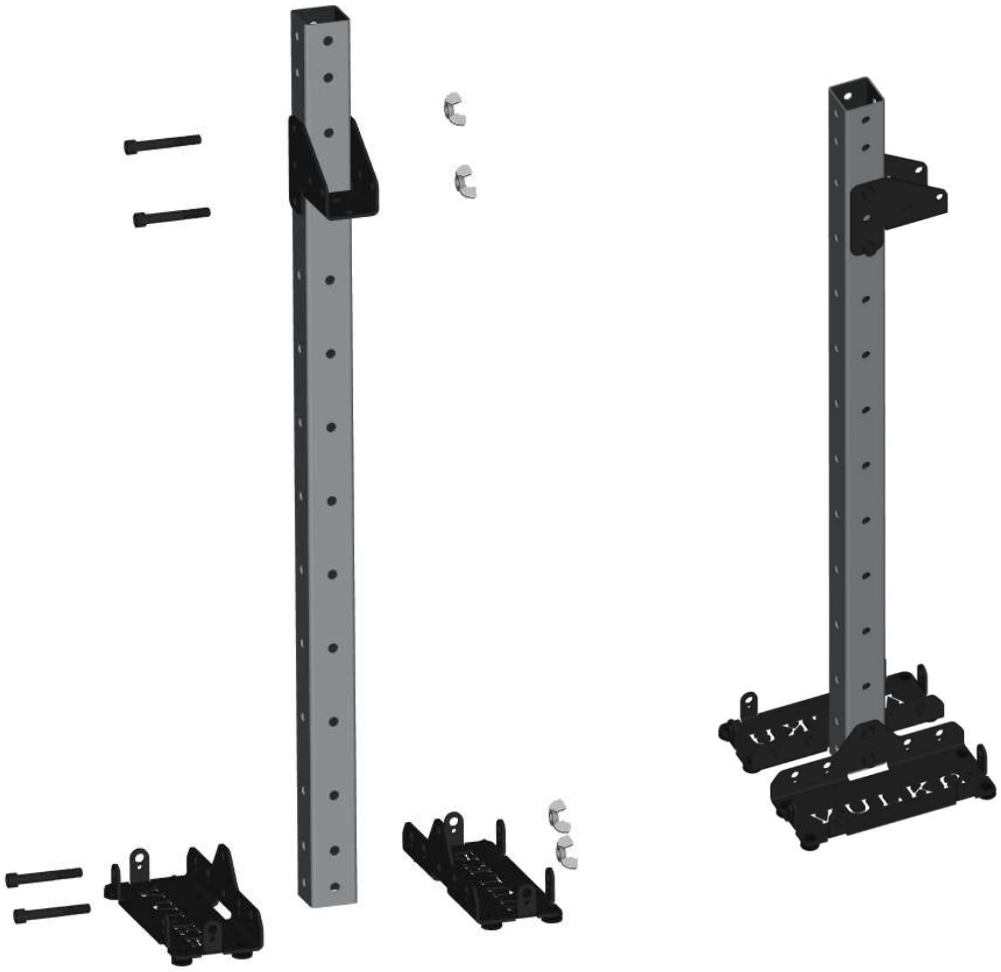
Inserting and Securing Bolts

When securing bolts with wing nuts, bolts should only be hand tight. **Do not overtighten the bolts.** Overtightening the bolts could lead to permanent bending of the brackets and difficulty removing the bolts. Though uncommon, a bolt may require light tapping with a rubber mallet when inserting or removing due to slight hole size variance and/or powder coating thickness – if this is needed, be sure to use as little force as necessary to get the bolt through.

