

# Technology Student Association (TSA) Structural Engineering Regulations

## Structural Engineering Contest

Level I = Middle School/Junior High: Level II = High School

(Teachers may wish to use the following rules for contests within their classes, regardless of whether a Technology Student Association Chapter exists.)

## Overview

TSA teams (two members per team) entering the Structural Engineering contest will construct a model truss bridge to be destructively tested to determine the design efficiency of the bridge.

## Contest Purpose

The purpose of the Structural Engineering contest is to provide a means for TSA team members to demonstrate their ability to fabricate a truss bridge after having been assigned span and width specifications.

## Eligibility for Entry

Each chapter may enter only one team. A team consists of no more than two chapter members. Team members must be from the same chapter.

## Time Limitations

The allotted time for design and construction of the bridge will be two (2) hours and thirty (30) minutes. All contestants in this event must arrive and be "in place" at the specified time and location.

## Specific Regulations

- A. There shall be two (2) members per team - no more, no less.
- B. All work must be done in the specified area.
- C. All materials will be provided. Contestants will be issued 20 feet of balsa strips. With conservation of full-length strips in mind, at the end of the two (2) hours and thirty (30) minutes, students must return all full-length strips to the contest coordinator.
- D. Pins and/or tape used in construction of the bridge must be removed by the team when the 2-1/2 hours of the contest have ended.
- E. The following definitions and graphic explanations are an integral part of the contest regulations.
  - Bridge Length:** The overall length of the bridge, including the span and the required bearing surface area of the roadbed (1" minimum, 2" maximum) on the bridge support.
  - Truss Bridge:** A bridge with a super-structure and/or a sub-structure supporting a roadbed across a span.
  - Super-Structure:** The structure of a bridge which extends above the roadbed.

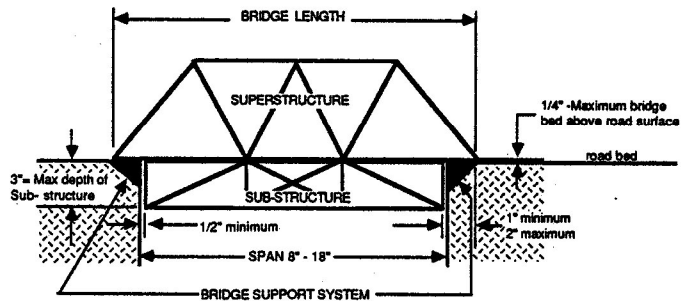


DIAGRAM A

**Sub-Structure:** The structure of a bridge which extends below the roadbed. Three inch (3") maximum.

**Test Block:** That piece of test apparatus to which the hook that holds the weight is attached. The length of which will be 2" less than the span announced at the national conference contest.

**Span:** The distance between bridge supports.

**Roadbed:** The part of the bridge that is meant to be traveled on. The bridge must be constructed to allow the test block (without the hook) to pass through the bridge opening on the roadbed from one end to the other. The roadbed must be flat and not greater than 1/4" thick.

**Failure:** The point at which a truss bridge collapses or is determined to have failed due to the stresses of the load placed on it.

**Lamination:** Two or more pieces of 1/8" x 1/8" beams glued together surface-to-surface (wood grain parallel).

- F. The exact span of the bridge to be built will be posted at the beginning of the competition. The posted specifications will be within the following limits:
  - Span 8" minimum 18" maximum
  - Width 3" minimum 3 1/4" maximum
- G. Bridges must be constructed in such a manner as to accommodate the test hook at the bridge's center. The roadbed of the bridge must be free of obstructions.
- H. Bridges will be allowed to dry a minimum of twelve (12) hours. Bridges will then be tested by applying weight until they fail.
- I. Coating of laminated beam/members with glue will not be permitted.
- J. See Diagram B for correct procedure for laminating beams.