April 9th, 2023

Dear Professional Engineers in California Government,

I was so honored to be awarded the Marilyn Jorgensen Reece Award for my science project at the 73rd annual Los Angeles County Science and Engineering Fair. Your organization's commitment to recognizing and supporting young engineers is truly wonderful, and I am proud to have been chosen as a recipient of this prestigious award.

This project was important to me because of both my personal interests and its potential global impact. I have always loved structural engineering and design, and when my class started learning about trusses and their mechanics in my science class, I was immediately interested. I knew that it was what my science fair project had to be about. Also, designing a bridge is one of the worst things to get wrong. People trust bridges to get them places and keep them safe. But still, about 130 industrial, government-built bridges collapse due to faulty design in the US each year. (Even more collapse in other countries that have fewer design regulations and less access to good materials.) So I thought a thorough experiment to find the strongest bridge truss could help the world, and finding the most efficient one could help places with fewer resources than the US.

In my project, *Trussworthy?,* I tried to figure out the most effective type of truss for bridge building. I tested five different trusses: Pratt, Howe, Baltimore, Warren, and the K-truss. My hypothesis was that either the Baltimore or the K-truss would support the most weight because they have the most triangles, which are the strongest shape when building a truss. My bridges were made out of balsa wood sticks ⅛ inch thick and normal wood glue. I tested the bridges using a wooden block on top of each bridge with a bucket attached to the block. The bridge rested on two tall, flat surfaces. I gradually added sand to the bucket. When the bridge broke, I weighed the sand, added the weight of the testing apparatus, and found the weight the bridge could hold. Then I calculated the efficiency of each bridge, which was the weight the bridge held over the weight of the bridge itself. The Pratt truss held the most weight and was also the most efficient, weighing only 9 grams but supporting roughly 31 pounds. I now realize that my hypothesis was probably wrong because the Baltimore and K-truss have more joints where the members intersect, which, after observing how the bridges broke, I figured out are actually the weak points of the trusses. Also, the efficiency levels of the two bridges were much worse than the others because they both weighed a lot.

Once again, thank you so much for your support and recognition. I believe that receiving this award will have a huge impact on me and my passion for engineering.

Sincerely,
Anna Schofield
6th grade
Walter Reed Middle School