



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Enoch Chang	Project Number J1806
Project Title Bridge by Brick: The Relationship Between Contact Surface Area and Strength	
Abstract Objectives/Goals The purpose of my project was to test why using rebar in reinforced concrete is staggered for freeway bridge construction and if contact surface area affects bridge strength. My hypothesis was that the greater surface area of contact on each Lego brick in a bridge, the more weight the bridge will withstand before it collapses. Methods/Materials To test my hypothesis, I constructed a bridge of uniformly sized Lego bricks and measured their surface area of contact. I had four sets of towers that were 16 centimeters, 21 centimeters, 26 centimeters, and 31 centimeters apart. The bridge was placed on the two towers that were 16 centimeters apart. Then, I added weights in increments of 200 grams on the center of the bridge until the bridge collapsed. I tested five other identical bridges on the same set of towers. Then I repeated the process over again on the remaining lengths of towers. All of the other bridges of different contact surface area were tested in the same way. Each size of bridge was tested six times. Results The less contact surface area resulted in the bridge supporting less weight. 11.14 squared centimeters could withstand the least weight of 1200 grams, and 27.46 squared centimeters withstood the most weight of 2600 grams. Also, as the length of the bridge increased, the bridge could support less weight. Conclusions/Discussion I concluded that the greater surface area of contact on each Lego brick in a bridge, the more weight the bridge withstood before it collapsed. So, my hypothesis was correct. I got my results because each bridge would overlap more and more, enabling it to support more weight. The bridges would also withstand less weight as the length of the bridge increased, because the towers would give less support.	
Summary Statement I wanted to find out if contact surface area of overlapping bars of steel on a bridge affected its strength.	
Help Received	