



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Erik R. Van Esselstyn	Project Number S0112
Project Title Fastest in the Fleet: What Is the Most Effective Keel Design?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project is an insight into what aspects of a keel's design will make it effective on a planing hull. It tests six different keel designs, each representing a different time period, style, and aspect of keel design, on a proportionally downsized planing Laser hull.</p> <p>Methods/Materials The hull was constructed out of pine shelf board and the keels were constructed out of Lucite Extruded Acrylic, each with the same surface area. The keel designs can be named by their uses: Laser keel, tanker bow keel, old fashioned rounded keel, shallow draft keel, oceangoing racing keel, and catamaran dagger keel. Using information from research, which told about what aspects of a keel are the major factors in its performance, it was hypothesized that the keel that would provide the least amount of drag was the tanker bow keel, because it carries the water up along its curved edge and splits it at the top. To test this hypothesis, experimentation was done by towing the test hull, with attached keels, from a dinghy attached to a Cal 28 sailboat under power at three different speeds, which were proportional to the hull's length of three feet. Drag was measured by a scale attached to the dinghy with a line running to the bow of the test hull, and the measurements were read off into a recorder.</p> <p>Results The results from the testing yielded that the Laser keel had provided the least amount of drag overall, because of its matching design to the hull and its good use of length versus width.</p> <p>Conclusions/Discussion The hypothesis, then, was incorrect, because the tanker bow keel did not have enough speed to fulfill its function.</p>	
Summary Statement This project is an insight into what aspects of a keel's design will make it effective on a planing hull.	
Help Received Mother steered Cal 28; Father helped with power tools and construction; Laser employee provided building diagrams.	