



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Tom J. Hiel	Project Number S0212
Project Title Load Carrying Capacity of Cylindrical Shells	
Abstract Objectives/Goals Cylindrical shapes are commonly used in items ranging from soda cans to the body of a wind turbine. Researchers are constantly testing building materials to minimize the risk of failure. In this experiment, I analyzed how much load a cylindrical shape could carry before it buckled or the material failed. Methods/Materials In the experiment, I tested three different types of empty cans: an aluminum Coke can, a narrow aluminum Starbucks (double shot) can, and a steel Slim Fast can. In addition, I tested unopened cans as well as cans filled with sand. The cans were compressed in an Instron, a machine used for testing of materials. The compression test displayed a graph which showed how much the load increased until the can buckled or the material failed. Results All my data has been described and graphs have been created showing my findings. Using the max load found in my experiments, the stress on the cans was calculated. In addition, the weight of the curves (Showing force on the can varying with displacement) was used to determine the ratio of the energy needed to crush a can. These ratios were used to calculate the exact amount of energy required to crush the cans. Conclusions/Discussion The max load and stress were used to determine which can was the most efficient at carrying high load. Real world applications have been added to the project demonstrating the value of my research.	
Summary Statement How does a cylindrical shell behave when compressed by load?	
Help Received	