JRA Dinghy Design Competition

Portfolio of Study Plans

"Rat! Let's have a competition to design simply the best little boat ever!"
"Great idea Mole! But what if people pour cold water on it?"
"Well then Rat, we'll just have to make sure it's cold water proof!"
"Of course it will be cold water proof if it's a boat, silly Mole!"
"No Rat, not the boat, the competition!"

And so, in the full light of their different expectations,
the two friends set about designing their own little boat,
for there is nothing – absolute nothing - half so much worth doing
as simply messing about with boats.

With suitable apologies to Kenneth Grahame,
author of ***Wind in the Willows***

Compiled and edited by
graemekenyon@hotmail.com

Cover photo:
Back row left to right: *Halibut*, *Sibling Tender, YouYou, Wuban, KISS, GP Dinghy, Medium Boy*
Front row left to right: *AD, Oyster, Boxer, David's Box Barge, NZScow, Simplicity 8*

In early 2021 the JRA announced a "**Dinghy Design Competition**".
The design brief was as follows:

Material: Plywood

Size:
1. Not too big, not too small.
2. No longer than can be obtained from a sheet of plywood 2.4m

Characteristics:
1. Simple and cheap to build, (think along the lines of building on a beach when the inflatable gives up the ghost unexpectedly)
2. Suitable for rowing, sculling, outboard, sailing, use as a yacht tender
3. Transportable on a roof rack
4. Able to have various free standing mast positions
5. One design centreboard/daggerboard/offset daggerboard/leeboard and rudder
6. Capable of carrying 2-3 people
7. As light as possible considering its possible use as a yacht tender
8. Buoyancy could be built in or not -buoyancy bags are cheap and Lightweight

Sail:
1. Able to reef
2. Sail cloth - heavy weight spinnaker cloth?
3. Windsurfer mast would be a reasonable way of getting the mast or an aluminium tube

Some of the entrants had doubts a about the need for yet another dinghy design and whether a competition was appropriate, given the "horses for courses" nature of the quest. Despite these misgivings, as well as the vagueness and all-encompassing nature of the criteria (or perhaps because of it) the final result was a portfolio comprising a surprisingly wide range of shapes and sizes, ranging from tiny to huge, from completely open to fully buoyant, from simple to complex and from light to moderately heavy - the only common factors being the use of plywood as the material, and the length over all being roughly in the vicinity of 2.4m.

***Halibut* Special** – a proposed junk rig especially for dinghies.
The portfolio of designs includes an unexpected bonus. Not all of the entries included a sail plan, and indeed not all designers believed that a junk rig would be appropriate on such a small vessel. However, the "*Halibut* Special" 3-panel dinghy sail offered by Arne Kverneland as part of his competition entry may prove to be the answer to any such doubts.
This rig can probably be fitted to any small sailing dinghy. (See No. 5 *Halibut)*.

The announcement of the competition was documented in Issue 85 (February 2021) of the JRA magazine. A very lengthy discussion arose on the JRA website forum (one of the lengthiest threads ever) which documents the thinking which went into some these creations.
This is recorded on-line in the thread entitled "Cash Prize of 250 GBP - Dinghy Design Competition" in the technical forum on the JRA website. Since the announcement of the winner on March 2022, the discussion on this forum thread has continued and is on-going.
The folder of official entries is available at https://junkrigassociation.org/dinghy-competition

The stated intention was that these designs should belong to the JRA and be available to members for free download. As such, and especially because each of the resulting dinghy designs is distinctly different from the others, the portfolio of entries is now a valuable asset, and will remain a source of information and inspiration for any member who may be looking for a dinghy design to suit their particular purpose.

The ten designs are presented here, in alphabetical order.
In each case, the words are taken from material supplied by the designers and supplemented in some cases by material they have posted on the JRA forum. The drawings are a selection from, in most cases, a larger set of drawings available with the plans.

Where suitable photographs were not available, photographs of a 1/5 scale model were used instead.

Contents

To add to the portfolio, the following design concepts were discussed on the forum but not officially submitted as entries to the competition. These should be regarded as incomplete, and may be available through direct contact with the designer.

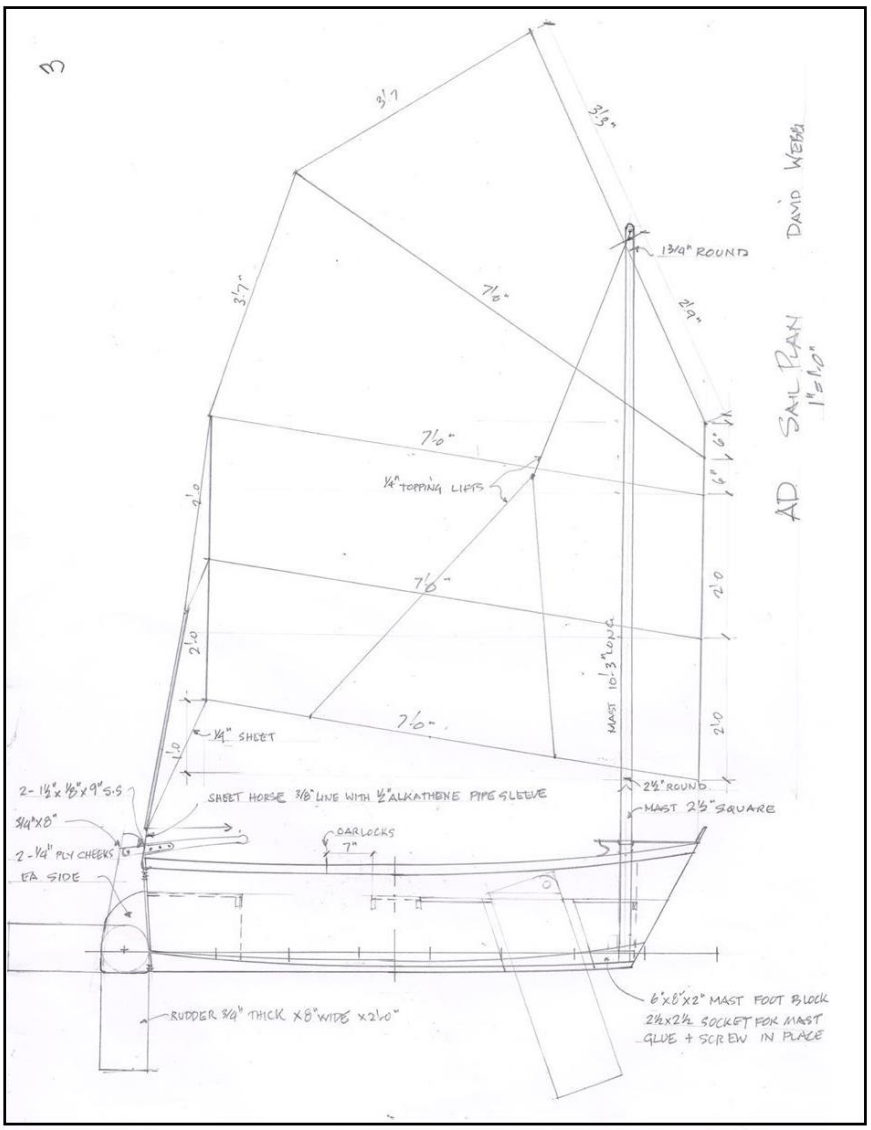
1. ***AD*** 2.34m x 1.42m designer David Webb

(Third Prize)

Designer's Comments: ***AD*** is the Mack truck of dinghies.
She was originally built from a design sketch, that I no longer have, as a tender for *Arcadian* in her original form as *Spirit of the Deep*. She was designed as a "maximum" 8 footer to carry charter guests and stores to the boat and handle up to a 5 horsepower outboard motor. She served well in that capacity, firstly as a rowing tender when she took two or three people and a lot of stores, and once even five people! I later converted her into a sailing dinghy and that is the version I have drawn up, but with a junk rig rather than the balanced lugsail she originally had. She is still serving the new owner of *Arcadian* in that respect and he is very happy with her performance both as a tender and as a sailing dinghy.
He says he has taught a lot of people how to sail using her.

