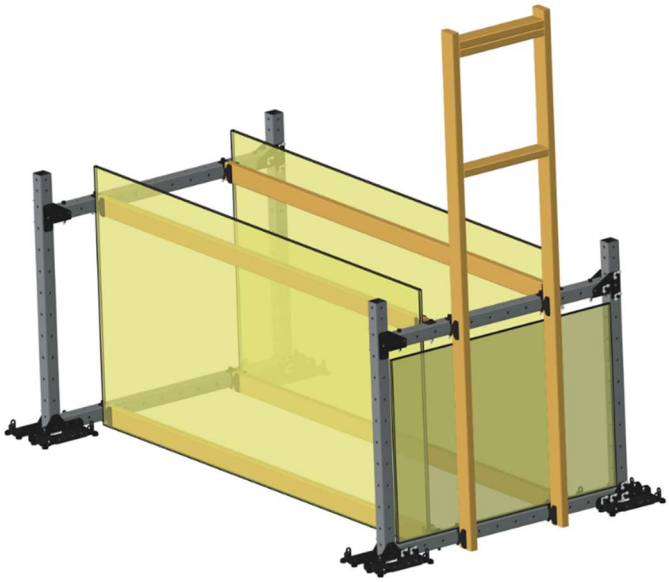
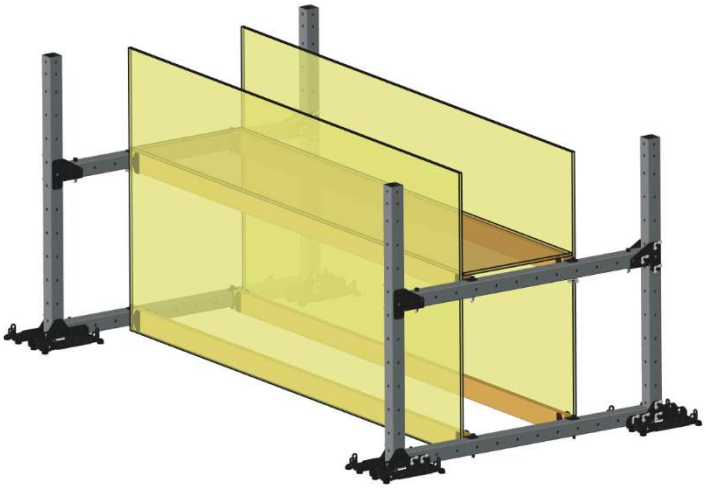
VULKA

FIRE EQUIPMENT

VTS Field Guide:

Denver Drill & Tunnel





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.

Never Exceed Weight Limitations

Weight limitations for this equipment is 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 in the course of 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 that 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 manufacturers 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 exceeds 4’, ensure fall protection is provided per OSHA requirements.

Overview

The Vulka Training System provides a means to quickly set up a Denver Drill, also known as the Langvardt Drill, in honor of Firefighter Mark Langvardt who tragically lost his life in the line of duty in 1992.

This simulates extricating a downed firefighter out of a narrow window and corridor – a difficult scenario for even seasoned firefighters to perform under stressful conditions. The VTS can be set up to be nearly the same dimensions as the actual scenario that claimed Langvardt's life, are can be modified to be easier or more difficult, depending on the training objective.

Tools & Materials

The following parts and materials will be needed:

- (1) VTS Unit
- (6) Pieces of 2x4 lumber. For typical Denver drill, 8' length is standard. If a top sill and high ladder point are desired, an extra piece of 2x4 will be needed.
- (3) 4x8 plywood sheets – ½"
- Screws for attaching sheathing to lumber. 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
- A-frame ladder
- Rubber mallet

Set Up

This Field Guide will cover how to set this configuration up properly and demonstrates the option of adding a top window frame and high ladder point.

See below for more detailed steps and diagrams.

Set Up Time

Set up time should take approximately 15-20 minutes with at least 2 people.

