

Stability and Trim Characteristics of Native Watercraft:
A Computerized Simulation Study *

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I Introduction

People of the western world have been fascinated with the Eskimo kayak ever since these unique craft were first seen in Greenland, Canada, Alaska and Siberia. Aesthetically and functionally the kayak has few peers in the world of watercraft. It was a highly complex and efficient hunting tool used by the Eskimo, Aleut, Koryak and Chukchi people of the Arctic.

My long-term research on kayaks has been aimed at discovering the place of the kayak in these cultures. How was it made, used and sung about? What was its importance within the culture? Where did it come from and how was the technology spread? How did it influence European exploration and settlement?

The more I discovered in both field research and searches of the literature, the more I came to appreciate the diversity of kayak types based on materials, use, environment and culture. This led me to try and reconstruct different kayak types in order to do comparative testing of handling characteristics. Eventually, however, I decided that while this gave excellent qualitative data, I needed more quantitative measures that would enable me to do some testing in a reasonable amount of time. I wanted answers to such questions as how fast were the different kayaks; how did this compare with explorers accounts; what were the load-carrying capabilities; how stable were the kayaks under varying conditions?

By this time in my research I had traveled to museums from California to Leningrad studying and making detailed drawings and measurements of kayak specimens. In many of these, the design changes over time were rather subtle, but quite radical in others. I had no way of knowing what they meant functionally. Then I discovered the field of Naval Architecture and learned that my neighbor was a top-notch mathematician.

Combining my neighbor, textbooks on naval architecture and my former career in computers, the answers to my comparative questions seemed obvious. Write a computer program that would take as input the kayak measurements and

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