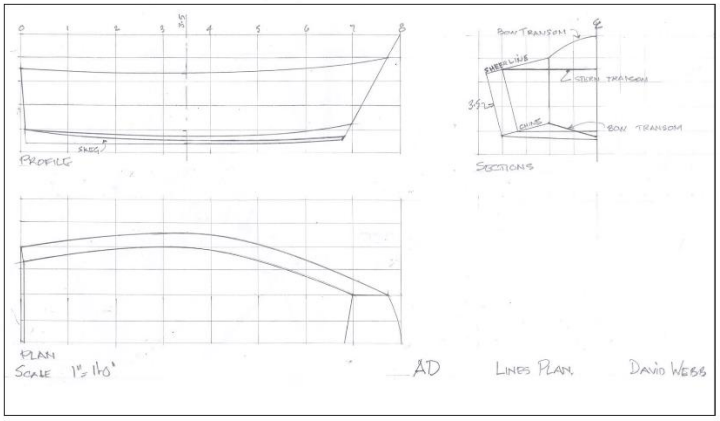
I have called her ***AD*** ("*Arcadian*'s Dinghy") to differentiate her from my other submissions.

I hope that you like her as much as I do.

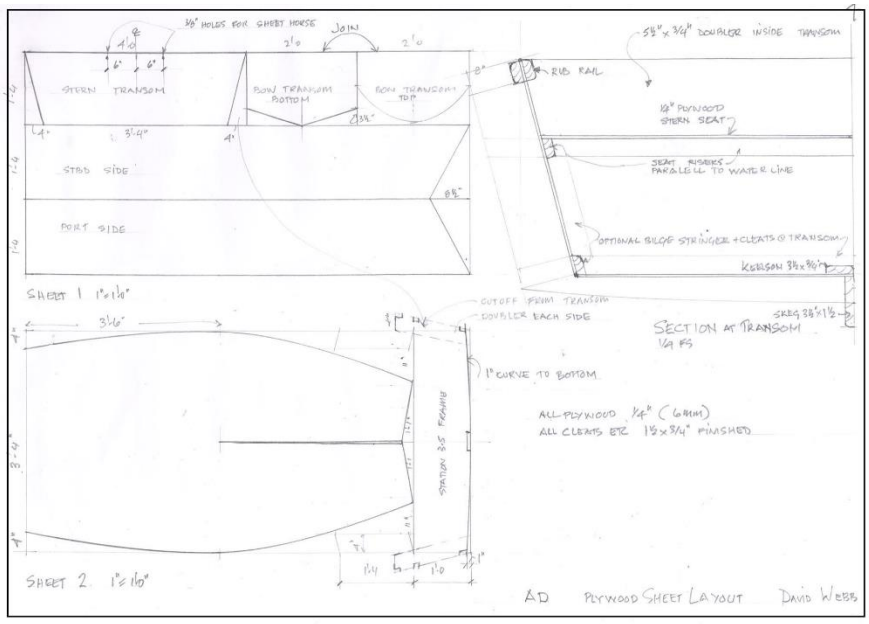


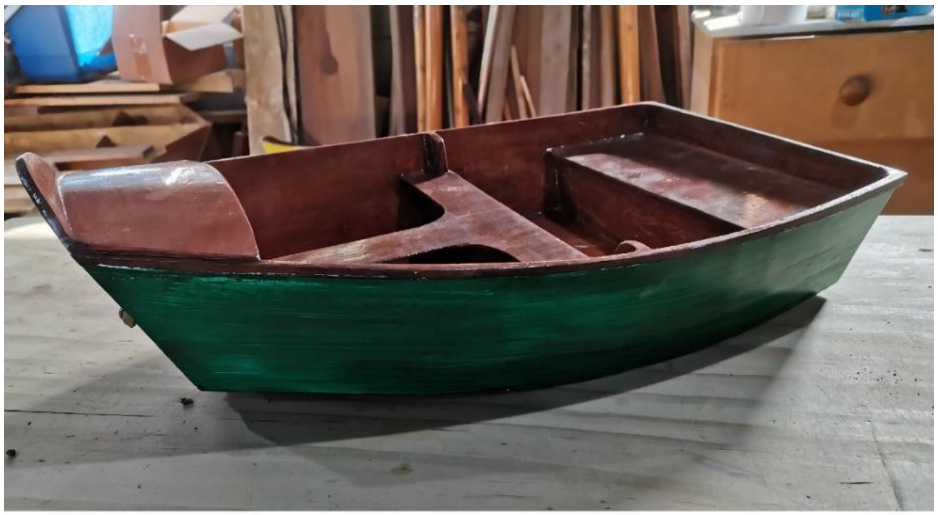
The rake on the bow and stern transom means that the flare is constant but the bow transom comes out as a parallel-sided piece, and the stern transom also looks different from the midship section.

The forward sloping daggerboard has two differences from an aft sloping one. The first is that when going to windward the daggerboard turns up to windward and if the case is loose gives an angle of attack that pushes the boat to windward, usually completely cancelling leeway and sometimes even a bit more than that. The second is that if you run aground with it, the grounding pushes the centerboard up the slot rather than tripping the dinghy up. If the daggerboard is held by a bungee cord then it just returns to its normal position when you get off the mud. The board is also much easier for the helmsman to adjust than an aft-sloping one. There is one disadvantage: the slot tends to scoop up water, especially when towed, so it needs a good seal at the thwart to prevent this. When being towed, a plug in the bottom of the slot is the best solution. The difference in sailing performance with a forward sloping daggerboard is quite noticeable.



