**2015 TEED 2103 Technology and Society - Structural Engineering Challenge**

**OVERVIEW**

Participants will model a through bridge of a recognized truss style for destructive testing. The bridge will be destructively tested to determine design efficiency.

**CHALLENGE**

Working individually, with material constraints, participants have an opportunity to construct a bridge that reflects knowledge of engineering design and construction concepts.

**REGULATIONS**

1. Dimensions
   * The structure must be exactly 12” in length, have a minimum internal width of 2”, and a minimum internal height of 3”
2. Materials
   * The following may be used as structural pieces
     + 12' of 1/8” X 1/8” balsa wood
     + 8’ of 1/8” X ¼” balsa wood to be used as horizontal members (this 8’ of material may be made of 1/8” laminated balsa wood)
3. Lamination of the material is prohibited (with the exception of the 8’ of 1/8” X ¼”
4. Joints are to be glued together with Elmer’s School Glue or blue, green or pink structures glue (no gorilla or super glue)
   * An adhesive spread past ¼” of the joint is prohibited.
   * Coating of structural members with adhesive is prohibited.
5. The structure must rest on the top of the abutments.
6. The center of the beam must provide clear passage for the one half inch (½") test rod.

**EVALUATION**

1. The structure is weighed before testing and the weight is recorded on the evaluation form.
2. An increasing load is applied to the structure via the test block until the structure fails. The test block is three quarters of an inch (¾") thick, two inches (2") in width and six inches (6") in length with a ½” hole to accommodate the testing device
3. The failure weight is recorded on the evaluation form.
4. The efficiency is determined by the failure weight x 4.54, divided by the weight of the structure in grams.
5. The efficiency is rounded off to three (3) decimal places and recorded on the evaluation form.
6. The highest numeric efficiency is the winner. In case of an efficiency tie, the greatest weight held by the tied entries will be declared the winner. Awards will be given for first, second, and third places from each level.
7. Structures that violate guidelines will receive a deduction of 20% of the greatest weight held for the first violation.
8. Structures are not to be tested if:
   * there are two (2) or more rule violations.
   * the structure cannot be placed on the tester.
   * the testing device cannot be placed in the center of the structure.
   * straight pins are left in the structure.
9. The structure must be submitted along with a completed engineering journal detailing the design process on November 19.