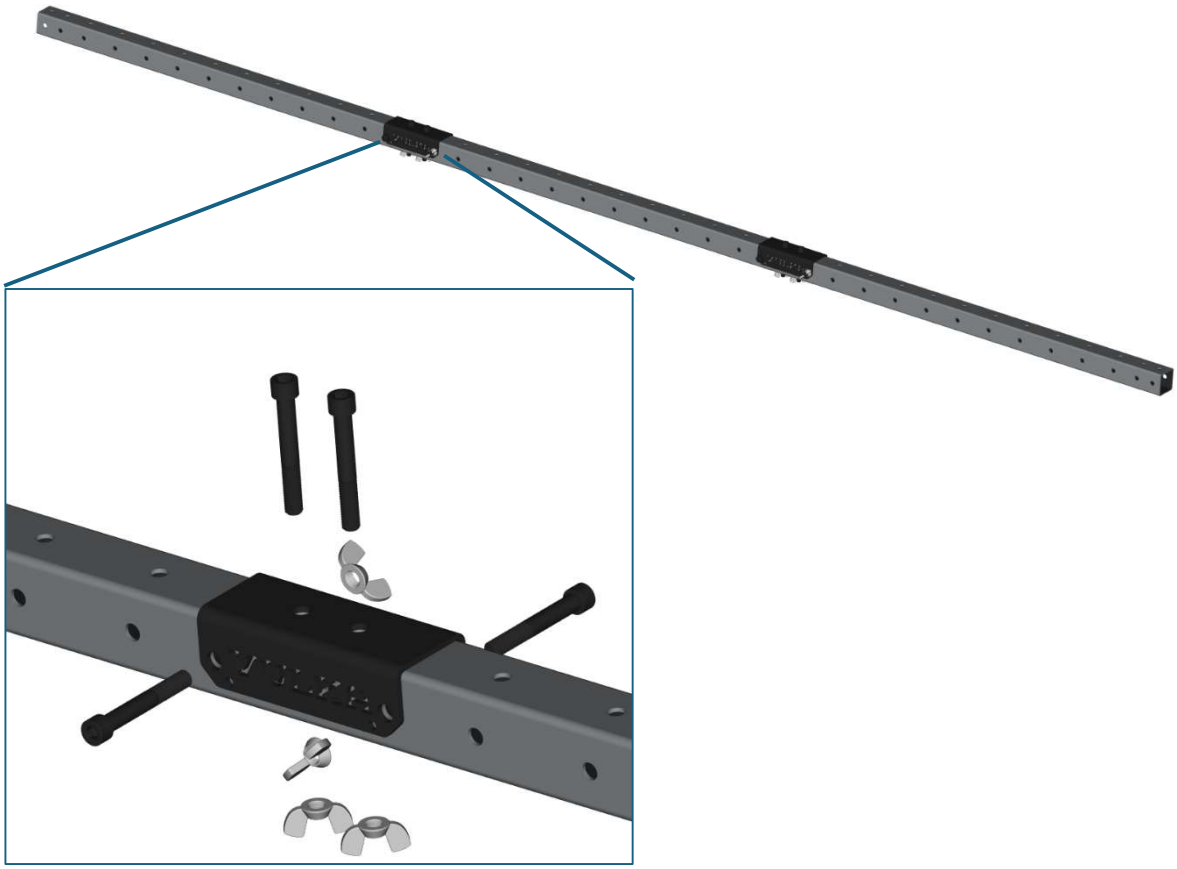
Assembly – Flat Roof

1. Assembling the Structure

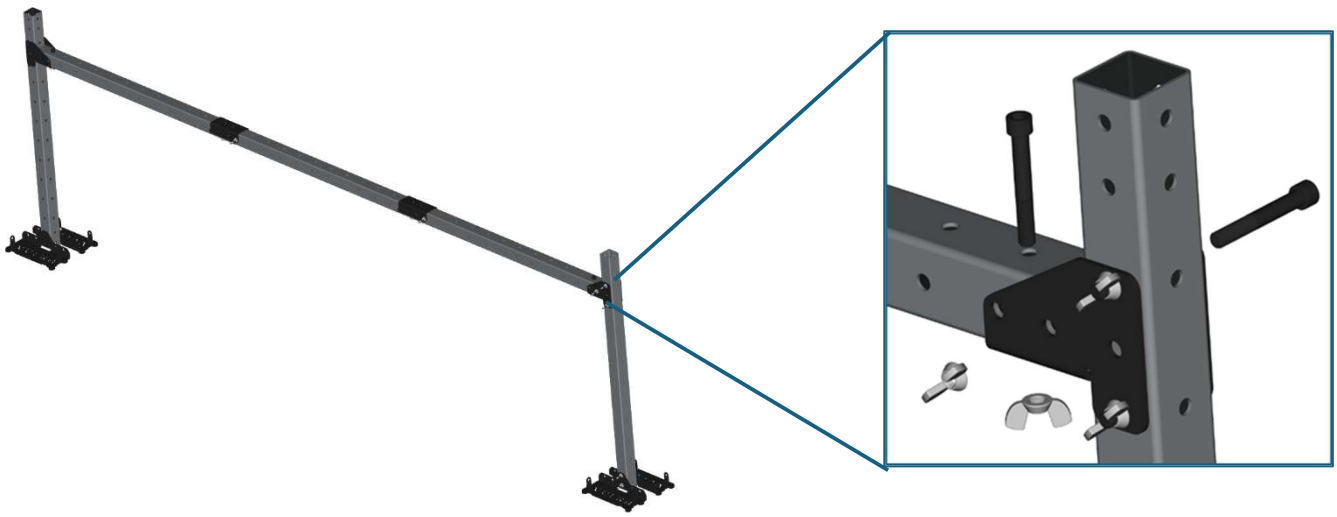
a. Start by assembling (4) upright structures with elbows mounted at the desired height. Remember that the lumber will add to final height of the roof/floor structure:



b. Assemble (2) cross bar brackets at either 8’ or 12’ length using 2 or 3 tubes, respectively. The 12’ configuration is shown here:

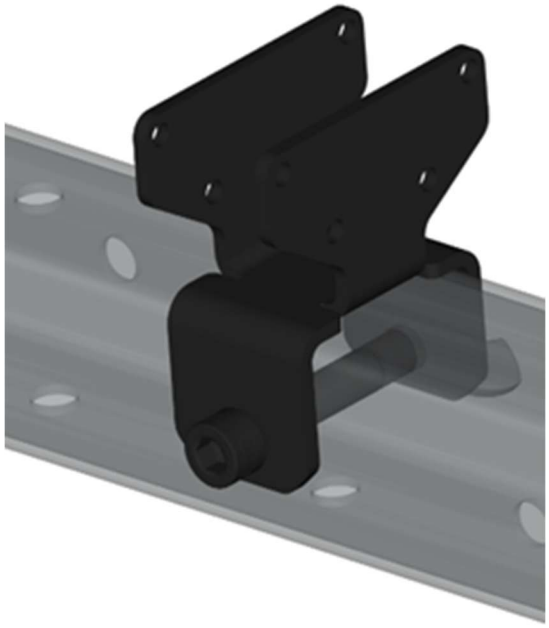


c. Using a minimum of 2 people, place the cross bars into the elbows on the upright segments and secure with bolts:



2. Attaching the Brackets

The lumber brackets are designed to hold any lumber with a width of 1.5” (i.e. 2x4, 2x6, 2x8…). The brackets are attached to any hole on the tube (except those used by bases, connectors, and elbows):



The lumber brackets can be attached at any interval of 4 inches, but typical construction (floors, roofs, and walls) uses either 16 or 24 inches on center. The following diagrams show example configurations to achieve those spacings:

16” O.C. Spacing:

24” O.C. Spacing:

Note: a “cheater” is used on the right side above to reduce the unsupported overhang when sheathing is attached. If an unsupported overhang is acceptable for the training scenario, this can be removed and all brackets can be shifted over, resulting in the following:

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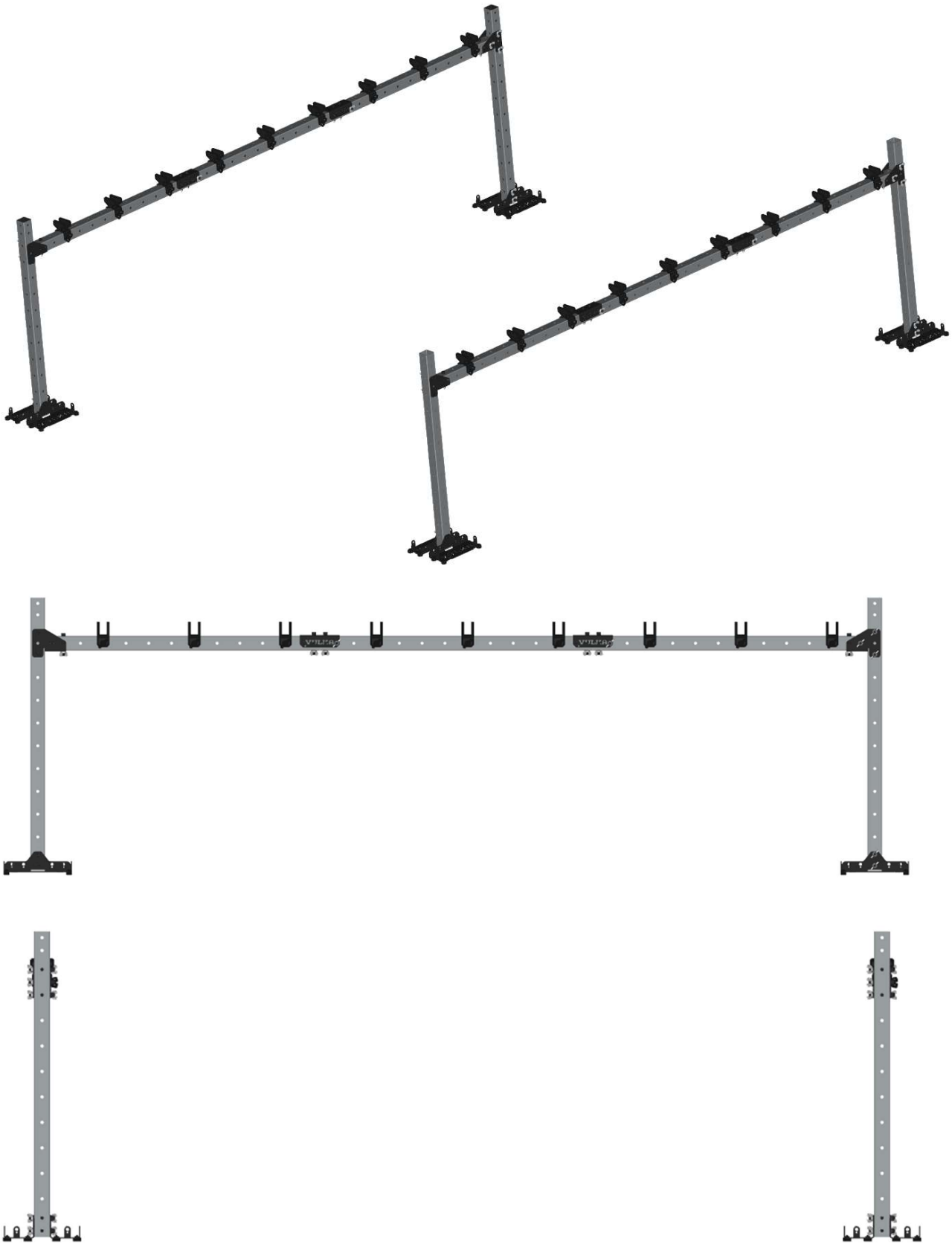
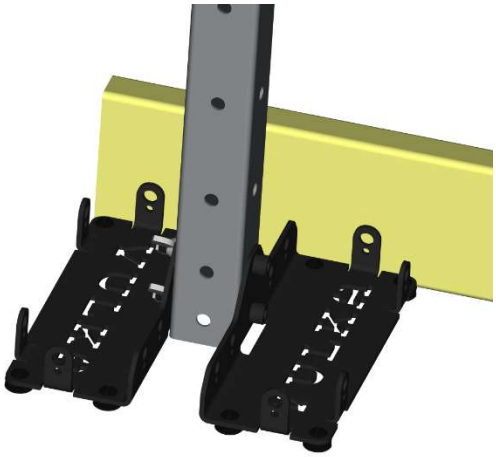
Assembled System (without Lumber):