*[Ed. **AD** is a single chine dinghy with a large bow transom. The bottom is made from a single sheet of ply, flat at the stern and "tortured" into a shallow Vee bottom at the bow].*



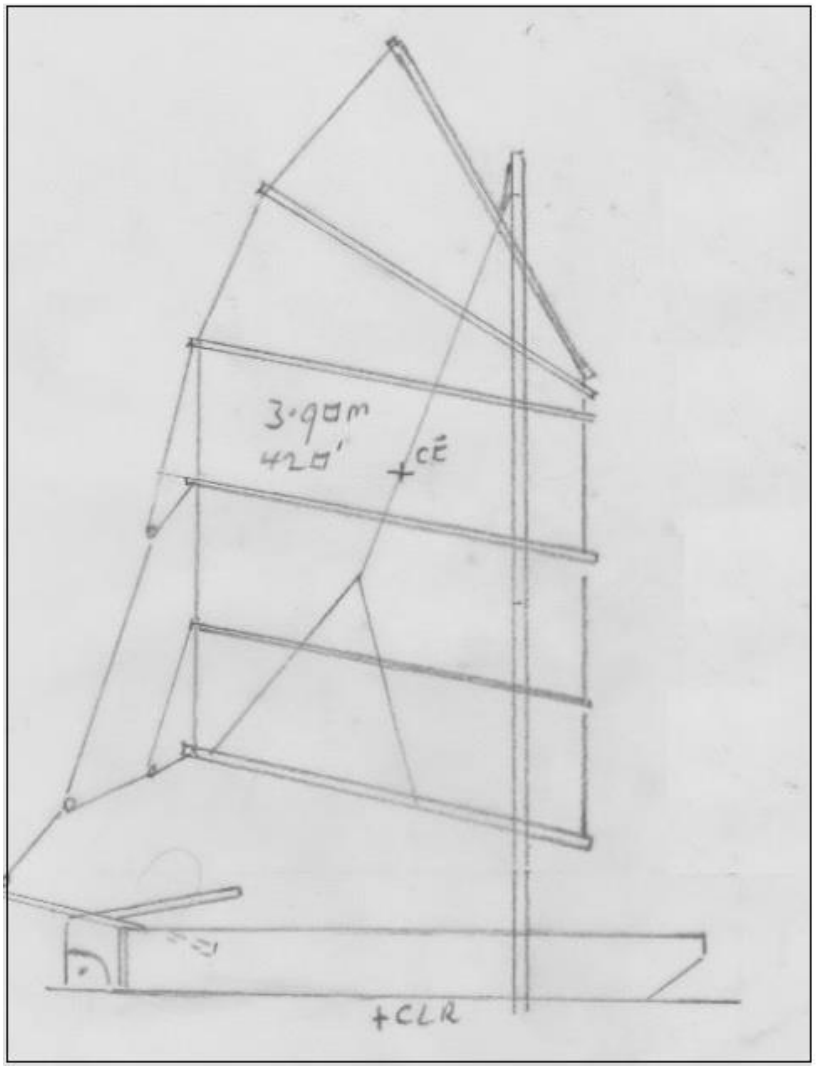


*One fifth scale model of **AD***

[*The plan package comprises a brief introduction and five sheets of drawings: plywood sheet layouts (2), sail plan, plan and profile, lines. All dimensions given, in imperial measurements.*]

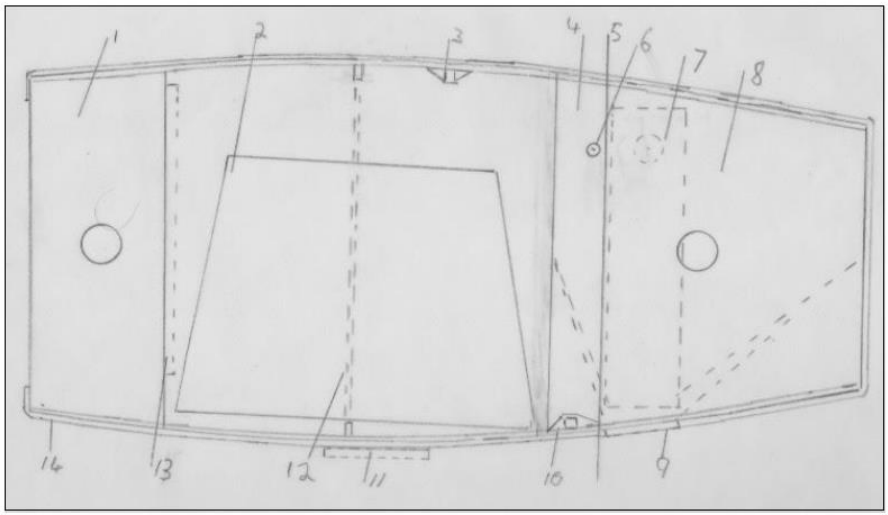
2. ***Boxer*** 2.40m x 1.13m designer John Pennefather

Designer's Comments: The "Boxers" in China were a group of reactionary rebels. My dinghy has Chinese origins and as a rowing / sailing dinghy tender, is likely to be considered a reactionary design. Also, I am rebelling against the typical European idea of a dinghy. Readers of G.R.G. Worcester's 'Junks and Sampans of the Yangtze' will find two small sampans that embody my thoughts. He inspired my design and I embarked on my first design in this format after reading his book.



More recently I have realised that the American Jon boats and other scows embody similar ideas.

One fifth scale model of ***Boxer***



One fifth scale model of ***Boxer***

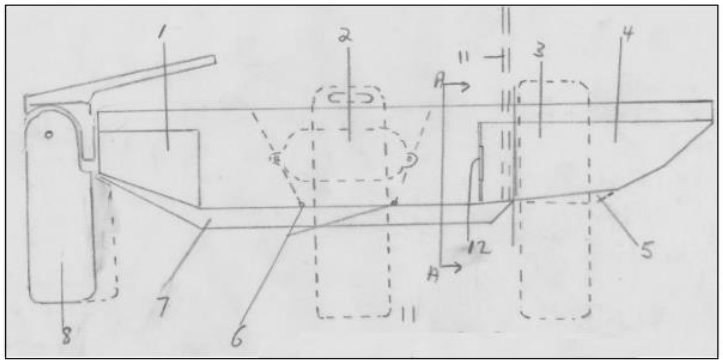
She looks like a box; but the idea that 'form follows function' has widespread acceptance. Chinese dinghy sampans have probably been evolving for a thousand or more years.
The Chinese knew how to build round bilged vessels but chose a flat-bottomed, slab sided, boxy form for their dinghies.
The dimensions I have used were dictated by deck space on my yacht.

As well as normal use as a tender, I want a dinghy which I can use for fishing trips and camping cruises in sheltered water. My other possible use is as a life-raft substitute.
For most of my cruising, only the very cautious would require a life-raft, but my reading and observations lead me to believe that a suitable dinghy may be a viable alternative if a raft is needed.

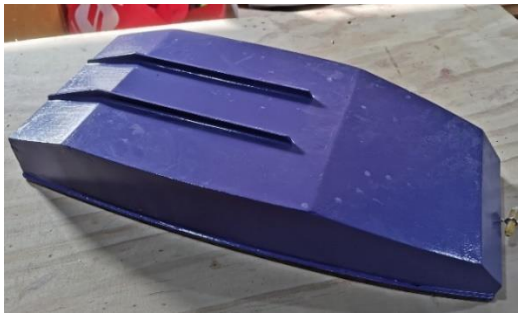
I think that it was Yachting World in the 1960's who reported that more yachtsmen had died in the previous year after falling from their dinghies than from any other yachting-related cause. I believe that the stability of the typical "Western" dinghy can be greatly improved by giving it a largely flat bottom and a nearly rectangular shape in plan view.
Flaring the topsides may give a bit more righting force at large angles of heel but it also means that there is a longer step from the dinghy to the yacht. If stability and safety are related, a flat-bottomed, slab sided design seems to be the best choice.

Most designers of Western style dinghies give their craft a cutaway shape at the stern to give the best water flow when it is rowed solo. This often creates a shape with a significant amount of the transom immersed when carrying a passenger. A Vee bottom only serves to increase the problem. Dragging this immersed transom through the water is a bit like having an oar pulling in the wrong direction. Philip Bolger created the ultimate box with his *Tortoise* and *Brick* designs, but some *Tortoise* users have complained that by raising the bottom at bow and stern, he lost fore and aft stability.