Lumber Size & Dimensions

The true “Denver Drill” has prescribed dimensions associated with it that mirror the conditions firefighters face when trying to rescue Mark Langvardt. The typical dimensions are:

- 20” window width
- 28” corridor width
- 96” corridor length
- 42” sill height

The VTS can get very close to these dimensions but can also be customized to be more or less difficult. The VTS allows for narrower window dimensions, wider or narrower corridor dimensions, and higher or lower window sill heights.

Corridor Width

The corridor width is determined by the spacing of the lumber brackets and can be adjusted to be narrower or wider for a more or less difficult scenario.

Corridor Length

Corridor length is determined by the length of the lumber.

Window Width

The window width can be adjusted by moving the window lumber brackets to the desired spacing.

Sill Height

Sill height can be adjusted by raising or lowering the top tube of the system.

Inserting and Securing Bolts

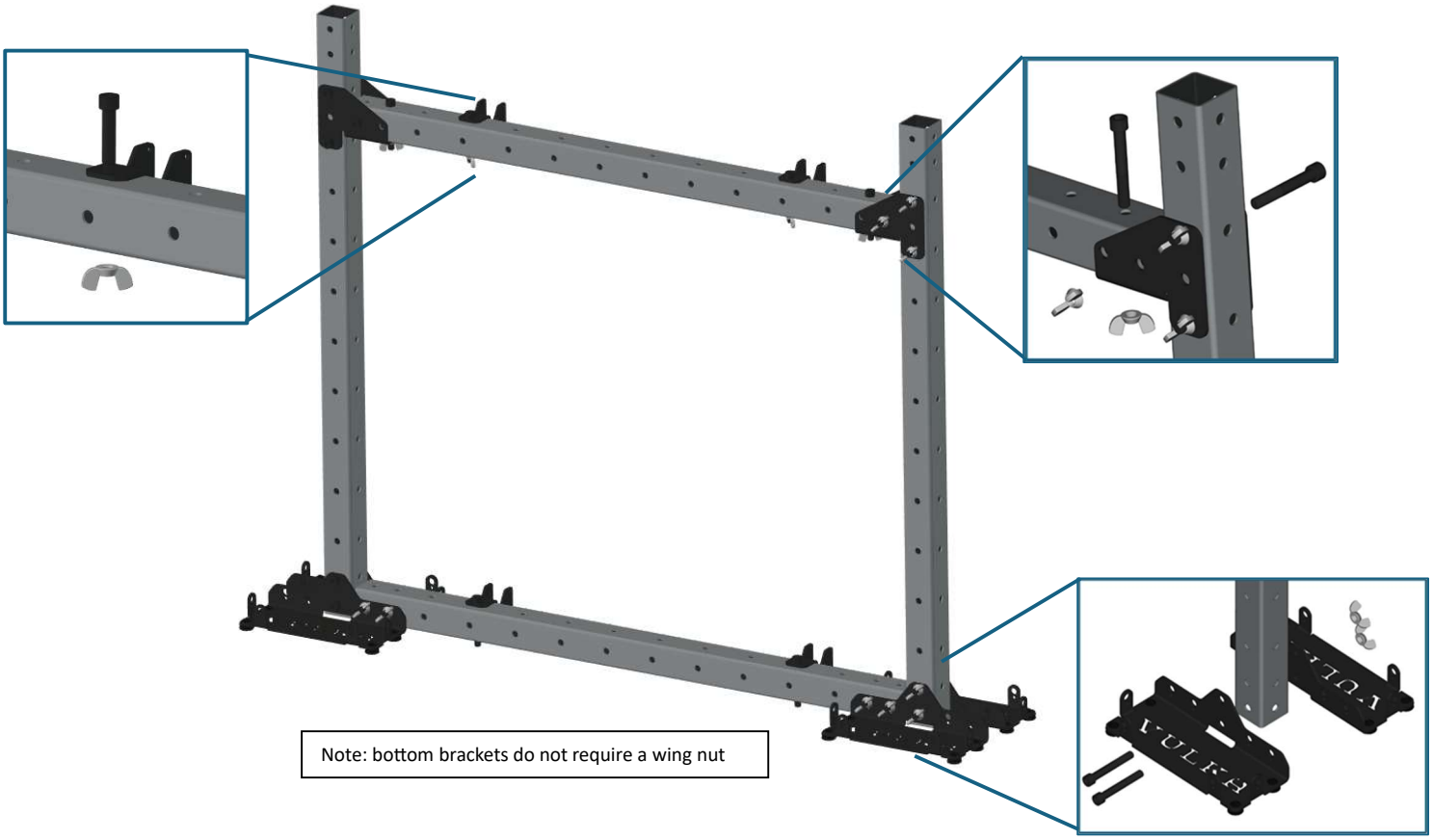
When securing bolts with wing nuts, bolts should only be hand tight. **Do not overtighten the bolts.** Overtightening the bolts could lead to permanent bending of the brackets and difficulty removing the bolts. Though uncommon, a bolt may require light tapping with a rubber mallet when inserting or removing 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.

