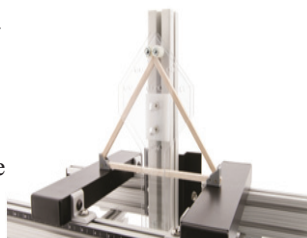


Truss Tester Accessory

(Order Code VSMT-TRUSS)

The Truss Tester Accessory is designed for use with the Vernier Structures & Materials Tester (VSMT). The Truss Tester Accessory holds a single truss upright and provides the means to apply a force to the truss, while measuring that applied force and the displacement of the loaded portion of the truss.



The truss holder consists of a pair of side panels that hold the truss being tested and prevent the truss from tipping over. A support post connects to the top rail of the VSMT with standard 80/20® fittings. The truss holder is connected to the support post through a plastic bearing shoe that glides up and down in the grooved post. The truss holder also connects to the load cell (force sensor) with a 4 in. threaded rod that screws into the top of the load cell. The Truss Tester Accessory applies the force to the truss through 1/2 in. diameter spacers that can be positioned for a variety of loading locations.

Note: Vernier products are designed for educational use. Our products are not designed nor are they recommended for any industrial, medical, or commercial process such as life support, patient diagnosis, control of a manufacturing process, or industrial testing of any kind.

What's Included

- (1) truss holder assembly consisting of (2) polycarbonate side panels (with bearing shoe), (4) 1/2 in. spacers, an aluminum coupling pin, and (1) 4 in. 1/4-20 threaded rod
- (1) bracket assembly with a grooved 80/20 post
- (1) bag of parts including
 - (2) truss corner brackets
 - (2) replacement 80/20 double-hole end caps
 - (2) additional 1/2 in. spacers with hardware



Assembly

Refer to the Truss Tester Accessory Assembly Instructions that shipped with the product. These are also available online at www.vernier.com/vsmt-truss-assembly

Using the Product

The Truss Tester Accessory comes in two parts: the bracket and support post that attaches to the VSMT and the truss holder that slides in the post groove and connects to the VSMT load cell.

1. Remove one VSMT crossbar by loosening the attachments and sliding the crossbar off the long beams. Remove the two end caps in order to slide the crossbar off the long beams.
2. Slide the bracket and grooved 80/20 post onto the VSMT support beam and center the device above the load cell. Do not tighten the screws at this time.
3. Slide the polycarbonate truss holder onto the grooved 80/20 post and lower it so the threaded rod can be attached to the load cell. Ensure the rod is threaded firmly into the coupler on top of the load cell. Tighten the screws that secure the bracket to the support beam.
4. Reattach the crossbar. Adjust the crossbars to the appropriate width and secure them. Re-place the end caps if desired.
5. Adjust the height of the Truss Tester Accessory with the displacement wheel on the VSMT. To adjust the height of the contact point, you may need to thread more of the rod through the coupling shaft, reposition the 1/2 in. spacers, or both.
6. Place the truss between the polycarbonate side plates and adjust the Tester height to make contact with the truss.
7. Wear safety glasses. Viewing is best accomplished looking head on. Broken trusses tend to eject material to the sides.
8. Connect the VSMT to an appropriate interface and software platform. Zero the sensors in the software. You are now ready to test the strength of your truss and collect data.

Specifications

The Truss Tester Accessory is designed for maximum 1/2 in. wide material. It is optimized for 1/4 in. square balsa, so not to exceed VSMT force limitations.

Safety

Wear safety glasses when testing trusses. Broken trusses tend to eject material to the sides.

Care and Maintenance

Be mindful that your truss doesn't exceed the maximum height accommodated by the truss holder (about 18 cm). The VSMT has a 0–1000 N load cell operating range. Forces above 1300 N may result in permanent damage to the load cell.

How the Accessory Works

The Truss Tester is an excellent starting point for conducting a bridge building activity. Students can evaluate how trusses fail and what they can do to improve

their performance. They may discover that the trusses usually fail in a particular way and that including a brace at the point of failure provides a significant improvement in its ability to sustain a load. They can also test more complex structures, such as a bridge or crane.

The truss tester was designed for use with 1/4 in. square balsa wood or 3/32 in. balsa planks up to 3/4 in. wide.

Note: Other materials may work, but these materials are readily available and are known to work with the design parameters of the Truss Tester and the VSMT.

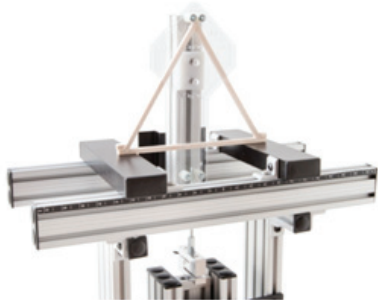


Figure 1 Truss constructed of 1/4 in. square balsa truss with reinforced corners

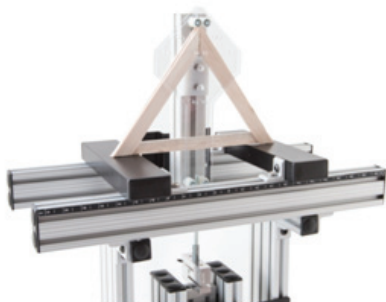


Figure 2 Truss constructed of 3/32 in. balsa planks

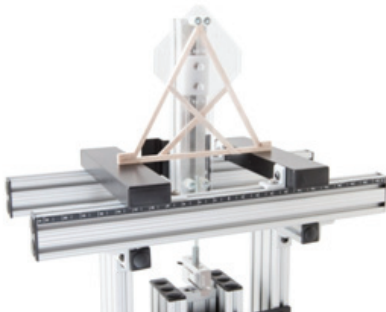


Figure 3 Truss with supporting members

The crossbars on the VSMT were set for a 16 cm span to carry a truss width of 18–20 cm in order to provide a range of potential angles that will fit within the truss holder dimensions.

The Truss Tester Accessory comes with two corner brackets that are useful in quickly constructing triangular trusses. The brackets slide onto the bottom member and can be pinned in place with a small nail, brad, or small piece of 1/16 in. or 3/32 in. diameter piano wire. The angled members can be cut to length and allowed to push against each other with or without glue or gussets.

An alternative to using the brackets is to glue the joints together. Lap joints with lots of surface area overlap work best, especially when trying to optimize truss design. Hot gluing balsa, with a little practice, provides a quick and strong bond.



Figure 4 Note that the angled members are free to push against each other

Tips for integrating this accessory with the VSMT can be found at <http://www.vernier.com/vsmt>

Troubleshooting

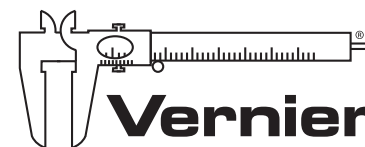
For troubleshooting and FAQs, see www.vernier.com/til/3595

Repair Information

If you have followed the troubleshooting steps and are still having trouble with your Truss Tester Accessory, contact Vernier Technical Support at support@vernier.com or call 888-837-6437.

Warranty

Vernier warrants this product to be free from defects in materials and workmanship for a period of five years from the date of shipment to the customer. This warranty does not cover damage to the product caused by abuse or improper use. This warranty covers educational institutions only.



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