



TENNESSEE SECTION, WEST TENNESSEE BRANCH

THE UNIVERSITY OF  
**MEMPHIS**®

Herff College of Engineering

---

## ***Structure Building Rules***

### ***E-DAY Competition 16<sup>th</sup> of November 2007***

---

This competition is open to teams made up of students from grades 6 through 8. Each team will represent their school and will consist of four or fewer team members. Schools may have up to three teams entering the competition.

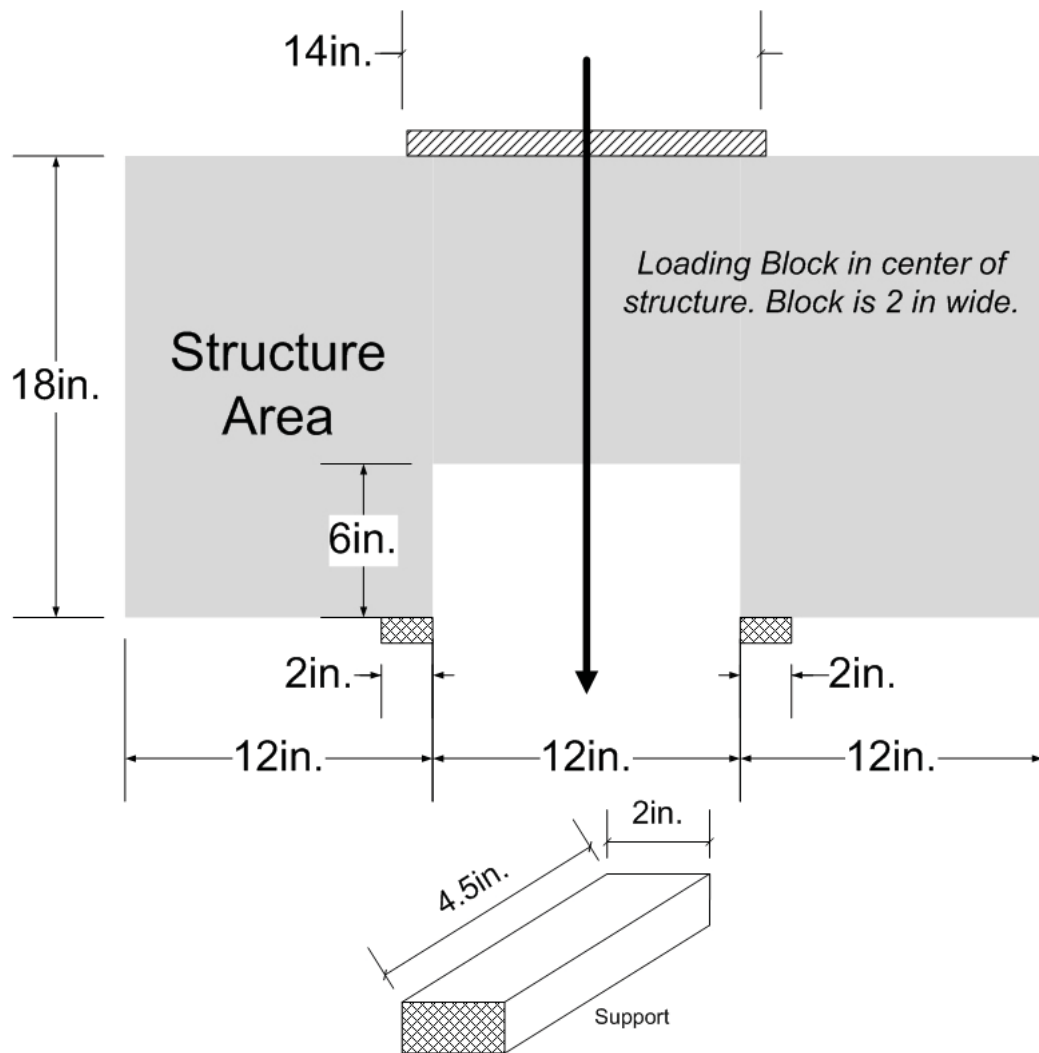
Student teams will compete with structures that they bring and submit to the judges on E-Day, the 16th of November 2007. Teams will submit their bridges from 9:30 AM until 4:30 PM to Room ES 102 C in the Engineering Building at the University of Memphis. Bridges will be submitted unassembled with all parts contained in a zip-lock bag no larger than 12 inches by 12 inches. The bag will be labeled with the submitting school's name and with the names of the team members.