So, I believe we may be best served by a flat bottom dinghy with only enough turn-up at both ends to give a smooth entry and to reduce the drag by avoiding an immersed transom. Also, by moving some buoyancy towards the ends we reduce the need to have a sheer line that rises towards the bow and stern. A higher sheer adds weight and windage and is only needed to keep the water out in extreme waves. I also see no evidence of the need for flare to the topsides. The slope of the bow above the waterline is intended to deflect any wave downwards, and when partly immersed by a wave, there is enough buoyancy to pitch the bow up and over the wave. If I am wrong, I would prefer to have a removable splash board or a canvas spray cloth and skirt that gives the bow a temporary turtle back.



Most nesting dinghies come apart at about the middle, but splitting them there puts most strain on the fastenings between the sections. I have split my dinghy closer to the bow, this reduces the stress on the join and gives a bow section that stows below the sheer of the stern section when the parts are nested. The joining and locking mechanism is designed to give a quick, positive and leak-free join. [*A detail drawing for this is provided. Ed.*]



I hope that the two handrails/keels will provide adequate resistance to leeway.
If they don't, one of the ballasted leeboard options shown in the drawing above is my next choice.

One fifth scale model of ***Boxer***

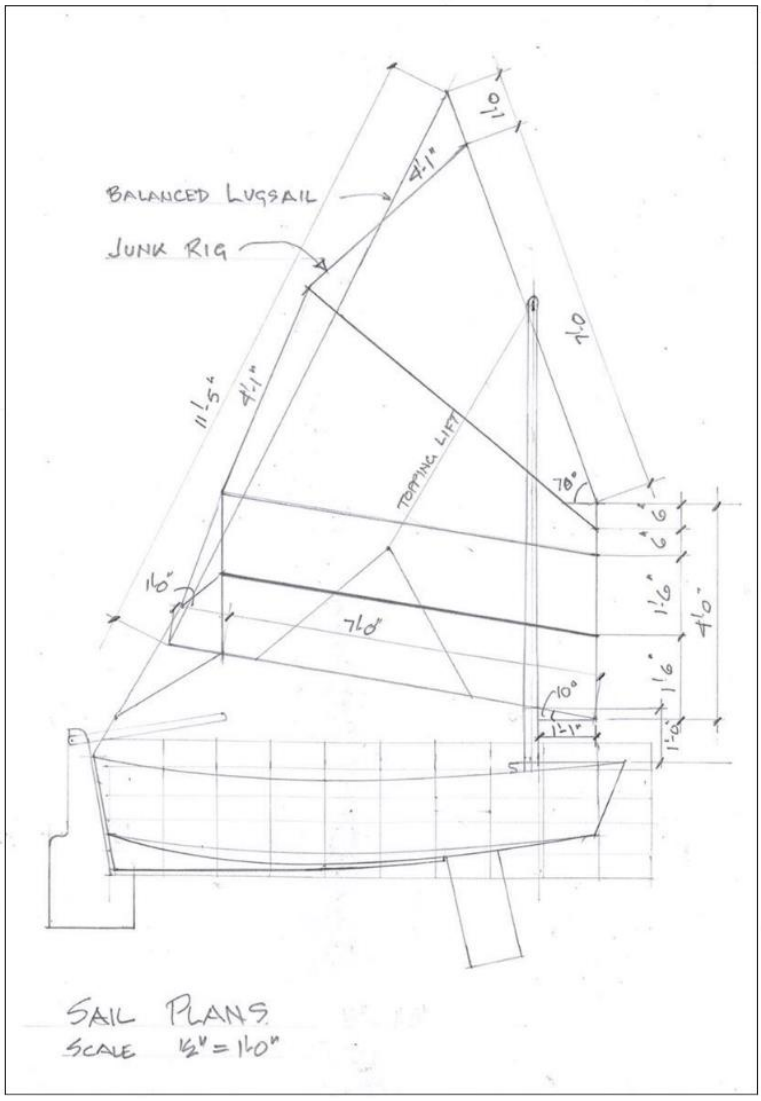
Access to my yacht from the car park requires the dinghy to be moved about 200 metres and down a staircase. My answer is to fit a set of stair climber wheels to a fitting that locks into the rudder gudgeons. [*A detail drawing for this is provided. Ed*]

[*In his submission John was too modest to mention that an early prototype for* **Boxer** *came first equal in the Royal Cruising Club/Yachting Monthly Dinghy Design competition in 2012. The plan package for* **Boxer** *includes a 10-page document comprising thoughts, instructions, measurements and a key to drawings. There are 7 sheets of drawings: plan view, profile view, sail plan and three detail drawings. Measurements are in the metric system. Ed*.]

3. ***DD*** 2.87m x 1.50m designer David Webb

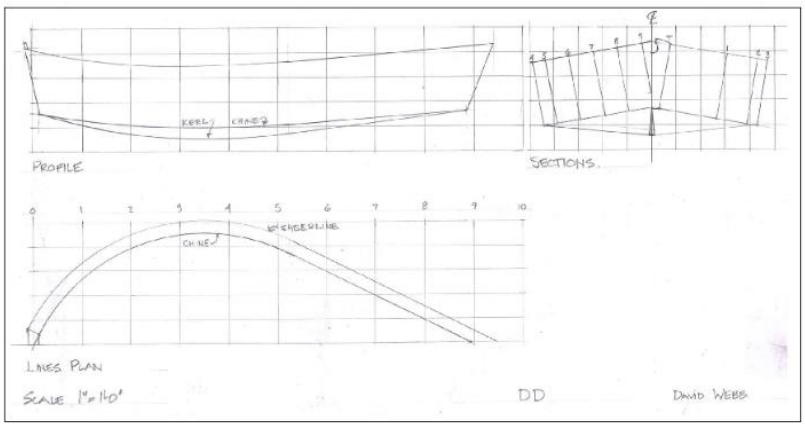
(Second Prize)

Designer's Comments: This is a variant of the dinghy I posted a couple of years ago in my designs on the website. I recently built a proof-of-concept prototype and have attached some photos of the build, more available if wanted. The design as shown on the submitted plans is a one-piece dinghy, but it can be made into a nesting two-part dinghy, which reduces the size for storage on board.



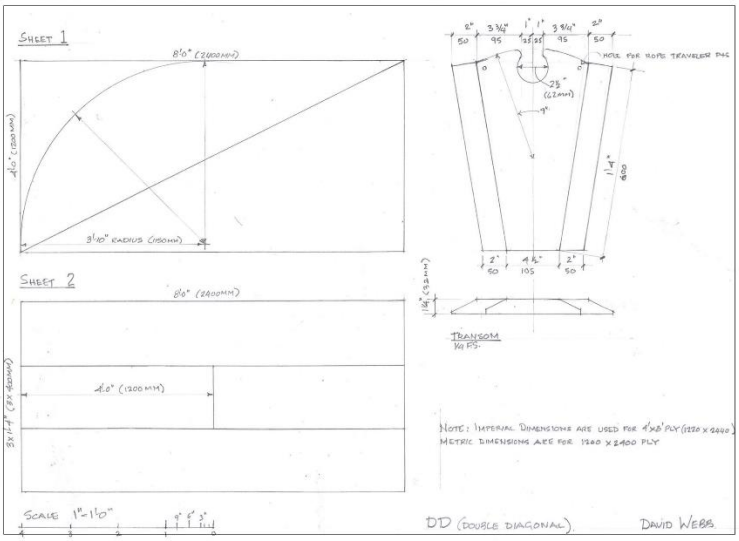
I re-used a 45 sq ft balanced lugsail rig from another dinghy design and have included in the design for that rig.
I also provided a four-panel junk rig of approximately the same area.