3. Connecting the Bases

The first step is to tie the two assemblies together at the base using 2 pieces of nominal lumber that are the same length as the pieces to be used for the spans. These won't be weight bearing, so it does not need to be the same dimension lumber as the floor joist pieces. These pieces are only needed parallel to the floor joists of the system.

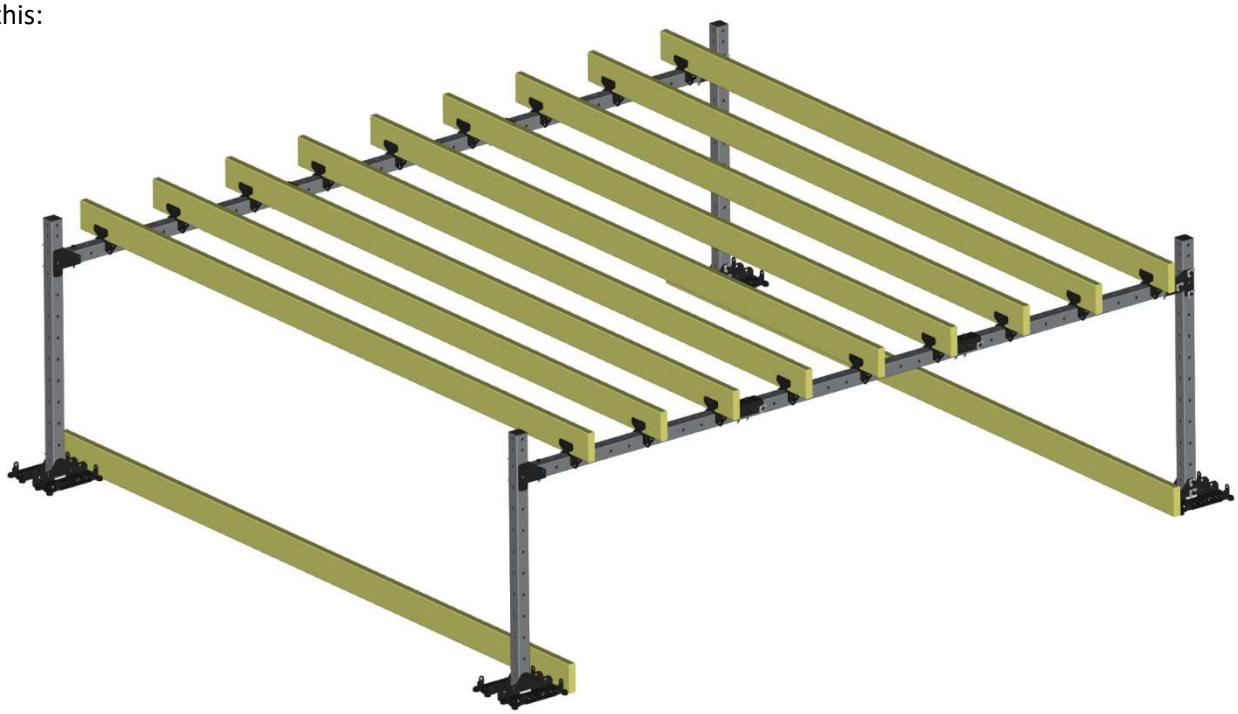
The lumber should be attached as shown below, with roofing screws through the ¼" tab holes and into the lumber using both tabs on each base, with the end of each piece of lumber lined up with the far edge of the base:

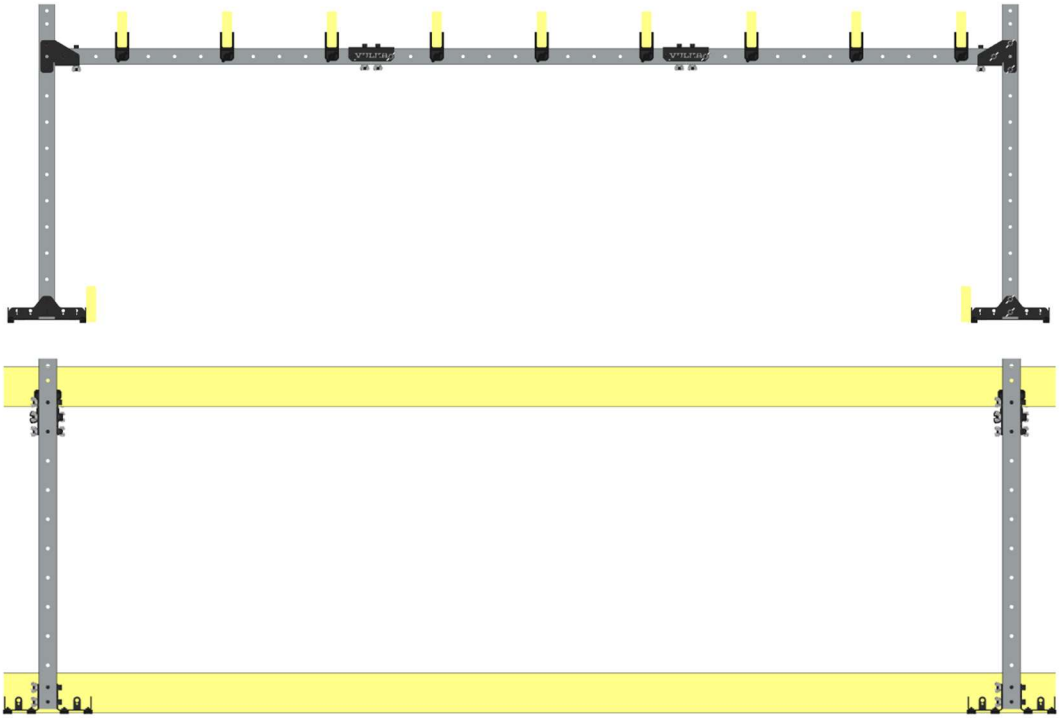


With both sides tied together it should look something like this:

4. Attaching the Lumber

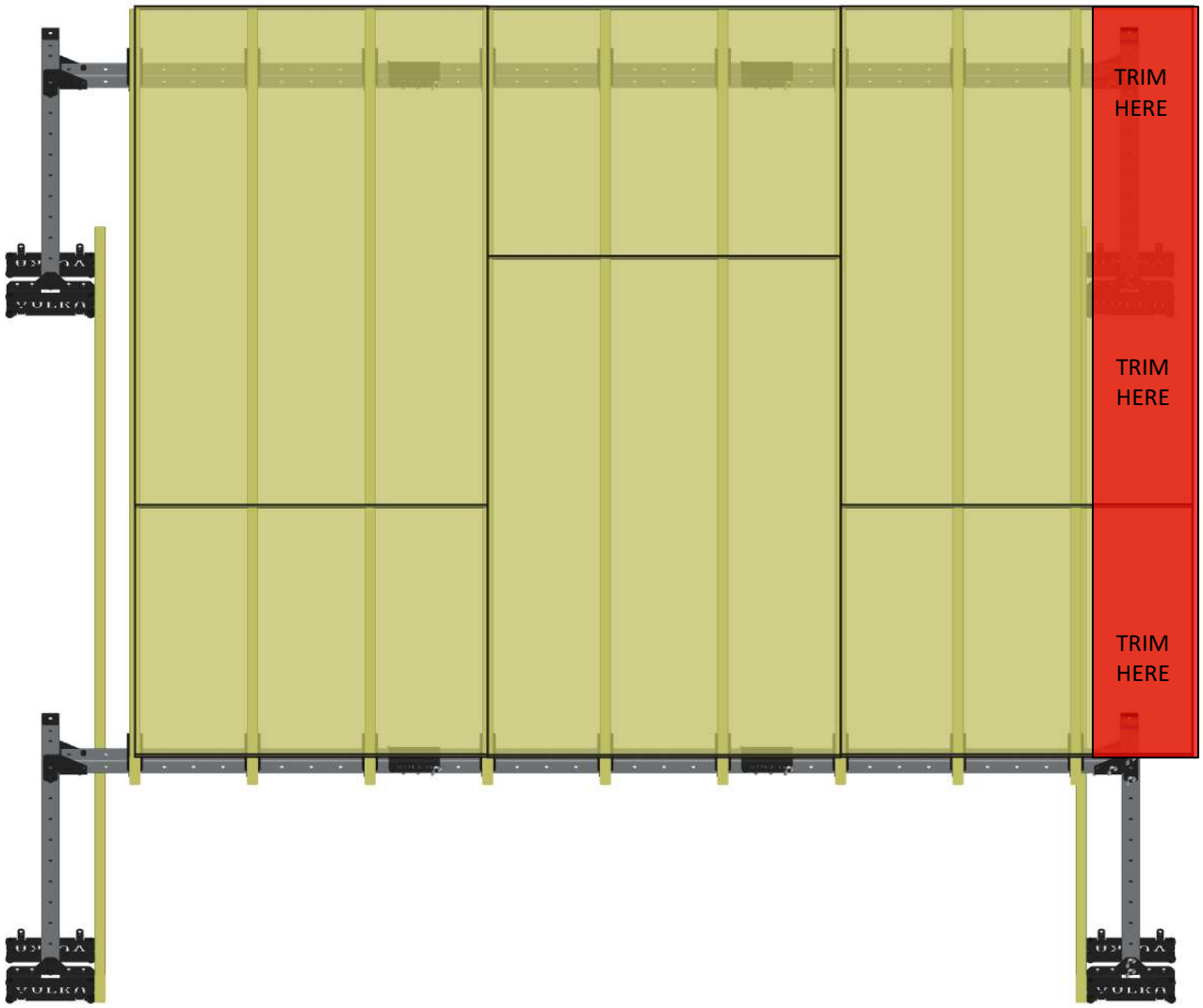
Lumber is then placed directly into the brackets and secured with 2 roofing screws for each bracket. Best practice is to place one screw on each side of each bracket. The lumber should be even and overhang the tube on each side. With each piece of lumber secured with 4 screws, the system will look something like this:





5. Attaching the Sheathing

When attaching sheathing, it can be attached vertically, or horizontally as shown below. In either case, it's important to ensure that the edges of the sheathing in the center of the structure are supported by a piece of lumber, especially if personnel will be putting weight in these locations. This will likely result in some overhang on one side of the structure, as seen below, but this can easily be trimmed off with a circular saw or reciprocating saw (which may be necessary to do to avoid getting caught on the upright).



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Final Assembly

Before use, be sure to verify that all bolts are in place and hand tight, and all lumber is secured with screws.

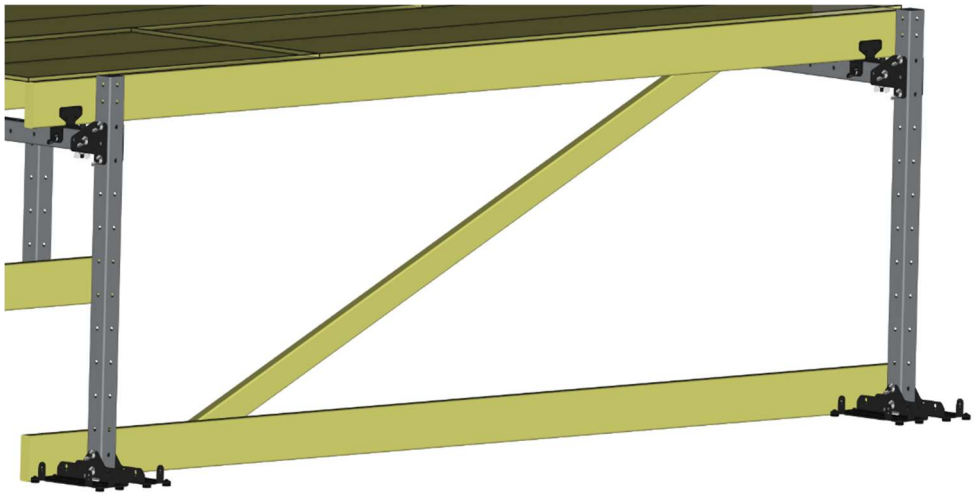
At this point, the VTS is ready for use. Additional roofing materials (metal roofing, roof foam, etc.) can be placed if desired. Sheathing can be replaced as needed by simply backing out the screws and placing new sheathing. Replace the rafter lumber if it has been compromised. Review safety precautions before training begins.

