



Colorado Science and Engineering Fair

2024 Individual Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: Breaking Bridges

Finalist's Name: Benjamin Knauf

School and City: Bear Creek Elementary School Monument Colorado

Sponsor's Name: Louise Knauf

Category: Engineering (ENGR)

Division: Junior (6th - 8th grades)

Abstract (250 words or less):

I am creating this experiment in order to prevent more bridge failures which could happen in the future and harm or even kill many people. This can be prevented by knowledge of stronger trusses for bridges. In order to understand which truss is the best of them I made four trusses using CAD and then cut them with a laser cutter. The different trusses I made with the laser cutter and CAD were as follows: the Warren, the Pratt, the Howe, and one I created myself. Next I weighed it on a scale. Then I put one of the trusses under the Instron and inside the plexiglass side retainer then started the Instron and had it take a reading of how much force it was pushing down with when it fractured. Then I divided the amount the truss held by how much the truss weighed. My results were that the Warren truss held the most weight and had the highest efficiency. The runner up was the Howe, then the Pratt, finally the one I created. What I can conclude from this is that the efficiency of the truss is not completely dependent on the number of triangles included in the truss.

I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.

Finalist's Signature: *Benjamin Knauf*

Date: *Mar 4, 2024*

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. A signed copy of this form must be included in your notebook.