The dinghy rows and sails nicely and is good in choppy conditions with its fine bow, deadrise, flare, and rocker.



Construction of the hull is very simple, the bottom is a single sheet of 1/4" plywood split diagonally from corner to corner and a 3'-10" curve is cut into the panels as shown on the drawings.

These two pieces are then joined at the forward and aft end. The parts are not joined along the centerline at this stage.



The small transom is constructed as shown on the drawings. The second sheet of 1/4" plywood is cut into three 1'-4" wide pieces, one of which is cut in half.

The full-length pieces are then attached to the half-length pieces with an epoxy glass scarf using a 4" wide piece of 12 oz double bias tape overlaid by a 6 inch wide piece of 6 oz glass cloth.

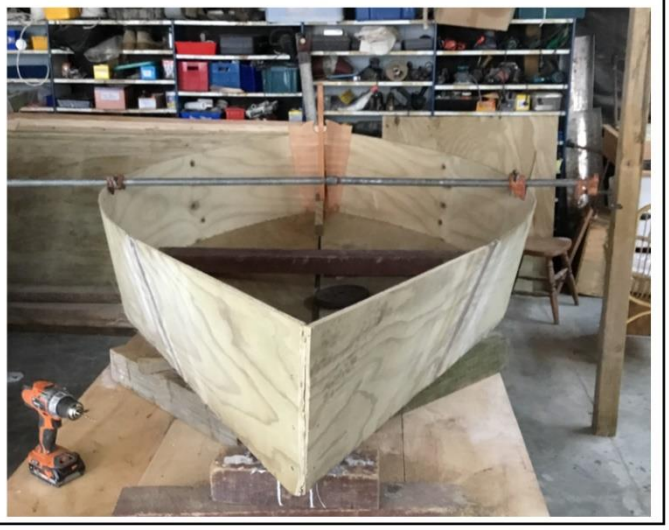
[*The plan set for DD continues with a page of detailed instructions, and also a very well-documented PowerPoint presentation with numerous photographs and notes. The following is just a couple of screenshots from the PowerPoint file. Ed*]

Assembly 1

The two bottom panels are aligned and blocked up to the approximate deadrise and rocker. Tie wires or cable ties are used to hold the bow and stern together. I used wire as I had a roll on hand and could not get cable ties because of Covid lockdown.

Assembly 5

The hull shape is now complete, the alignment needs fine tuning and the ties tightened up. Hold the rocker with a Spanish purchase from the bow to the stern and make sure the flare to the topsides is correct. Clamp a 2x4to the top of the side panels from the bow back about four feet to hold them straight. Once you are happy with the flare and rocker then the slot along the keel needs to be filled with slivers cut from the offcuts of the bottom panels. Once this is done the keel can receive the inner taping of two strips of biaxial and one of 6 oz cloth. Once this is set the chine joints can receive a cove of filled epoxy and once this is set then the inner glass taping of one coat of 200 gsm biaxial and one of 6 oz cloth can be completed. Once this has set the ties on the outside of the chine can be cut off , the chine filled and rounded and then fiberglassed. This completes the basic hull assembly.



*One fifth scale model of **DD**.*

Note: if nested, the bow section fits between the aft buoyancy tanks.

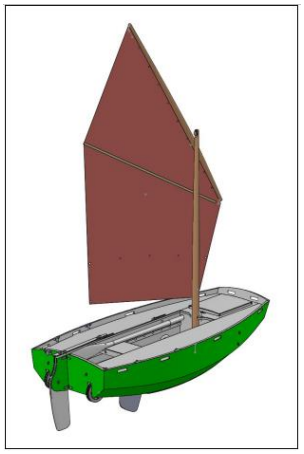
[*The design package includes a page comprising introduction and detailed building instructions, together with a PowerPoint demonstration. There are four sheets of drawings: sail plan, lines, construction details and plywood sheet layouts/transom drawing. Ed.*]

4. ***GP Pram*** 2.37m x 1.22m designer John Perry

(Winning design)

Designer's Comments:

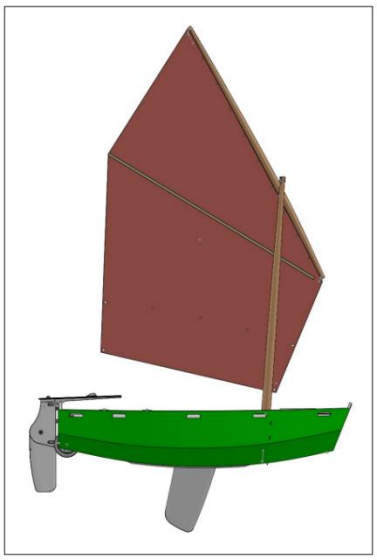
The aim is a general purpose boat, a little under 2.4m overall length, that can be used with oars, small outboard motor (2 to 3 h.p. suggested) or under sail.
This could be used as a yacht tender.
The boat is intended to carry one, two or three adults.



A stowage compartment at the bow is accessed through a lockable hatch having a 450 x 450 clear opening. This compartment should be rain and spray proof but it is not intended to be watertight in the event of capsize, as there are good size buoyancy tanks at the sides of the boat.

The flat bottomed hull without a skeg will be very manoeuvrable under sail or oars.

Two pairs of rowlock sockets are fitted together with two rowing thwarts which are adjustable fore and aft.

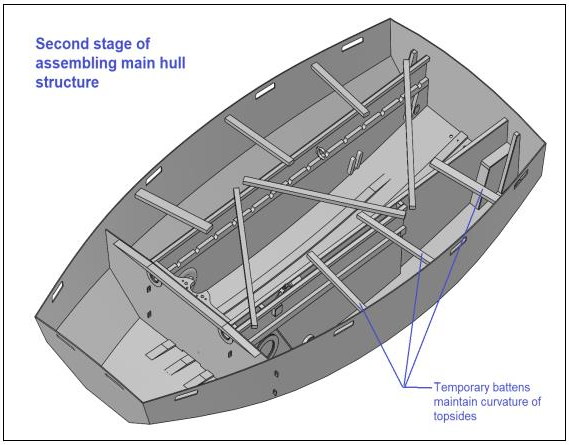


The rig is a standing lug sail on a non-stayed mast, with spar lengths to fit inside the boat.
A full length batten makes it part way to being a junk rig without the complication of sheets to the batten ends. The sail is loose footed so that it can be lifted over the head(s) of the crew when tacking - this is considered the best option for a very small boat. Sail area as drawn is 3.3 m^2, which is similar to the Optimist children's sailing dinghy. Sailing performance should be similar to an Optimist dinghy with similar payload, i.e. rather slow in light winds or when heavily loaded but capable of sailing in wind strength to around F8 in sheltered waters.

A single slab reef taking 400mm off the foot of the sail is suggested, a second reef would be possible. The suggested mainsheet arrangement is two separate main-sheets, one for each tack (similar to the usual sheeting of a foresail). The use of two main sheet positions was common on traditional lug-rigged working boats.

