



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Matthew A. Tatarka-Brown	Project Number J0233
Project Title Stressed Out	
Objectives/Goals Which structural beam shape will withstand the most load-bearing weight?	
Abstract Methods/Materials Five different polystyrene beam shapes, cut to 15 inches, three of each polystyrene beam shapes, a five gallon bucket (to put bricks in), thirteen bricks (to put in bucket), a hose (to fill up the bucket when the bricks cannot break the beam), a test stand, a gram and ounce scale (to weigh each beam), a regular bathroom scale (to measure the weight of the bucket), a notebook, two clamps (to hold down the beams), an S hook (to hold the bucket to the beam), a camera (to take pictures of the project), a stopwatch (if the water & the bricks do not break the beam, count to two minutes), safety glasses, and a carpenter's square (to measure deflection). Cut each beam to the length of fifteen inches, weigh each beam with the ounce & gram scale, set up your test stand with a twelve inch gap, clamp the first beam at both ends, put the #S# hook on the center, hang the bucket from the #S# hook, load one layer of bricks into the bucket, record deflection, repeat until all bricks are used, fill remaining space in the bucket with water slowly until the beam breaks or the bucket is full, when beam breaks, dismount the bucket & record it's weight. If the beam does not break leave the bucket full for two minutes, remove the bucket and weigh it. Photograph the results. Repeat this procedure for each beam. Analyze the data.	
Results The Square beam withstood the most weight with 70 pounds. The H beam withstood 68, I beam withstood 63 pounds and the T beam followed with 45 pounds in order. The weakest beam was the Z beam, which withstood 38 pounds on average.	
Conclusions/Discussion I conclude that if you need to support a tremendous amount of load-bearing weight upon a beam, use a Square beam.	
Summary Statement This project tests five structural beam shapes to determine which, Square, H, I, T, or Z, has the greatest load-bearing capacity.	
Help Received My step-father helped set up the test bench, loaded the bricks and took many of the photographs, my mother and step-father helped with the poster board.	