April 27th, 2024

Dear Professional Engineers in California Government,

I am writing to express my heartfelt gratitude for receiving the Marilyn Jorgensen Reece Award. As a young student passionate about engineering, receiving this honor is a source of immense inspiration.The legacy of Marilyn Jorgensen Reece, as the first licensed female civil engineer in California, is a beacon of possibility. Her groundbreaking work demonstrates that with dedication and hard work, I too can contribute to the world of engineering. Please extend my thanks to everyone involved in the selection process. I am truly honored to be associated with Marilyn Jorgensen Reece's legacy and will strive to uphold the values of innovation and excellence that this award represents.

More than a quarter of our country's 600,000 bridges need repair or are structurally unstable. Structural engineering and design has always fascinated me; I thought the best way to impact the world at my age was to conduct an experiment.

This science project was formulated to uncover which bridge would support the most weight during an earthquake. Testing consisted of three different bridges: truss, suspension, and cable-stayed. My hypothesis was that the suspension bridge would break the fastest and hold the least weight. To discover the answer, an earthquake simulator, or shake table, was needed. While constructing the shake table, I had two pieces of plywood with 1 inch dowels in between, and walls were added onto the ends of two sides. Springs were fastened between the walls of the bottom and top pieces to simulate the oscillations of an earthquake. Wooden blocks were added to the top piece in order to fasten the bridge to the table, and a hole was drilled down the center of both pieces in order to hang the weights. Once I attached the bridge to the table, I looped a rope through the metal panel that I drilled to the bridge. At the bottom of this rope was a wooden board, where I would apply weight. Each time I added weight, I shook the table. To acquire earthquake consistency, I used a Newton meter or force meter. In the end my hypothesis was correct and the suspension bridge broke the fastest at an average of 51 lb 1 oz. I believe this occurred because the suspension bridges are not built with strength in mind, while truss bridges are. The triangular structures of the truss bridge allow it to absorb more tension.

Thank you once again for this incredible honor and your continued support for young engineers like me. Sincerely,

Mary Tomooka
St. Monica Academy