This example assembly shows 2x6 nominal lumber, spaced at 16” O.C., with 12’ length. The tube cross bar is 3 tube lengths (12’) wide. Total working surface area will be roughly 128 square feet.

Add Cross Brace (if Needed)

Depending on the height and size of the system, there may be some sway in the direction of the lumber. This is normal and will not result in failure of the system under normal operating conditions. If using this system for a scenario where sway needs to be reduced, adding a diagonal cross brace connecting a joist to the base lumber with screws will eliminate this sway. Typically, one cross brace is enough, but two can be provided in opposing directions if needed.

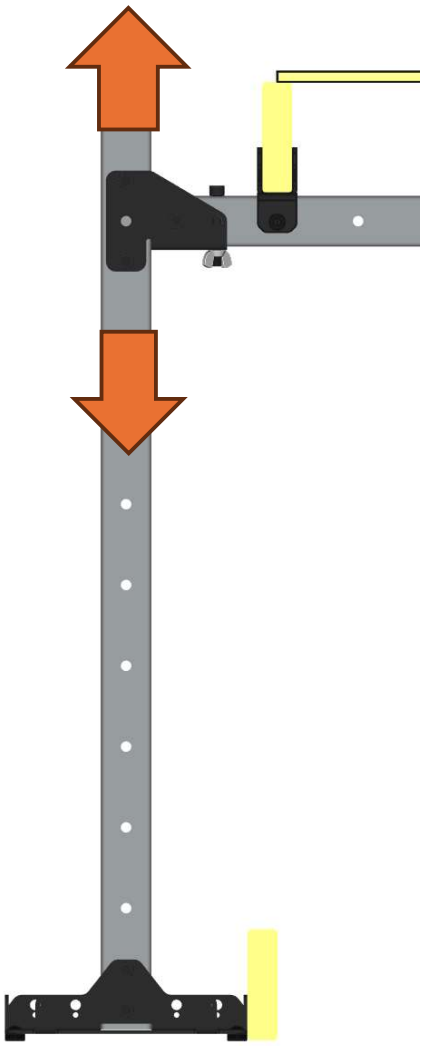
NOTE: This is required for safety if operating at a height above 4' (a single tube length).



Adjusting Roof/Floor Height

Adjusting the height can be done while the system is fully assembled but is a 4 person operation at a minimum. To adjust, have at least one person on each corner of the system to remove the bolts connecting the elbows to the uprights, while supporting the cross bar. Once the bolts are removed, the cross bars can be raised or lowered to adjust the angle to the desired pitch. Resecure the elbow with the bolts.

Note that larger systems may require more than 4 people to support the weight and adjust the height. Always err on the side of caution and have additional personnel on standby to assist.



Adding a Parapet/Wall Structure

The parapet and wall configuration are the same structure. When used as a roof, this structure becomes a parapet. When used as a crawlspace or floor, this structure becomes a breachable wall that can accommodate real drywall. Both scenarios provide obstacles that are difficult to replicate without a real-world structure.

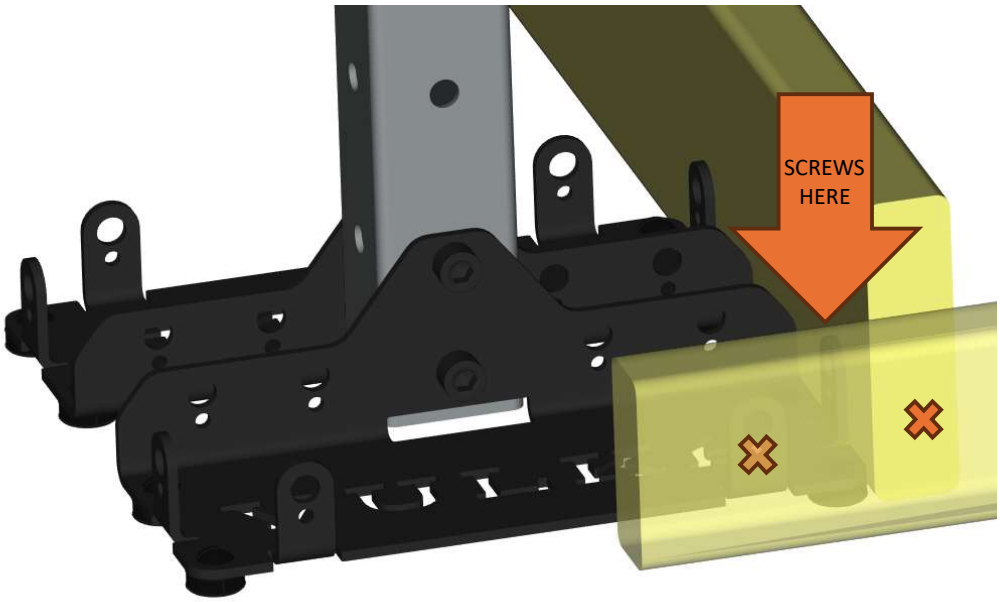
Adding the parapet is much easier to set up **before attaching any sheathing to the roof/floor structure,** since the sheathing will likely have to be offset or resized to accommodate the parapet.

Materials Needed:

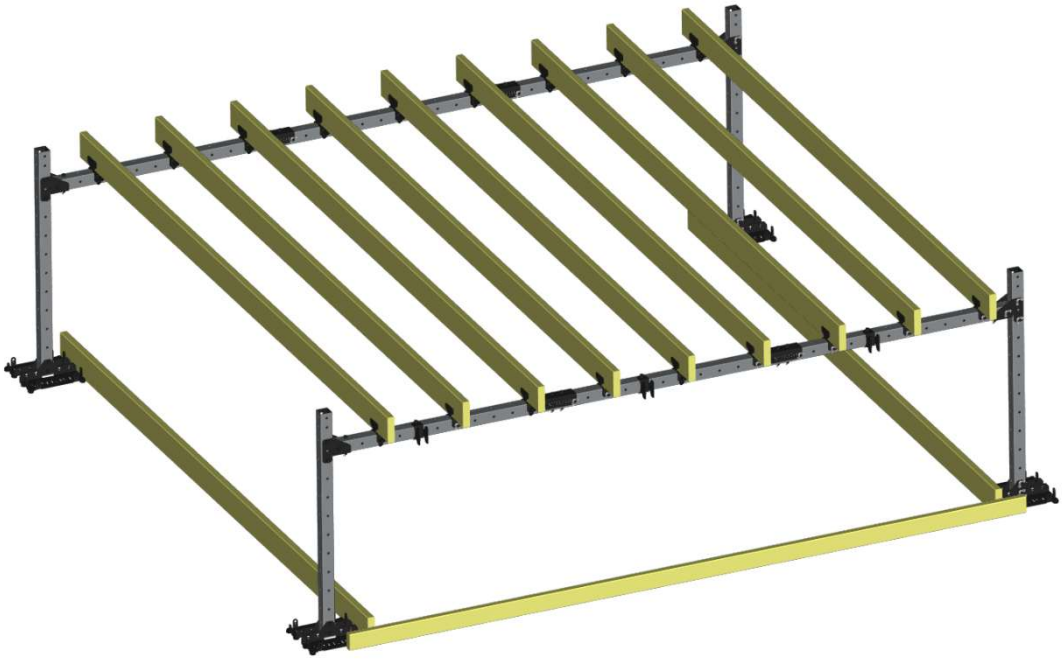
- Lumber that is the same or greater length as the tube segments (8' for 2 tube segments, 12' for 3 tube segments). Can be 2x4 since this is non-load bearing. For a single parapet/wall, only 1 piece is needed, for a parapet/wall on both sides, 2 pieces are needed.
- Lumber for the vertical studs of the parapet/wall (2x4 recommended). The length of the lumber is determined by the desired height of the parapet. Parapet height is also determined by the height of the floor assembly (lower floor = higher parapet height).
- Plywood/OSB or drywall (½" or ¾")
- Screws for attaching lumber to lumber. Drywall or wood screws (2" or greater) are typically okay.
- Screws for attaching lumber to brackets. Metal to wood roofing screws (#8-#14, 1.5" length) are recommended since they provide a gasket to cushion the metal bracket.
- Vulka Spacing Jig recommended (*included in Convenience Pack Add-on*)
- Same tools listed at the beginning of this guide

Assembly – Parapet/Wall

1. Create a bottom plate that is the same or greater length as the tube segments. Attach the lumber to the **outside** of base plate tabs with roofing screws through the ¼" holes, and directly to the existing base plates with drywall/wood screws, as shown below:

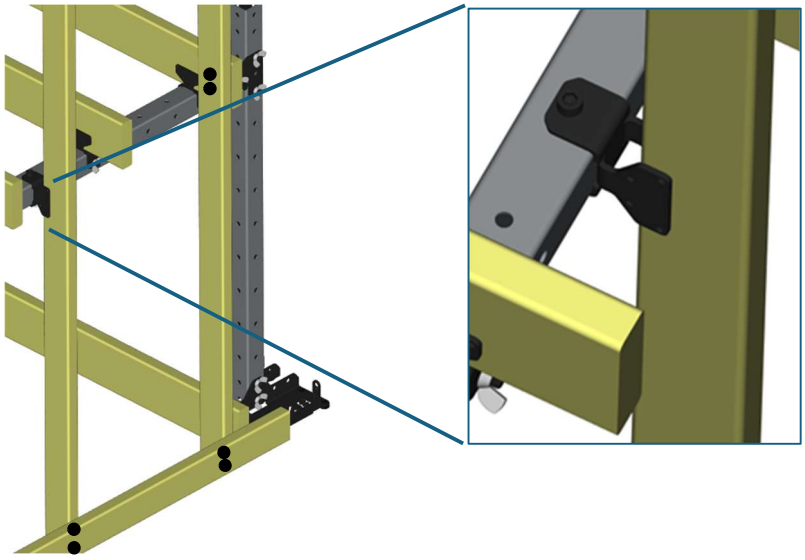


With both sides secured, it should look like this:

