Objective

Each team is to design a truss bridge with a maximum load-to-weight ratio. The bridges will be
constructed using three sizes of basswood strips: 1/4, 3/16, and 1/8-inch square. Since the goal of each
design is to maximize the ratio of failure load to mass, a more massive structure must be able to carry a
larger load.

Specifications

Each bridge will be placed on flat supports that are 10 inches apart (as shown in the figure below).
The truss will be loaded from the top in two locations that are 5 inches apart. This loading will be
centered in the middle of the bottom 10-inch wide supports. Your bridge should consist of two
identical trusses joined by cross members so that the two trusses are 3 inches apart (i.e. your bridge
will be just over 3 inches wide).

Length = 10 in
Height = 10 in maximum
Width = 3 in

There is no restriction on the appearance of your bridge as long as it meets the spatial requirements
for loading. The figure above is only used to illustrate the constraints of the loading apparatus, and
is not intended as a recommendation for your truss design.
Each team will be issued the following materials:
- 1/4 X 1/4-inch basswood – 8 feet
- 3/16 X 3/16-inch basswood – 4 feet
- 1/8 X 1/8-inch basswood – 4 feet
- 1/8 inch X 1 inch basswood sheet – 2 feet
- Superglue – 1 bottle (optional)

You MUST use glue to join your members together; however, you ARE allowed to purchase another type of commercially available glue. Other than glue, you are NOT allowed to substitute or use any other materials to construct your bridge (e.g. metal, plastic, other wood, etc.). If you have a significant amount of unused material, please return it.

Design and Construction

The first step will be the group design of your bridge. Each team member will create a unique design using the ModelSmart software. Then, you are to compare the different designs and select one to be your initial bridge design. This will be done as homework. See Blackboard for the due date and the ModelSmart assignment for additional details.

The next step will be the building of your bridge. Your material will be provided after you have finished your team design. You will receive these as soon as you hand in your ModelSmart assignment and initial design. Your truss will be tested in a compression testing machine in Rogers. See Blackboard for the exact date of your performance test.

Grading and Competition

After testing, you will submit a short report, answering some specific questions about your truss and other groups’ trusses. Some of the aspects included in the report are design load-to-weight ratio, actual load-to-weight, failure analysis, and quality of construction. Each team member will also give an estimation of the effort of the other team members. These two items (report and team member evaluations) will form the basis of your grade for the project.

Each team’s bridge will be judged in an informal competition to see which one has the highest load-to-weight ratio.