

In the fall of 2009 John “Jock” Williams was asked by the Polynesian Voyaging Society (PVS) in Hawaii what he thought about building some new, longer iakos for their traditional Hawaiian canoe *Hokule’a*. An iako is one of the eight beams which span the two hulls of the canoe. Historically, these were carved from solid wood, native to the Hawaiian Islands. In 1983, when *Hokule’a* was built, the iakos were laminated with white oak and resorcinol glue. The PVS has embarked on a venture to sail the *Hokulea* around the world bringing with them the understanding of the Polynesian people and their culture. Before heading off the decision was made to make some changes to the canoe. Most notably was the plan to widen the canoe by two feet to provide additional stability for the long ocean passages.

John Williams Boat Company was brought in for advice on the method and construction of the iako. A sample four foot section of the laminate – 23 layers of ¼” white oak and West system epoxy – were built and then delivered to the University of Maine’s Advanced Wood Composite Center for testing. The laminate underwent shear block testing where the strength of the wood was compared against the strength of the epoxy and an intense cycle delamination test where the laminates were stressed with heat/cold, pressure and boiling repeatedly. The results were suitable for the stresses the iako would encounter during the voyage. The decision was made to have JWBC build the full size beams.

Each iako is 20 feet long with a 5 ½” x 5 ½” box section and very distinct “s” curves on either end. Finding full length pieces of white oak milled to ¼” was impossible. In order to achieve the 20’+ length needed for glue up, each laminate was made from two pieces of oak epoxied together with an 8:1 scarf joint. These joints were spread out over the entire laminate to be sure none were adjacent to another. A jig to laminate the beams was built using a steel I-beam as the backbone (and then welding on a steel plate) which had been cut with a water jet to mimic the distinct curve of the iakos. Threaded acme rod on either side of the jig and a 2” x 2” steel box beam between the rods was clamped against the oak with pneumatic nut drivers to force the wood into the shape of the jig.

The actual layup of each iako took five men and about two hours’ time start to finish. One hour was dedicated just to the application of the epoxy and getting the laminates clamped into place before the epoxy gelled. When the ambient temperature got past 75° it was a bit of a fire drill! The beams remained clamped in the jig for 48 hours after which they were released then run through the planner and shaped. A couple of protective coats of epoxy added the finishing touches.

The beams were shipped to the west coast then put on a boat to Hawaii where they will be lashed to the canoes of *Hokule’a* in preparation for the upcoming voyage.

For more information on the Polynesian Voyaging Society go to www.pvs-hawaii.com.