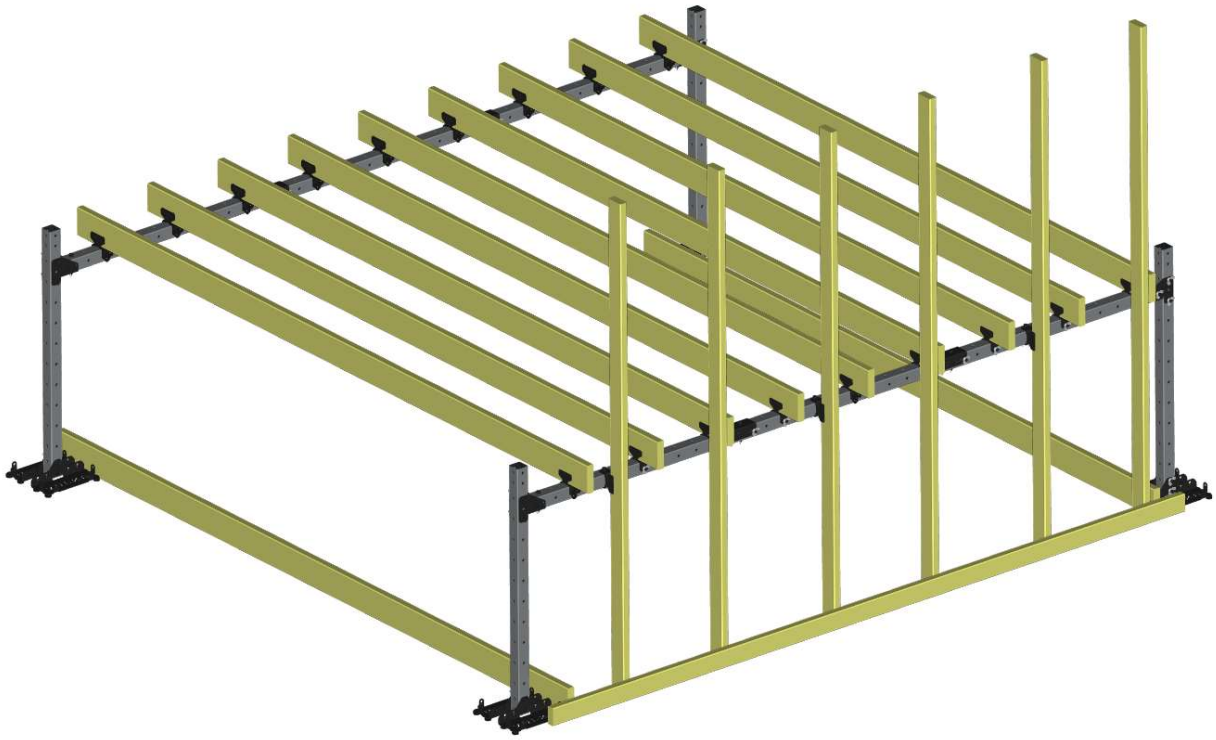


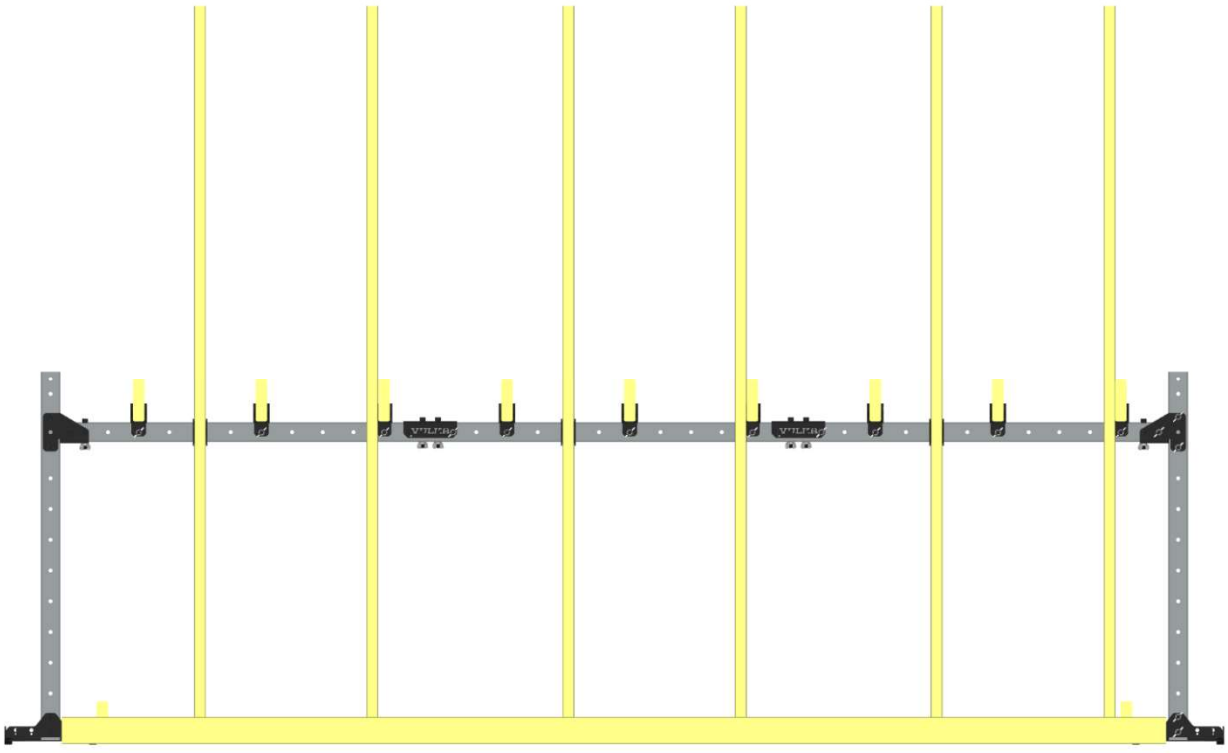
2. Place studs at desired intervals. Depending on the desired spacing, the stud can be secured to the side of an existing floor joist, or a bracket can be placed to achieve a different spacing. Both options are shown below. The bottom of the stud is secured to the bottom plate. Use at least 2 screws at each connection point.

   This is where a framing square/level or the Vulka Spacing Jig (*included in Convenience Pack Add-on*) will help ensure the studs are straight. Note that with a bracket the lumber should not sit all the way in the back of the channel or it will cause the wall to lean.



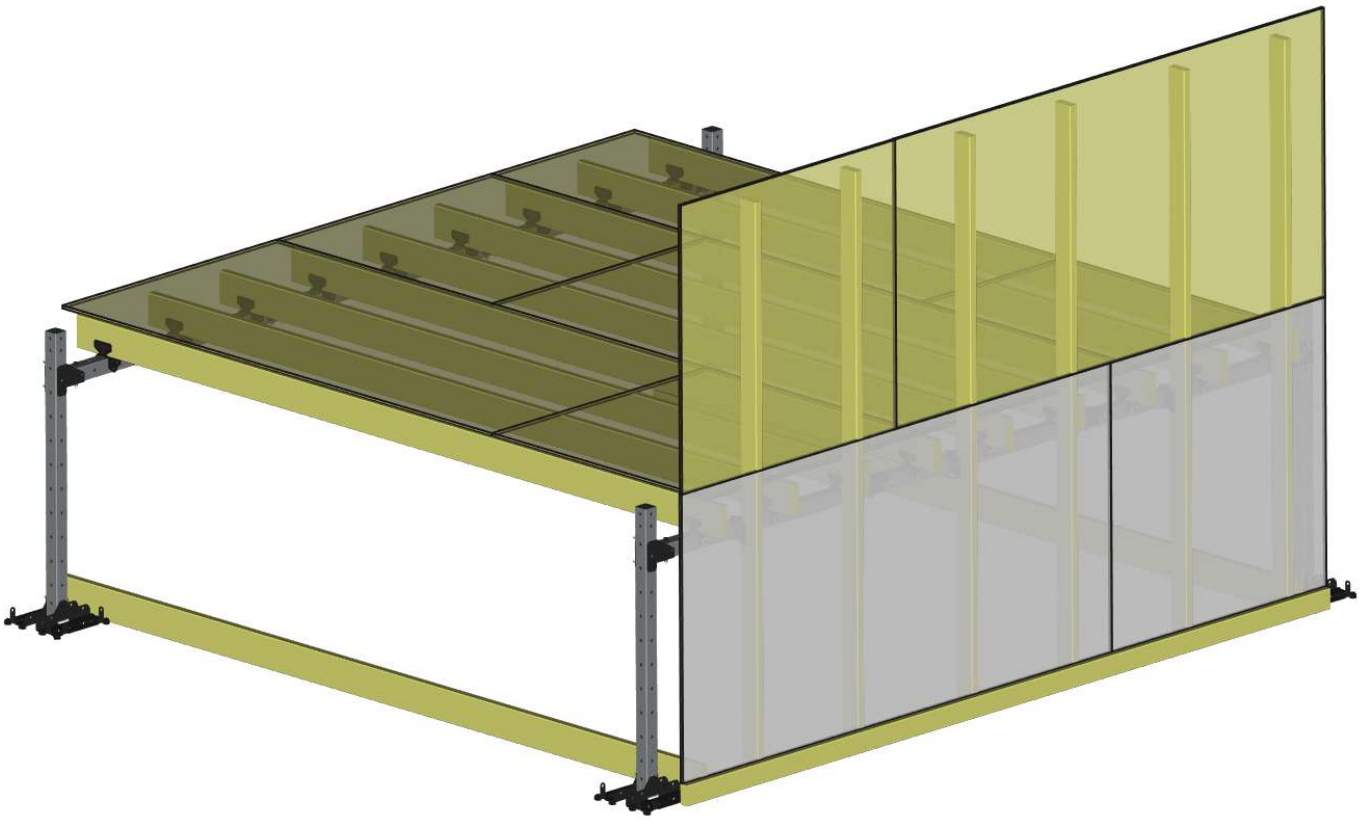
Shown here is an example that has 16” O.C. floor joists. Using a combination of the methods above, a ~24” O.C. wall stud spacing was achieved. Depending on how many brackets were used in the initial set up, more brackets may be required for a specific wall spacing than are provided in a single VTS unit (additional brackets are available at vulkafire.com).