It is recommended to use the 3/8” hex key to tighten bolts until brackets are firmly in place with little play.

Assembly – Denver Drill

1. Assembling the Structure

a. Start by assembling **(2)** arch structures as shown below. The lumber brackets in this step will determine your corridor width and the top tube determines your sill height. As shown below gives you an approximately 28” corridor and 42” sill height:



b. Place (4) lumber brackets onto one of the arch structures. These brackets will determine the window width. As shown below gives you an approximately 20” window width:

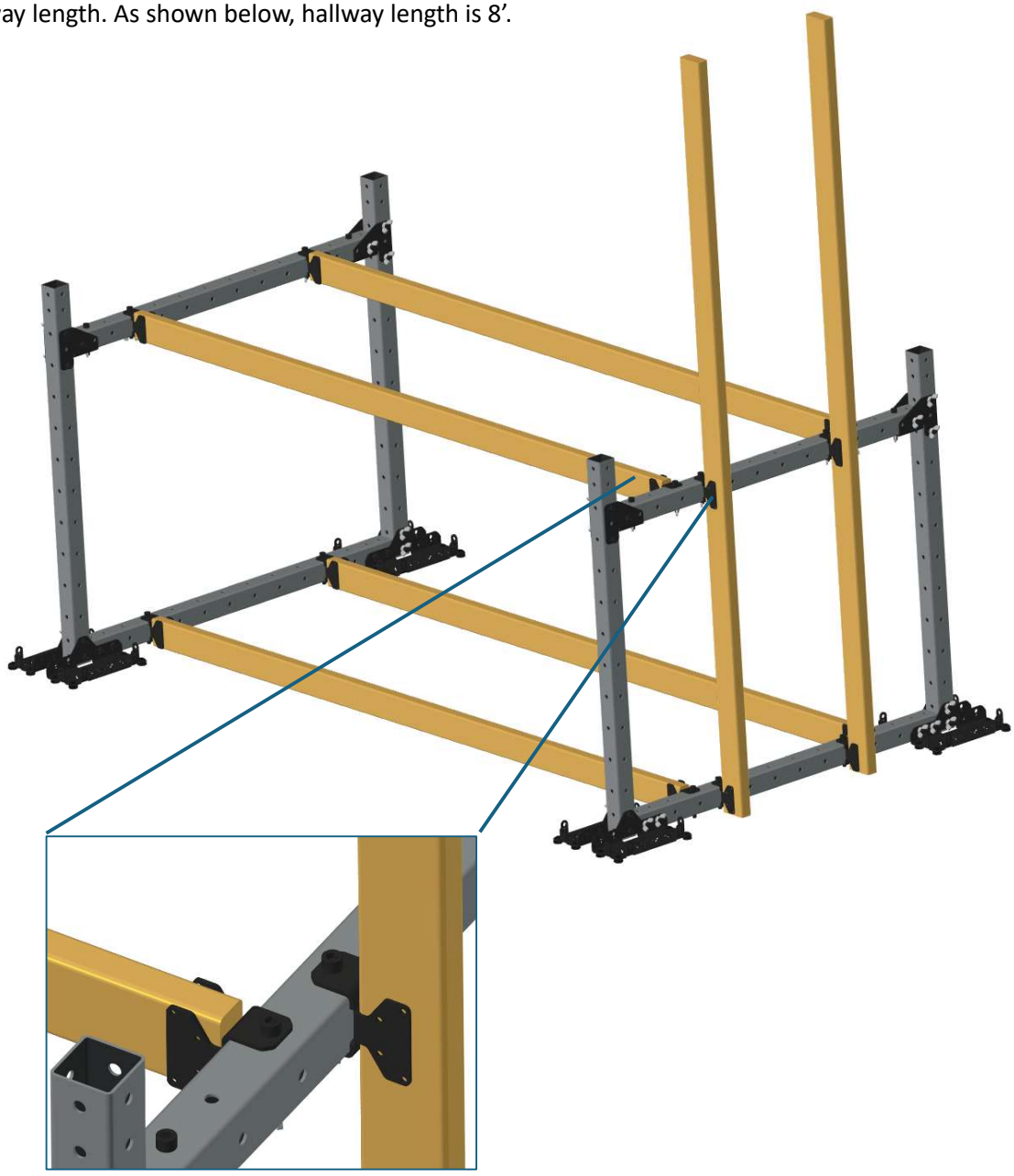
Note: bottom brackets do not require a wing nut