A .dxf file is provided for the sail, this is intended to provide the nominal overall dimensions but a skilled sailmaker, amateur or professional, will build appropriate curvature into the sail allowing for the bending of the yard from tension in the halyard.
The full length batten should reduce flogging of the sail during hoisting and tacking, a second full length batten midway between the one drawn and the sail foot could be considered to further reduce flogging. The sail area as drawn is limited by the desire to make both the spars stow in the length of the boat

The line diagrams provided show the construction from various angles and these diagrams together with the .dxf files associated with this document should give the dimensional information a builder would need.



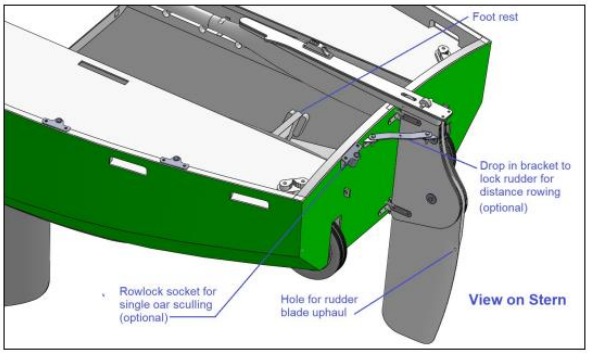
Machines that automatically cut plywood and other sheet material generally use .dxf files as input so it should be possible to use the provided .dxf files as a basis to cut the plywood parts by either a computer controlled router, a water jet machine or a laser cutting machine.

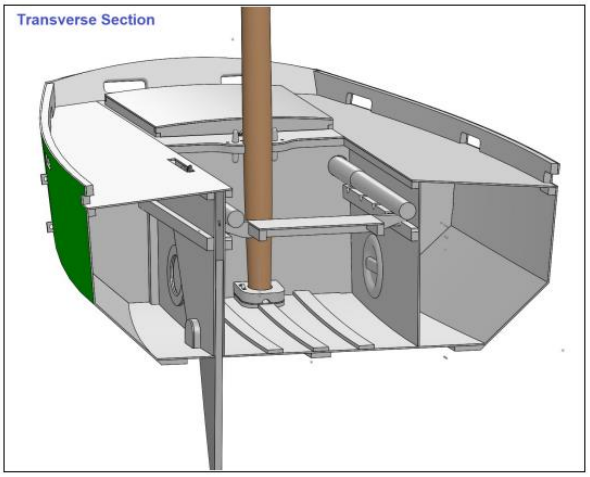
The author's experience is with water jet cutting which would be suitable for this design.

It should be possible to assemble the hull without using a conventional 'building jig', the shape of the plywood parts cut according to the .dxf files giving the shape of the hull with some temporary bracing to hold parts orthogonal and avoid twist along the length of the hull. The assembly of the hull is described as the following sequential steps: 1. Port and Starboard Side Panel sub-assemblies 2. Port and Starboard Side Deck sub-assemblies 3. Bulkhead sub-assembly 4. Assembly of main hull structure with internal taping and epoxy coating 5. External epoxy coating/sheathing/fairing and painting.

It seems that some people would like a boat design to include a table of offsets.
If someone actually wants to build this boat and are sure they would prefer a table of offsets then I can make one. Since it is a chined hull the offsets presumably would be measured from the chines to the centre plane and from the chines to a nominal waterplane. So for this '5 plank' hull that means 3 pairs of numbers for each cross section - not too hard. How many cross sections? I think 10 cross sections is fairly normal but may be more than necessary for such a short boat. But I would say that I would much prefer to build a plywood boat from .dxf files defining the shape of every piece of plywood rather from just a table of offsets. Ideally one would start by getting all the plywood parts cut out automatically from the dxf files, although this is not the only way. This adds cost certainly, but it also bypasses much of the more tedious parts of boat building, leaving the builder with the more enjoyable work and reaching the launching point much quicker.
At the present time the dxf files for this design are not 'nested' - they are at somewhat random orientations. If automatic cutting is envisaged, or even plotting at full size, the next step would be 'nesting' the shapes so that they can be cut out with minimal wastage.

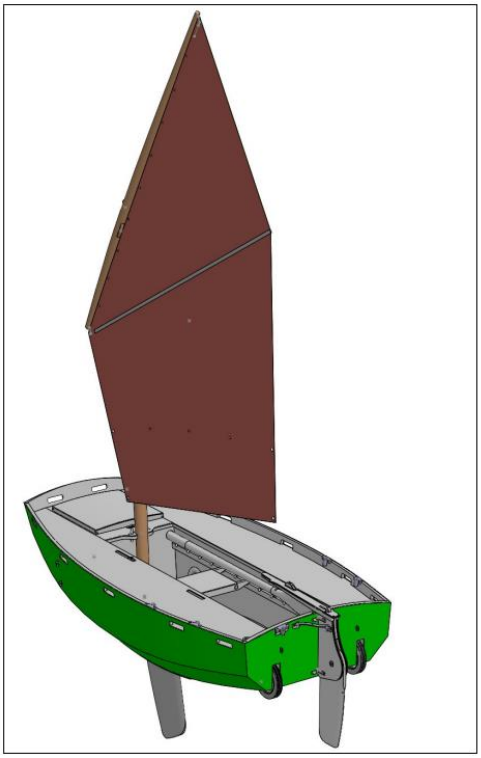
Talking about boat building costs, I don’t think you should build your own boat to save money - if you just want a boat as cheaply as possible get a second hand one, if you look around I expect you will find a good one for less then the cost of materials, or even for free from someone who just needs to clear storage space. I think the only justifiable reason to build your own small boat is for the satisfaction of doing it, which I have found can make it very worthwhile.

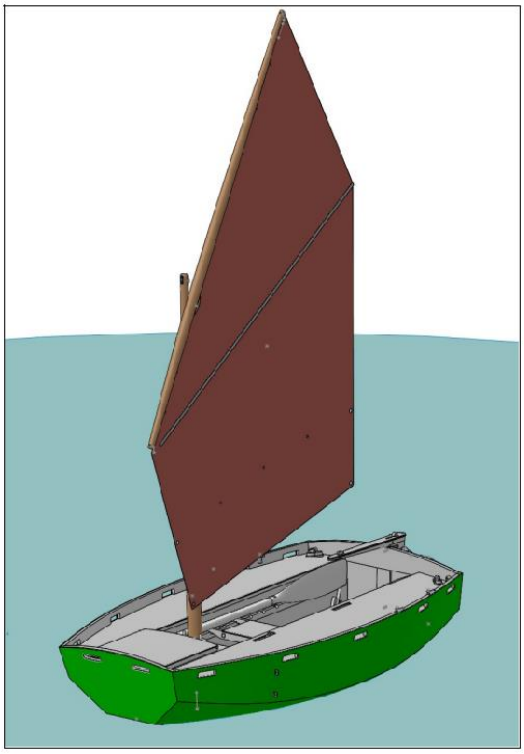




The rudder has a lifting blade with a cord to raise it and an elastic cord to hold it down. The tiller as drawn is removable for stowage in the forward locker but could alternatively be permanently glued to the stock for simplicity and rigidity.

The design features a pivoting centreboard offset from the centreline of the hull (an off-centreboard) The author considers a pivoting board superior to a sliding 'dagger-board' although it is more complicated to build. A pivoting board is less vulnerable to grounding damage. it can stay permanently in its case so does not take up space in the boat when not under sail and it allows some adjustment of the centre of lateral underwater area.



