Project #1 – K’NEX Truss

The objective is to design, analyze, and construction a truss structure using K’NEX connectors and rods with that supports the design loads.

All structures must hold the design load. Once the design load is sustained, structures will be evaluated based on the largest cost-adjusted strength-to-weight (SWR).

Design Report

➤ A written report is required for each K’NEX structure submitted for evaluation.

➤ The content and quality of the report will account for 50% of the project score.

➤ The remaining 50% of the project grade will be determined by the strength of the structure based on the ultimate strength-to-weight ratio (SWR).

There are two strength criteria for structures:

1. all structures must support the design - 50 pound minimum (30% all-or-nothing – structures supporting 50 pounds or more receive 30 points; structures that do not support the load receive no points; and

2. the structure with the highest SWR is awarded full points (20%) and the remaining structures will be awarded scores commensurate with their performance (first place will be awarded 20 points, second place 19 points, third place 18 points, etc. . .).

If a structure does not meet the construction rules, listed below, the submitting student will receive no strength points.

Construction Rules

1. Structures must be constructed using only K’NEX pieces.

2. Glue is not allowed in construction of the structure.

3. K’NEX members cannot be coated or treated in any way.

4. The structure must be designed to fit on the support shown in Figure 1.
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Construction Rules

5. The structure must cantilever at least 8 inches from the support. The height of the structure must not exceed 14 inches.

5. The height of the structure will be determined from the lowest point on the support to the highest point on the structure.

5. A tolerance of 1/8 inches will be granted on all envelope dimensions.

6. The cantilever structure must include a connection to the support.
6. In other words, your cantilever structure should connect to the vertical support wall.
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Construction Rules

<table>
<thead>
<tr>
<th>Color</th>
<th>Part</th>
<th>Weight (lb/sq in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>1</td>
<td>1.86</td>
</tr>
<tr>
<td>Orange</td>
<td>1</td>
<td>1.46</td>
</tr>
<tr>
<td>Green</td>
<td>2</td>
<td>2.15</td>
</tr>
<tr>
<td>Blue</td>
<td>3</td>
<td>2.29</td>
</tr>
<tr>
<td>Yellow</td>
<td>4</td>
<td>2.51</td>
</tr>
<tr>
<td>White</td>
<td>5</td>
<td>3.67</td>
</tr>
</tbody>
</table>

Rules

- Green: 3.48
- Blue: 3.11
- Yellow: 2.32
- Red: 3.02
- Orange: 1.96
- Purple: 0.66
- Light Gray: 2.17
- Dark Gray: 2.15

Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 1, 2018</td>
<td>Rules and Instructions</td>
</tr>
<tr>
<td>February 23, 2018</td>
<td>Prototype Testing (out of class time)</td>
</tr>
<tr>
<td>March 1, 2018</td>
<td>Final Testing and Design Report</td>
</tr>
</tbody>
</table>

End of K’NEX Truss Project

Any questions?