

Tech Wars 2020 – Niagara County Community College

Competition Category: Small Bridge Competition

Level of Competition: Middle School & High School

Event Coordinator: Brad Wright BWright@ClarenceSchools.org

Objective of Competition: Design and engineer a bridge using 1/8" x 1/8" wood members to hold up to 100 lbs. over a 12-inch span.

Rules of Competition:

Construction:

1. Dimension Requirements

IMPORTANT SPECIFICATIONS

- Overall Width must be between 2 ½" - 3 ½"
- Overall Height must be between 2" - 6"
- Overall Length must be between 13" - 15"
- The design must allow a 2"x2" block to pass clear across the deck of the bridge, simulating a vehicle crossing the bridge.

2. The bridge shall allow a 1-1/2" x 2" loading block to descend to the deck surface (roadway) for testing. Load is applied from above, at the center of the 12" span.

3. The bridge shall be constructed entirely of 1/8-inch x 1/8-inch wood members.

4. Any common adhesive may be used at the joints of the wood members.

5. Wood joints may be notched if desired.

6. There is no limitation on laminating pieces of the bridge together. Bridge members may be glued side by side.

7. Any species/combination of wood species may be used in construction of the bridge.

Competition:

1. The bridge will be measured to ensure that it meets design specifications.

2. The mass of the bridge will be determined before testing.

2. All bridges will use the same test device.

3. The bridge is placed on the bridge tester, with the span set at 12 inches.

4. The bridge will be tested using a loading block measuring 1-1/2" x 2". The loading block will press on the "deck" (road surface) of the bridge.

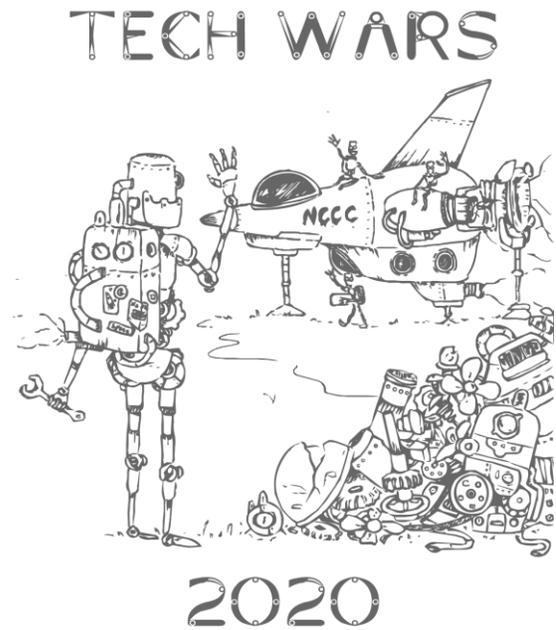
5. The coordinator will lower the lower the loading block to the bridge surface.

6. The coordinator will begin to add a load to the bridge at a steady rate. (Maximum load of 100 lbs)
7. The coordinator will continue to increase the load until the student asks to stop, or the bridge collapses.
8. The mass of the critical load will be recorded (MLS).
9. The bridge with the highest structural efficiency (SE) is the winner.
10. In the event that the bridge supports the full 100 lbs load without breaking, structural efficiency will be calculated using 100 lbs as the MLS.

SE = Structural Efficiency
MLS = Maximum Load Supported

$$SE = \frac{MLS}{\text{Mass of Bridge}}$$

14. Registration will be limited to 20 bridges per school.





The Bridge Testing Apparatus



The Loading Block