

then perform the calculations under varying load conditions that would provide data for comparative analysis of a number of functions.

The rest of this paper details the computer program, how it was written, the basic assumptions behind it, the mathematics used, and the results along with some initial comparative analysis.

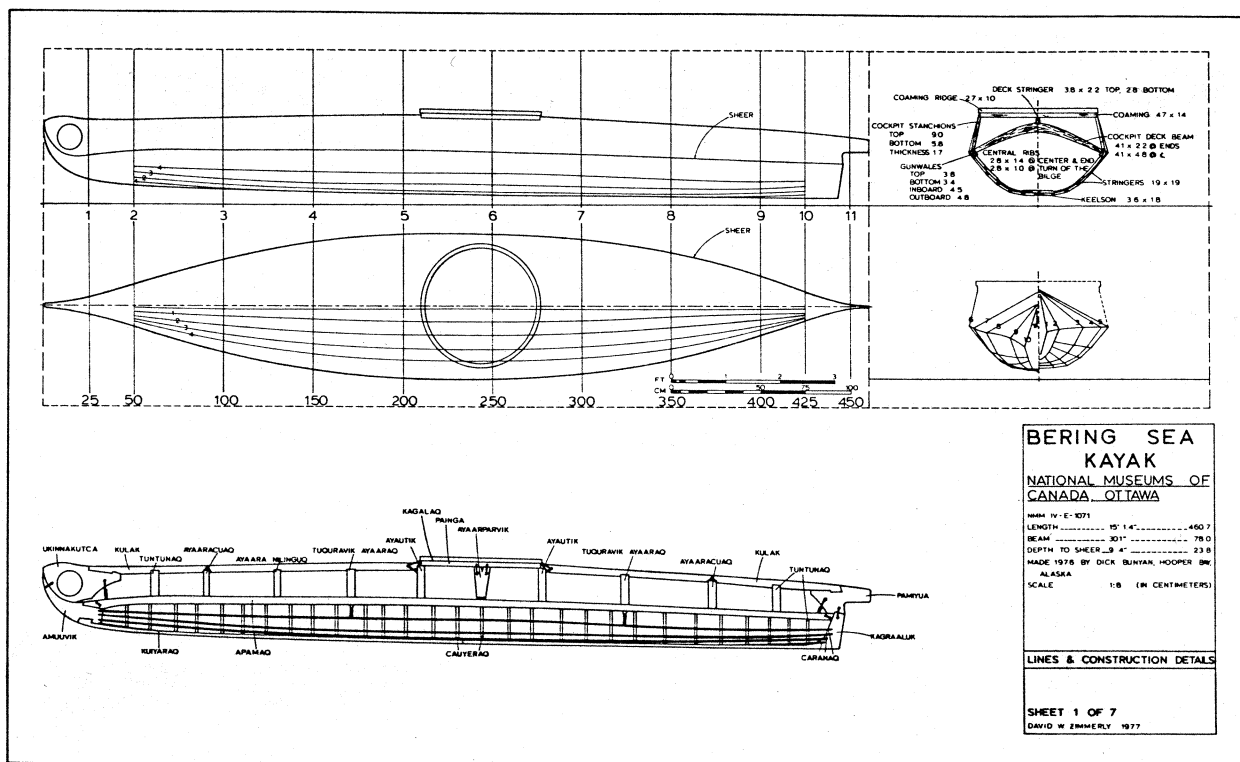


Figure 1. Lines and construction details of Bering Sea Kayak

II The Computer Program

The first version of this program was written in Fortran IV to run on the National Museums of Canada Univac 90/30 computer.*

Mathematically, the watercraft simulation program is not too difficult to understand. It uses only basic high school math and physics. First, Archimedes' principle, paraphrased, says that a boat will float in a tank filled to the top with water, when the weight of the water that spills over the top is equal to the weight of the boat. Secondly, we need to understand the concept of moments which are simply a weight times its distance from a fulcrum. It is the old familiar see/saw problem: for perfect balance, how far from the middle should a 75 lb. girl sit if her 150 lb. father is on the other side 5 feet from the middle (answer: 10 feet)? The mathematics involve a bit

* Time on this computer was provided through the courtesy of Peter Homulus, director of the National Museums of Canada's National Inventory Program.