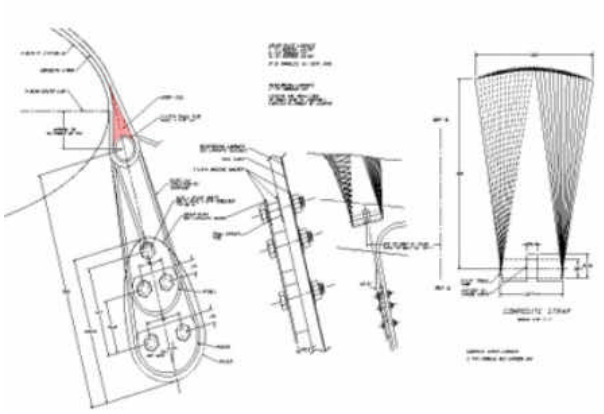
Composite Engineering & Other Specialties

Aside from providing **full construction detailing** for our own designs, Antrim Associates has performed composite engineering for many diverse projects. Some highlights:

- Design engineering for the America^3 syndicate - design team member for successful defense of America's Cup 1992.
- Complete engineering, including finite element analysis and construction drawings, for an "Airship Car" (blimp passenger compartment).
- Full hull construction drawings for a 7 litre class racing powerboat capable of 145 m.p.h.
- Engineering design of composite airplane tail.
- Hull engineering for a 100' trimaran, "*Rave*."
- Numerous carbon fiber rudder posts.
- Complete engineering for various cruising catamaran.
- Laminate engineering analysis for Disneyland's "Splash Mountain" log ride.



Computer Programs

Wrote "***PBJ***" sandwich/laminate engineering analysis and related programs; marketed to the general public by Sandwich Software. Also developed custom laminate engineering software for Knytex (now owned by Hexcel) and separately for Orcon Corporation. These programs allow the company to provide engineering assistance to users of their construction materials. Developed numerous in house programs for specific structural applications such as daggerboards, rudders, wing and fixed masts.

In conjunction with recent design projects, we have developed several computer programs relating to performance analysis and prediction.

RESIST predicts the drag characteristics of a variety of hull types and underwater foils: displacement hulls, slender, light displacement hulls, planing hulls, hydrofoil craft.

SAILPLAN was developed to evaluate the efficiency of a tilting rig. The program calculates lift, drag, and total force and moment resultants in a 3 axis system for any combination of main, jib and spinnaker and for any input rake and cant, over a full range of wind angles.

FOILS uses resultant forces from the sailplan to optimize size, position, and helm balance of the keel or board and rudder or any combination of underwater foils.

PERFORM is a velocity prediction program originally developed for the Formula 500 project, because conventional VPPs could not handle the extreme stability and planing speeds of this type of hull. The program has undergone several enhancements to work with multihulls and with a wide variety of hull / foil combinations.

POWER combines the drag estimates from a given form with a sophisticated propeller design calculation, allowing an optimum stock propeller to be selected or a new propeller designed to suit a specific application.

Consulting

As consultants to Orcon Corporation from 1984 - 1989; we were involved in more than 300 engineering projects. Much of this work was in developing hull laminates for almost every conceivable type of boat, including: 70' sleds, IOR one tonners, Formula 40 catamarans, rowing shells, racing and cruising powerboats. We also engineered special boat parts, such as carbon fiber masts and rudder posts and crossbeams for multihulls. Other projects stepped outside the marine industry: composite auto bodies, skateboards, a helicopter rotor, a bicycle used by the Olympic Team. We also performed laminate testing and prepared technical data sheets for Orcon's line of unidirectional materials.

Antrim Associates, Naval Architects
4018 Archery Way, El Sobrante, CA 94803
phone 510.223.9680 fax 510.262.0303
www.AntrimDesign.com Jim@AntrimDesign.com