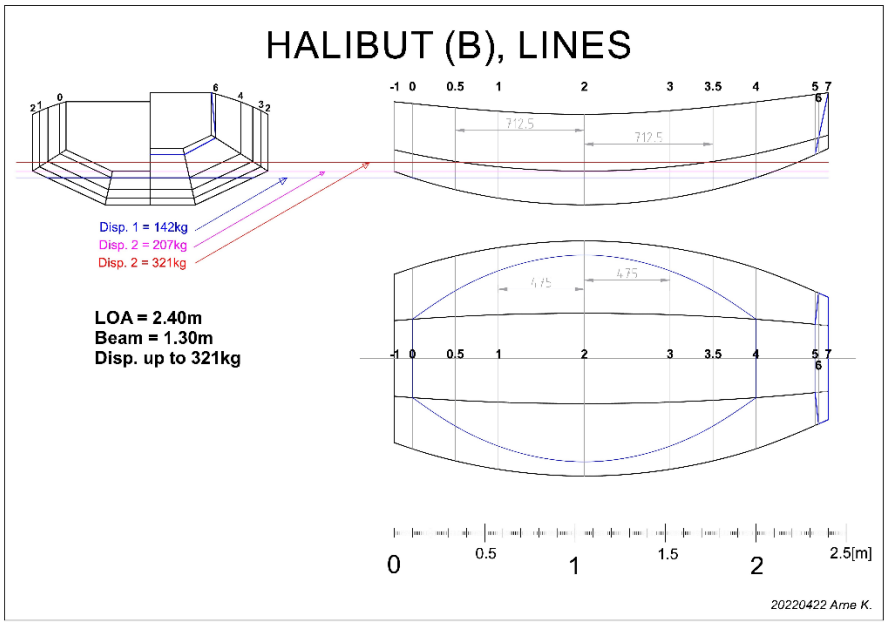


[*Detailed drawings for every component are provided, a very small selection of which are given here. The designer's notes and instructions are comprehensive, a 33-page PDF file And 33 DXF files of illustrated construction details.*
What is provided here is also very much just a small sample. Ed.]

5. ***Halibut*** 2.40m x 1.30m designer Arne Kverneland

Designer's Comments: Before this dinghy design competition started, I had been playing with my QCAD program to see if I could make use of some of **Phil Bolger**'s ideas on how to draw the chines to minimise crossflow over them, and thus reduce drag.

The only hull shape, which can make full use of this concept, is the pram shape.



The lines plan shows Halibut being symmetric fore and aft of the central main frame (stn. #2), just like a shuttle ferry.

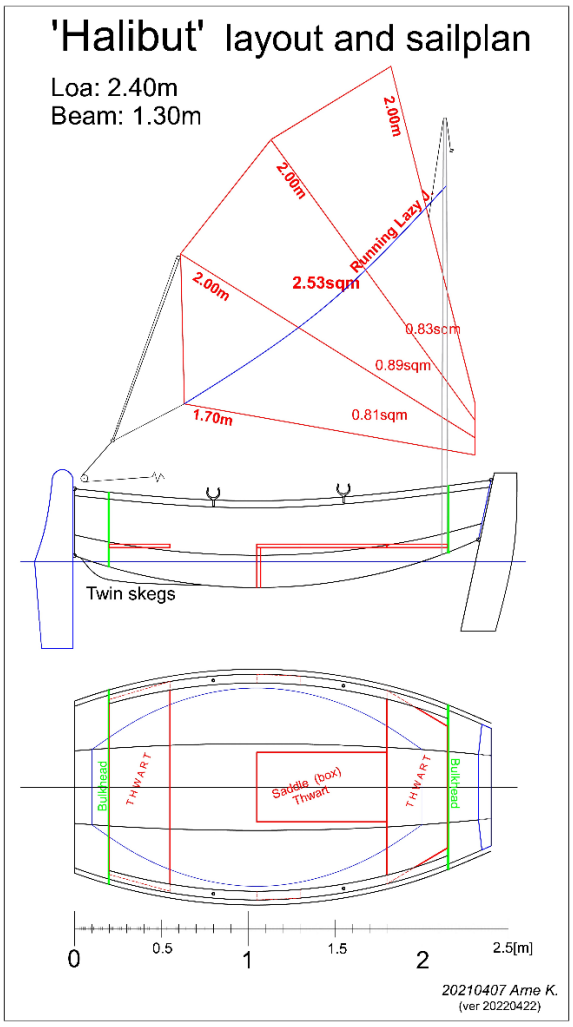
I find no reason for not doing it like this, and the design and building will be quicker this way, since several stations fore and aft of the main station will be the same.

As an extra bonus, the way the curves along the panels run, also saves time when building: when plank no. 2 (bottom side) has been lofted and cut out, it can both be used for scribing the lower edge of the topsides and for the side edges of the bottom plank. Only the sheer line has to be lofted in addition.

This five-plank design is similar to many traditional Norwegian workboats. These have a narrow waterline when light, but they get increasingly wide as you load them, thanks to their flared topsides. This makes them easy to row, steady when loaded, and dry.

Building and interior.
Halibut is meant to be a stitch-and-glue job, using mostly 6mm plywood.
I have avoided using a central structural thwart, because I think a saddle thwart is better for keeping this little nutshell trimmed with two passengers. Instead, I would suggest putting at least one stout central frame at station #2.

Beyond that, I will not go into detail on how the boat should be built - except for one piece of advice: *before* assembly, seal all raw edges of plywood and end grain of additional pieces of timber, either with epoxy or with 2-pot polyurethane varnish.



As the Layout and Sailplan diagram shows I have given *Halibut* a little auxiliary rig, which is quick to set and stow.

[*This sail plan, with further details regarding the sail, is described in the next section, entitled*: "***Halibut Special*** *Junk Sail for Dinghy*"]

My initial plan was to have *Halibut* Just as a rowing tender, and to tow it behind my boat.

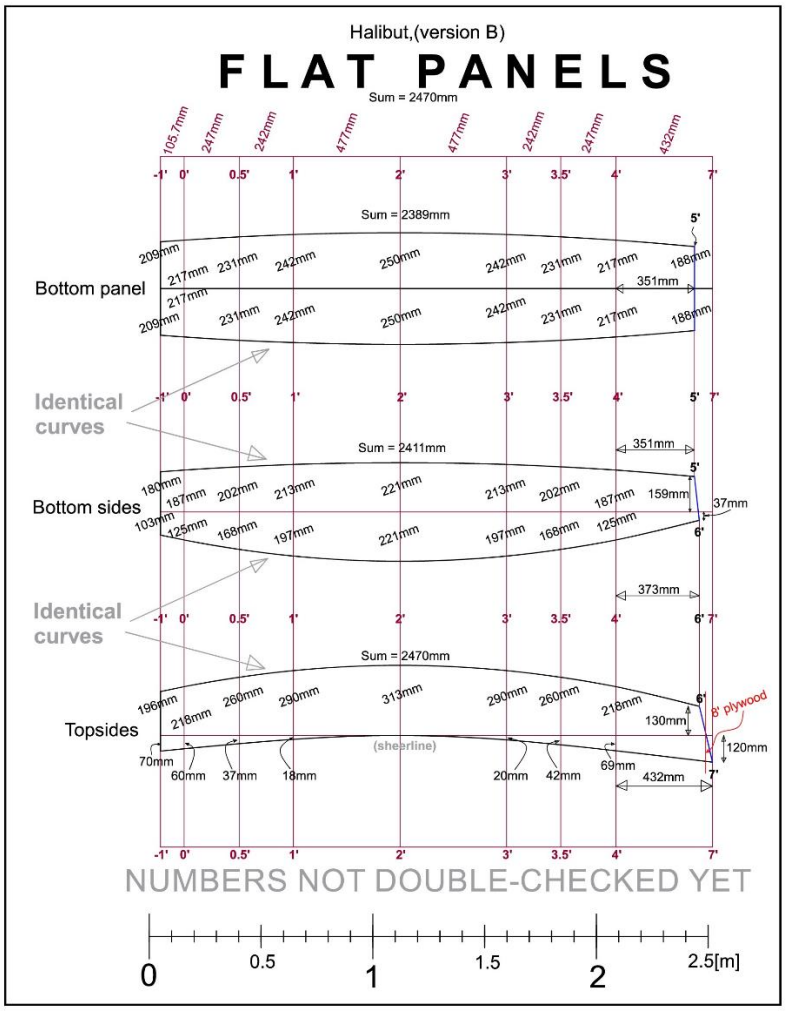
I would prefer not to compromise interior space or ease of building by adding a daggerboard trunk.