Assembled System (without Lumber):

Assembled structure is shown below. Space the structures approximately 8’ apart to make adding lumber easier. Corridor lumber brackets should face each other. Don’t worry too much about the exact spacing or getting it perfectly square, the lumber will help with this.

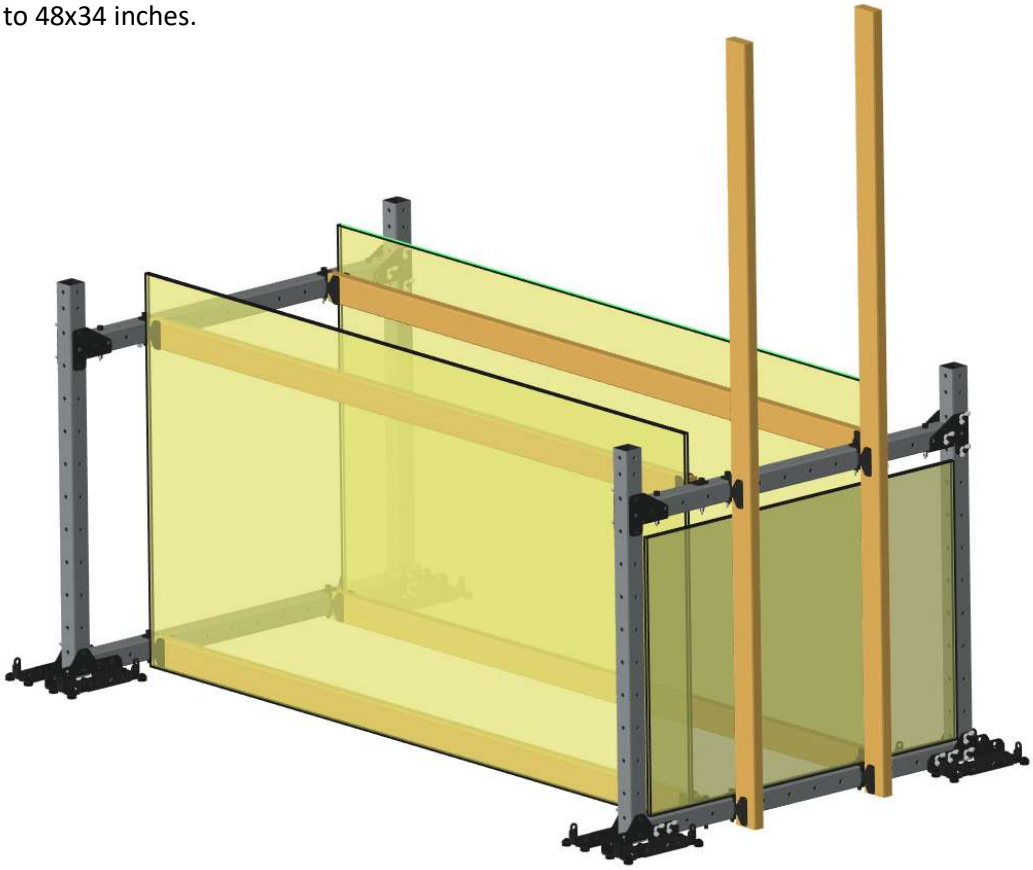
2. Attaching the Lumber

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 length will determine your hallway length. As shown below, hallway length is 8’.



