



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

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| Name(s) Tyler S. Hand | Project Number J1809 |
| Project Title Falling Bridges | |
| Abstract Objectives/Goals My objective in doing this project was to test bridge design load capability in an earthquake situation. Methods/Materials To do this I built a shake platform that had a motor with a crankshaft and a hinge. Supports were added to the platform so that all bridges contacted the platform in the same way. I built 4 different types of bridges, 3 models of each. Each bridge was put on the shake platform and three pounds were added to the bucket. The bridge was then shaken for 10 seconds. This process of adding weight was repeated until the bridge was broken. Results Bridge type 1 failed with the least amount of weight. Bridge type 4 held 3 times as much weight as bridge type 1. Bridge type 3 averaged between bridge type 2 and type 4. Bridge type 2 held the greatest average weight and the greatest single load of 33 pounds. Conclusions/Discussion After testing all the bridges and looking at the amount of weight each bridge held, I concluded that bridge type 2 withstood the most weight while being shaken at a verticle frequency. After inspecting the way the bridges broke I saw that all bridges actually failed for the same reason. The main beam for all of the bridges had twisted (rotated) out of position, which then caused the glue joints that attached the truss to the main beam to fail. I then concluded that bridge type 2 held the most weight because its design allowed it to flex more therefore; the load was more evenly distributed over the entire bridge. | |
| Summary Statement My project determined which bridge design would withstand the greatest load while being shaken at a verticle frequency. | |
| Help Received I received help on my project from my Dad to build the shake platform. He also participated in testing the bridges. My Mother helped proofread my presentation. | |