



**CALIFORNIA STATE SCIENCE FAIR  
2003 PROJECT SUMMARY**

<b>Name(s)</b> <b>Lynn A. Hiel</b>	<b>Project Number</b> <b>S0208</b>
<b>Project Title</b> <b>Thermal/Fire Protection Basics and Applications</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My project determines if one or more insulating layers will protect a steel rod when heat is present. <b>Methods/Materials</b> I did this experiment using 12 straight, pre-measured, steel rods cut to the same length and 18 thin strips of fiberglass dipped in fire protection. I prepared 3 uncoated rods, 3 rods with 1 layer, 3 rods with 2 layers, and 3 rods with 3 layers. Using the testing device, I hung 2000g on each end of the rod and heated the middle using a Bunsen Burner. When the rod yielded 1/8", I stopped my stopwatch and recorded the time. I repeated the entire procedure for the rods covered with 1, 2, and 3 layers of protection. <b>Results</b> I found that when heat is present, the steel rod covered by an insulating layer, supported the load for a longer period of time than the uncoated metal rod. Additional layers on the rod increased the amount of time the rod resisted the heat. All these results were graphed and showed the interaction between the rod, layer of fire protection, and time the steel rod could support the load. It was noteworthy that the greatest time gain occurred between the uncoated rod and the rod with 1 layer of protection (430% gain). A second layer showed a relatively small gain (100%). This is interesting from the cost-effectiveness point of view. <b>Conclusions/Discussion</b> Since the layer of fire protection prolonged the time the rod could support the load, the results supported my hypothesis. The work in my project has direct applications in space shuttles, skyscrapers, utility poles, and houses, which are all structures that require insulation to protect them from the destruction of a fire.	
<b>Summary Statement</b> My project studies the effect of one, two, or three layers of fire protection on the load carrying capacity of a steel rod.	
<b>Help Received</b> Neighbor helped supply steel, teacher helped formatting report, mother helped taking pictures, father helped during the experiment with the Bunsen Burner.	