3. Attaching the Sheathing

The 2 4x8 sheets of plywood or OSB sheathing are secured to the outside of the lumber with screws. A third sheet of plywood will need to be cut to size to screw into the back of the studs forming the window. The size of this sheet depends on the height of the sill. In the configuration shown, this sheet is cut to 48x34 inches.



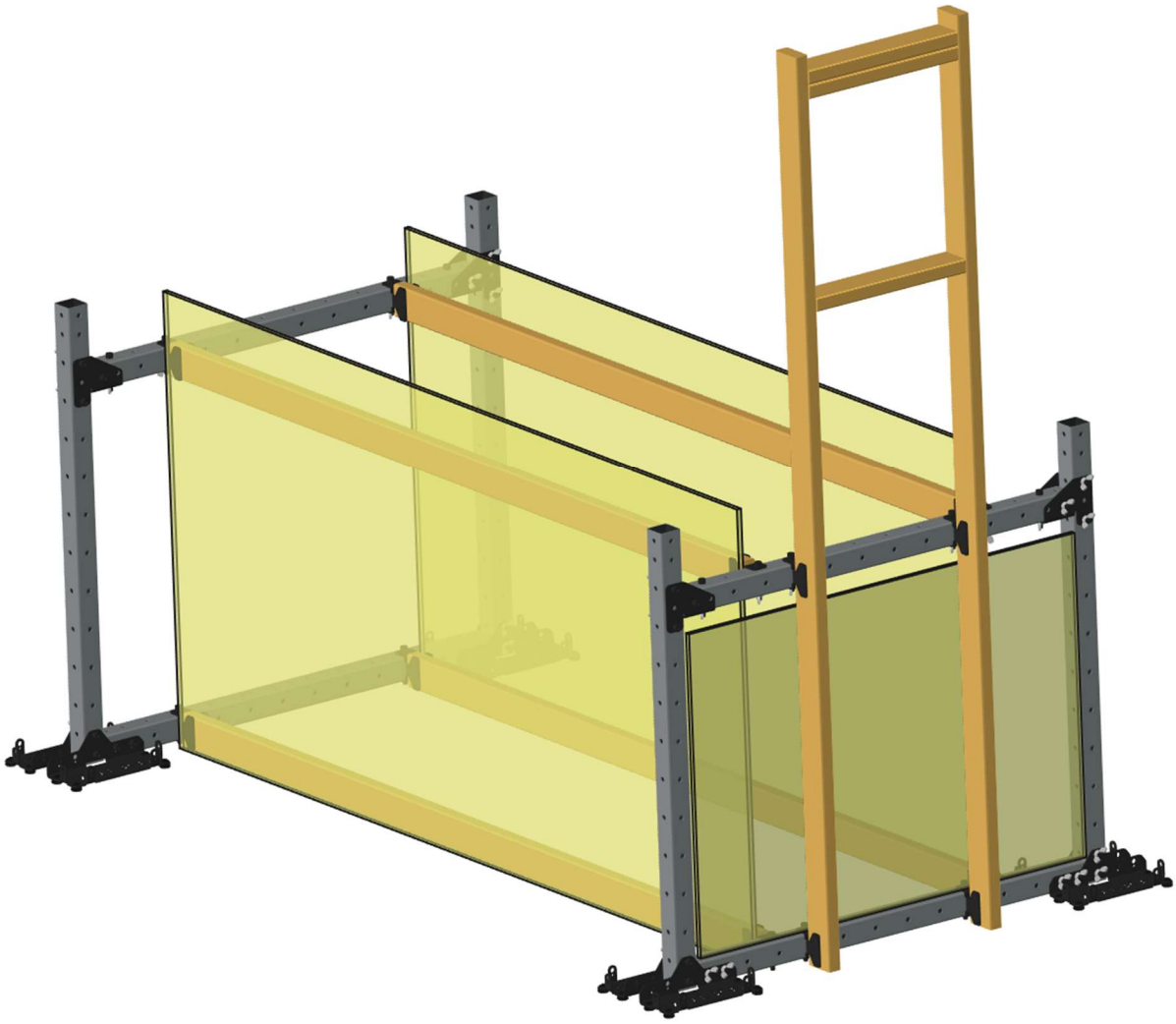
4. Final Assembly & Check

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. Review safety precautions before training begins.

Optional: Adding a Top Sill

Many areas teach using a high point rope device to assist with getting a firefighter up and out of a window. This is an incredible tactic to train on, but requires the ladder be placed above the window. In order to use this tactic with the VTS, simply add (2) sections of lumber at the desired ladder height, and (1) section of lumber to create the top of the window. In the configuration show below, the lumber required is 18.5” long for a 20” OC window width:



Assembly – Entanglement/Confined Space Tunnel

1. Assembling the Structure

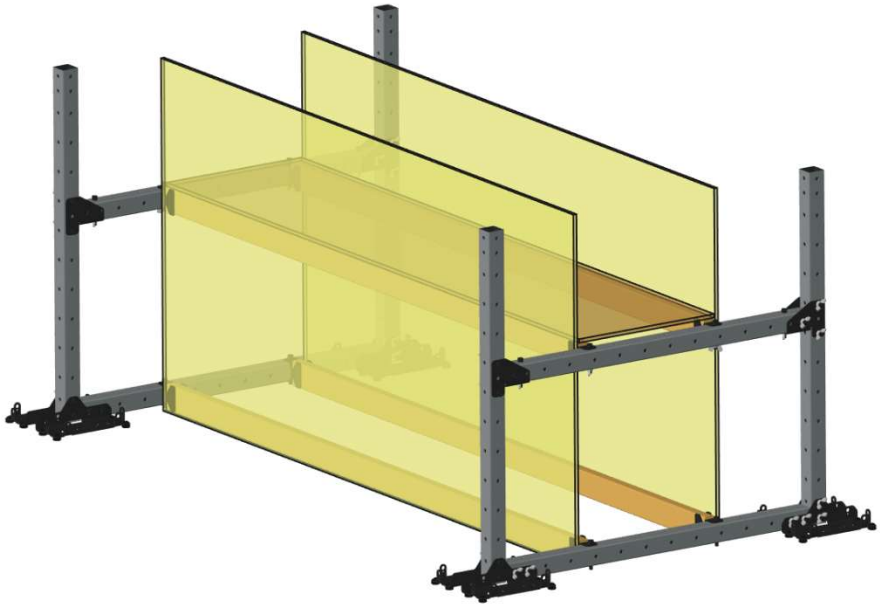
Follow step 1 for the Denver Drill configuration, except adjust the desired height of the cross bars and brackets to achieve the desired tunnel dimensions. An example of this is shown here, with roughly 20” tunnel width and 30” tunnel height:

2. Attaching the Lumber

Refer to step 2 of the Denver Drill configuration for attaching lumber. If wires, pipe, or other hazards are going to be included in the tunnel, this step would be the best time to add those. As with the Denver Drill, the lumber length will directly determine the tunnel length. Shown here is 8’ lumber:

3. Attaching the Sheathing

Refer to step 3 of the Denver Drill configuration for attaching sheathing. Note that an extra piece of sheathing will be needed on the top side to enclose the tunnel, if desired. The sheathing will likely need to be cut to size. Shown here is 21.5”x96” sheathing:



4. Final Assembly & Check

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. Review safety precautions before training begins.

Optional: Customization

The tunnel shown in this example is quick and basic. There are obviously many things that could be added to enhance the training, including a drywall breach on one or both sides of the tunnel, multiple tunnel levels, 90 degree turns, etc.

This guide is only meant to cover the basics and spark imagination. Please be sure to send us pictures of your most creative and challenging tunnel configurations!

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