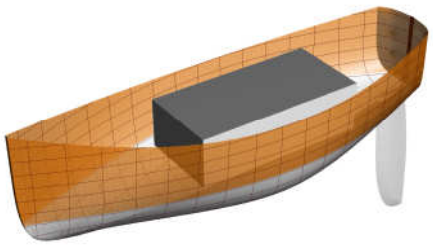
~ Presto ~

Cruising footy



A model to be built as a relaxing pastime during winter evenings - may be as a Christmas gift to a young nephew-.
A toy boat to be used for many happy years giving her - when needed - just a fresh new touch of varnish.

Presto has been designed to fill the gap between extreme racing models (delicate, expensive and complicated) and "made in china" ugly plastic beach toys .
I have done my best to imagine a model that should be simple and inexpensive to build, a good sailer on the water, but strong enough to withstand hard use.
A footy to be enjoyed during pleasant Sunday afternoons.

Building method has been aimed to first-time builders, and a future possibility of a "school project" for young boys and girls has been envisaged too; for this reason Presto can be launched as a free sailer model, and she can be easily fitted with a RC set as second time retrofit. All electronic parts are installed on a single removable block to be installed within a purpose designed "hold".

Even if nice appearance was one of my goals, her classic design (hull and rig) has been based not only on aesthetic, but on sound engineering analysis too, as well on a careful study of existing successful footys .
After initial design decisions I have done several freehand sketches , and basic calculations have been carried out in order to optimize main dimensions (length, beam, displacement and sail area).
Based on this preliminary study, a complete computer model (including appendages and RC arrangement) has been created to fine-tune final details.

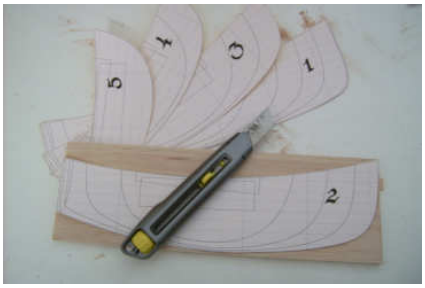
1 - Building method : sawdust and sandpaper

Following a "top down" design flow chart, I have fixed the building method as the starting point of design history.

Bread and butter , using balsa planks glued on a center plywood keel is a system that can guarantee a sturdy and watertight hull, even in case of unskilled hands. As side benefits we can get a nice looking and efficient round bilge hull.

Drawbacks : a lot of sawdust and not so light hull.

In order to simplify the construction process I have foresee the use of enough planks (5 each side - 10mm each) to have a well defined initial point before starting use sandpaper , and the use of cardboard templates at 5 stations will aid novices to check proper hull shape.



Plank on frame, or hard chine wooden hulls have been discarded because without careful panel cutting and stitching one or more leaks are guaranteed, and - from structural point of view – only a "full" carved hull has enough strength to survive use as a toy.

Fiberglass (or even worse , carbon fiber) has not been considered as a valid material alternative due to the additional cost and potential health hazard of resins other bad smelling glues : definitely a "no go" for a children project.

Last but not least, cutting and sanding wood is a relaxing pleasure for old and young modelers (isn't it ?).

(May be a foam version could be feasible - and even a bit lighter-, using inexpensive insulation material)

2 – Dimensions : how long ? how heavy ?

Broadly speaking, radical design choices have been avoided from the beginning, and for this reason basic dimensions of Presto can be considered quite "average" (to avoid reinventing the wheel).

DISPLACEMENT : Not too heavy and not too light , a target value has been estimated around 500 gr, in order to achieve a good ballast ratio even if the hull shell can't be considered as feather light (about 120 gr). Plus or minus 50 gr are to be expected due to quite remarkable variation of balsa density.

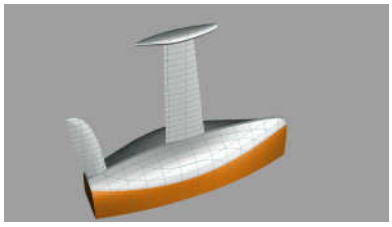
LENGTH : To achieve a maximum LWL, I have designed a "diagonal" hull with an over all length around 320 mm.

BEAM : hull beam has been designed as an harmonized compromise between drag and stability requirements, and taking also taking in account the building materials (ten balsa planks plus a plywood keel – 104 mm)

DEPTH : hull depth has been dictated by the need to house an inner "hold" big enough to fit the rc set – if needed -, and to have a quite large midship freeboard.

SAIL AREA : a basic rig has been designed to take advantage of fair weather (Mediterranean , Florida) , size has optimized based on stability calculations, aiming at 35° heel angle at 10-12 knots of true wind speed. On my own models I have built a mainsail that can be reefed to withstand stronger winds. In case of use in more windy countries, a smaller rig shall be advisable.

APPENDAGES : keel size has been designed with a side area around 8% of sail area (a bit more than footy average) for good upwind performances.
Rudder side area is 60% of fin keel as a balanced compromise between good steering control and low wetted surface.



3 – The shape : aesthetic & engineering

Hull shape shows a nice sheer to have plenty of fwd freeboard, moderate topside flare to improve stability, a fine entry and a narrow transom to have a balanced heeled hull.

Transverse sections are quite full and "squared" amidship , with an increased deadrise angle fore and aft.

4 – Rig : why a gaffer ?

Gaff rig, even if *seems* to be out of fashion, can be very efficient and powerful on this kind of models. Due to the fact that footy rules don't tax sail area, and that there are no limits on longitudinal length of sail plan, this kind of rig has about 30% more canvas of a "modern" sail plan with same heeling moment (due to the reason that gaff rig center of effort height is much lower than usual).

This solution has already has been tested on my Folgore footy during EuroGP 2008 at Birkenhead.

Spars are made of wooden dowel, sailcloth is 0.75 oz Dacron or even shopper bag plastic.
All hardware can be handmade using just wood, brass wire, and glue.

5 – Blades : keel & rudder

Keel and rudder are two pieces of 4 mm plywood with a rounded leading edge and an handmade sharpened trailing edge. Keel has been designed to be removable for easy model storage within a wooden transport box, and to have the opportunity to use different weights according the weather

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