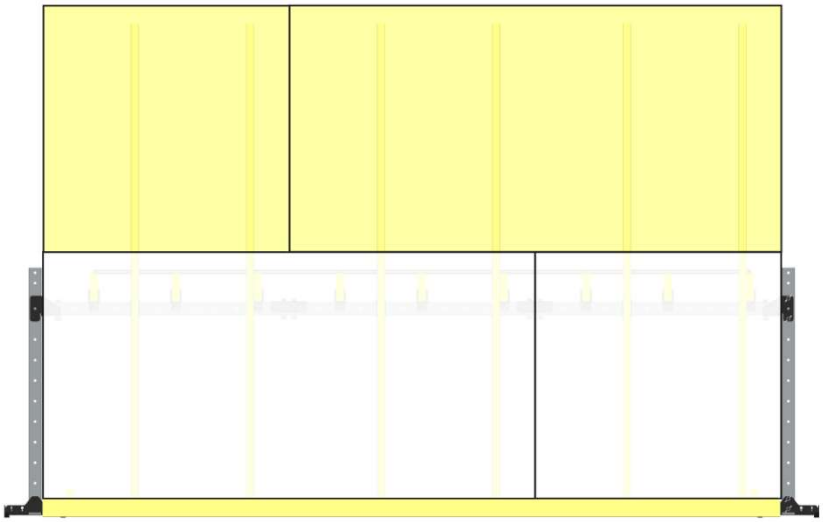


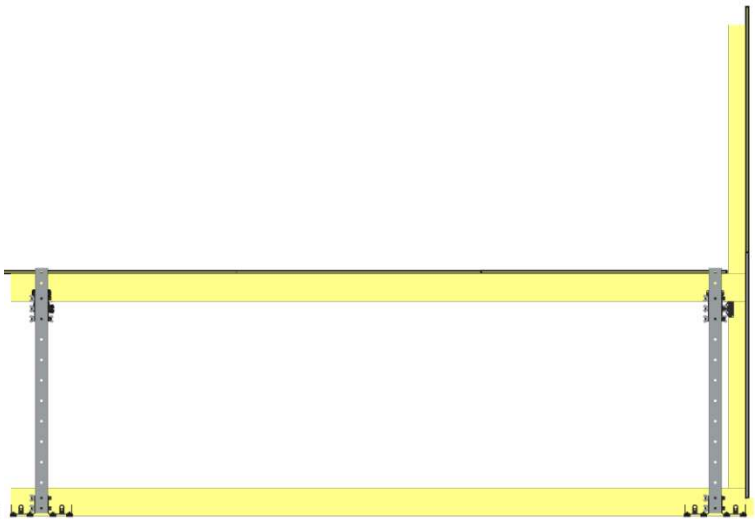


3. Attach sheathing and/or drywall. Drywall could be used on the bottom to create a wall breach scenario into a crawlspace, while the sheathing used on top creates a solid parapet wall.

   After the sheathing is secured to the studs with drywall or wood screws, the sheathing can be applied to the roof/floor joists.

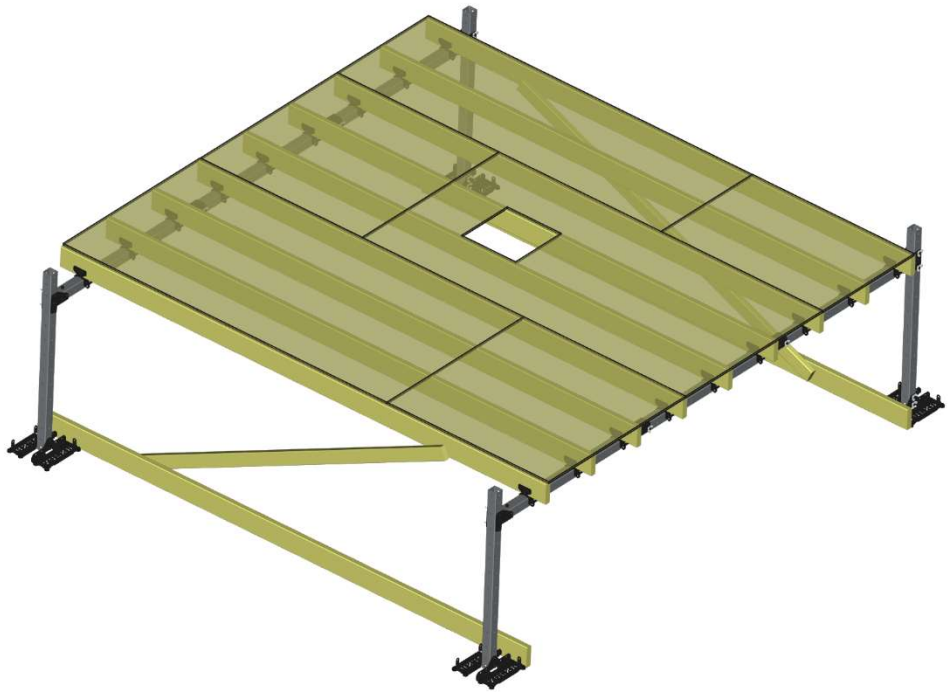






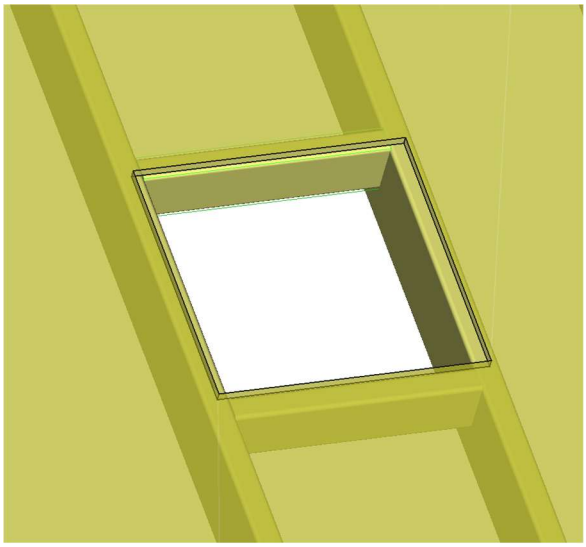
Framing a Floor Hole

Holes can be placed in the roof/floor system for firefighter through the floor evolutions. The hole can be whatever size is needed, but should be supported on at least 2 sides with lumber. If the hole is split between multiple sheets of sheathing, the hole should be supported on all 4 sides



If supporting the hole on all 4 sides, 2 small sections of lumber will have to be measured and cut. The lumber should be the same nominal size as the joists. For 12” spacing, these sections should measure 10.5”, for 16” spacing they should measure 14.5”, for 20” spacing they should measure 18.5”, for 24” spacing they should measure 22.5”.

Example of a hole supported on all 4 sides:



Question? Concerns? Improvements?

Please be sure to reach out to us at support@vulkafire.com !

General information and additional configurations are available in their own Field Guide. Please be sure to check vulkafire.com.

Add-ons for the VTS are also available at vulkafire.com!

END OF GUIDE