## ***Rules***

1. Structures must be submitted to the judges unassembled. All parts for the bridge must be K'Nex pieces that are commercially available. No panels or cables/strings may be included in the structure.
2. All parts for the structure must be contained in a zip-lock bag that is no larger than 12 inches by 12 inches. The bag must be sealed and labeled with the school name and the team members at submission.
3. Glue is not allowed in construction of the structure.
4. K'NEX members cannot be coated or treated in any way.
5. The total length of the structure may be no more than 36 inches.
6. A block that is 12 inches wide and 6 inches high must be able to go under the structure at the level of the support.

[www.engr.memphis.edu/EDAY2007](http://www.engr.memphis.edu/EDAY2007)

7. The free height of the structure will be determined from the lowest point on the support (the level of the supports) to the closest point on the structure measured vertically from the ground at the center of the structure which is the loading point. The test block will be passed under the structure at support level.
8. The structure must be a minimum of 2 inches wide and a maximum of 4.5 inches wide. The structure may be a maximum of 18 inches high and have a maximum length of 36 inches. A tolerance of 1/8 inches will be granted on all dimensions.
9. No support, other than the support as shown in the diagram, will be provided for the structure. The supports are positioned 12 inches apart as shown on the accompanying diagram. Support for the structure is provided by flat pieces 2 inches wide by 4.5 inches deep each located 6 inches from the center of the structure as shown in the drawing as the cross-hatched boxes.
10. No pieces may be added or subtracted from the pieces submitted in the zip-lock bag.
11. The judges will determine the mass of the structure when the structure is submitted.
12. All members of the team may participate in the construction of the structure. Notes and sketches may be used to aid in the construction. No outside aid may be given to the team during the building of the structure.
13. The judges will measure the time for construction. The team signals completion of the structure. After completion, no changes or modifications to the structure may be made.
14. All structures will be loaded to the point of failure. Failure is defined as collapse or as the point where the structure can no longer support an increased load. The judges decision as to failure will be final. A 14 inch x 3 inch X 1 inch wooden block will be used to load the structure at the center of the structure. The loading block will be applied to the top of the structure and will be located in the exact center of the structure. Each team will be responsible for the placement of the loading block on their structure.
15. The structure must be designed to support the loading block and to allow loading. The structure must be able to pass a rod through the center of the structure from the top to the bottom to facilitate loading. The loading block supports a rod which extends below the support surface to allow loading. Judges will do all loading of structures.



## Details of loading

The structure when assembled must fit within the grey area as shown on the drawing above. No part of the structure may be outside of the grey area. Loading will be at a point at the top of the structure in the center of the loading.

Please direct any questions about the competition to  
[ppalazol@memphis.edu](mailto:ppalazol@memphis.edu)

[www.engr.memphis.edu/EDAY2007](http://www.engr.memphis.edu/EDAY2007)

## JUDGING CRITERIA

1. Structural performance will be measured by a strength-to-weight ratio computed in the following manner:

$$SWR = \frac{Load}{Mass\ of\ Structure}$$

where **SWR** is the strength-to-weight ratio.

2. The time factor will be the time that it takes the constructors to build the structure measured in seconds.
3. The final score for the structure will be computed using the formula:

$$Final\ Score = 75 \times \frac{SWR_{This\ Structure}}{SWR_{Highest}} + 25 \times \frac{Build\ Time_{Fastest}}{Build\ Time_{This\ Structure}}$$

For example: If the best SWR measured during the competition was 532.2 and the fastest construction time was 35 seconds and your structure had a SWR of 524.6 and a construction time of 57 seconds your Final Score would be calculated by

$$Final\ Score = 75 \times \frac{524.6}{532.2} + 25 \times \frac{35\text{sec}}{57\text{sec}} = 89.28$$

4. The structure with the highest Final Score at the end of the competition will be judged as the winner. Final standings and results will be sent to all competing schools.

To enter a team or for more information contact  
Ms. Shelia Moses at 901-678-4933  
or by e-mail at [srmoses@memphis.edu](mailto:srmoses@memphis.edu)

For information about rules or rules clarification contact  
Dr. Paul Palazolo at [ppalazol@memphis.edu](mailto:ppalazol@memphis.edu)