Improved Truss Strength through Design Optimization

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The intended purpose of this experiment was to design an original truss that would become part of a bridge, the MeSta Bridge, in order to hold up more weight than the Pennsylvania-Pettit Bridge. Last year’s project consisted of testing a variety of truss designs where the Pennsylvania-Pettit Bridge succeeded in holding almost half a ton, standing out from the rest of the competitive trusses. The goal behind coming up with a new truss was so that it would support a bridge allowing it to hold more weight while using a reduced amount of material. A Structural Statics book, an online bridge design program and personal knowledge were used to calculate the forces of the truss nodes. The summation of the forces from the nodes had to be bigger than 4000 Newton’s in order to guarantee that the original design will succeed in being the strongest. In order for this project to be more accurate and precise on the weight load held, all bridges built were compressed and professionally broken by a metallurgic machine at a constant rate of 250 pounds per minute. As a result, MeSta Bridge succeeded in holding an average of 902 pounds which was 52 pounds more in average than Pennsylvania-Pettit.

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