If the boat is to be rigged, I would like to suggest trying a bow-board as shown on the drawing.

Or, if you prefer, maybe a leeboard will do instead

One fifth scale model of ***Halibut****.*

The updated layout plan shows a saddle thwart instead of the central rowing thwart shown here.



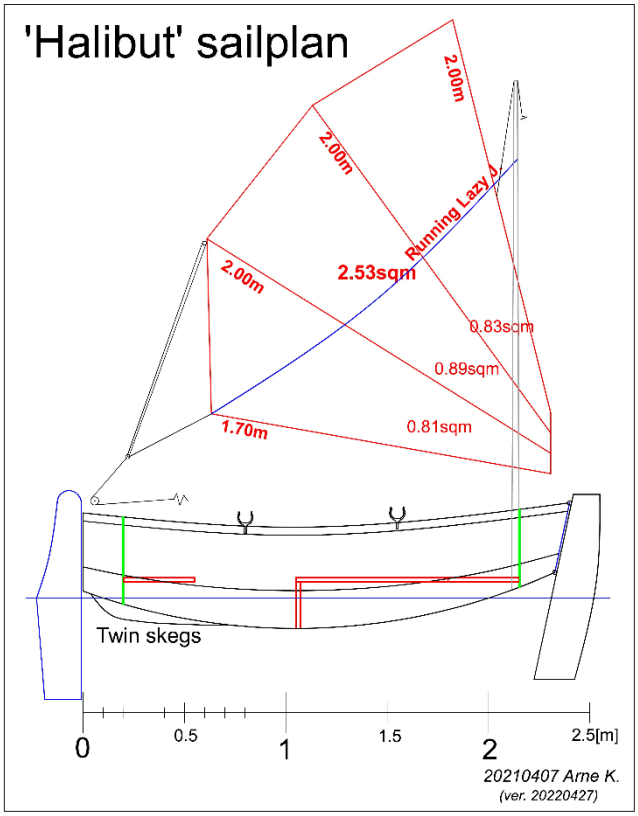
My designs (*Halibut* and *Medium Boy*) were intended for someone who can follow a few sheets of building plans, without needing computer skills.
However the original QCAD files will be available for someone who can co-operate closely with a CNC-cutting shop, as a one-off customer, to get the plywood panels pre-cut.
Personally, I would suggest manual lofting.

[*The plan package includes six sheets of drawings: (1) lines, (2) Offsets for bottom and side panels, (3) Offsets for frames, stations and transoms, (4) sail plan and layout, (5) patterns for sail panels, (6) cambered panels drawing.*

DXF files are also available for someone who can use them, and can liaise directly with a CNC cutting operator. Ed.]

***Halibut* Special** Junk Sail for Dinghy designer Arne Kverneland

Designer's comments: "*Halibut* Special", the simplest auxiliary junk rig yet?
While designing the *Halibut* dinghy, I also presented a little auxiliary junk rig for it on the JRA forum, as a junk rig was more or less called for there.



I got the idea to try a fully fanned 3-panel junk rig, essentially the top-section of the sails I usually make.

I have found that the top three panels of my sails are so efficient that they deserve to be tried alone on such a little nutshell. This will give a sail of half-decent sail area, which will reef well in two stages.

The lazyjacks are in fact just a pair of topping lifts.

The boom has been shortened to avoid sheet tangles. The sheet span should allow the reefed sail or bundle to be sheeted to the centreline.

The procedure for stowing the sail should be like this:

1. Let go the halyard to dump the sail into its lazyjacks.
2. Haul on the running lazyjacks to raise the sail bundle and pin it to the mast. (Slightly slack batten parrels make this possible).
3. Cleat the tail of the lazy jack at the mast.
4. Bring the sheet inboard, reeve it around the sail bundle and cleat it off on the mast.
5. Unstep and lower the mast and sail bundle.

After a bit practice, this should be doable within 60 seconds.
An important part of the auxiliary rig concept is that this planform allows the sail bundle to be stowed within the length of the mast.

Actually, the sail can also be reefed upwards by using the running topping lifts as brailing lines. This lets one row in calm weather with the two top panels set. As soon as the wind returns, the boom is again lowered and one can continue sailing. The quick setting and furling of the sail, plus raising and lowering of the mast, makes this rig to a true aux. rig.
Upwind performance has not been totally neglected, but has lower priority here.
The shown sail is very small. It can of course be scaled up to any needed area, if wanted.

The aux. rig concept should still work at up to 5-6sqm sail area; that is, without compromising fast stowing of the sail and mast. However, if my boat were mainly to be used for sailing, I would rather give it a 'real' junk rig with at least five panels.

Control lines:
I am not sure yet which lines this rig will need, but I'll try to list them:

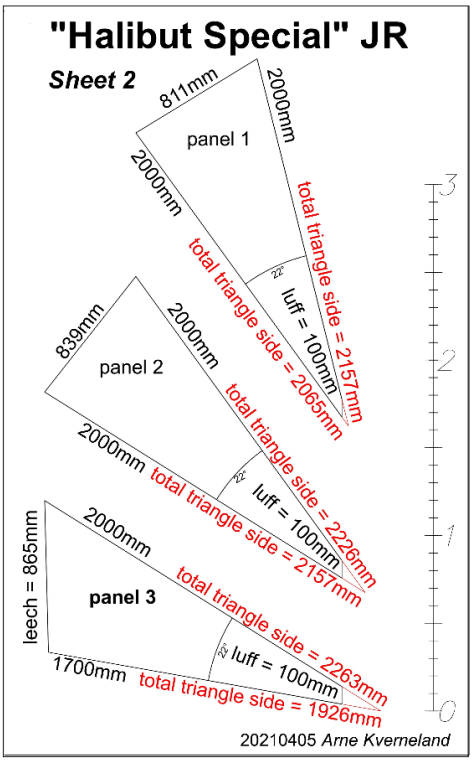
- Halyard and sheet, both single part
- Running lazyjacks, actually just a pair of topping lifts.
- Yard hauling parrel, probably needed.
- Throat hauling parrel, THP, probably, er.. not needed...

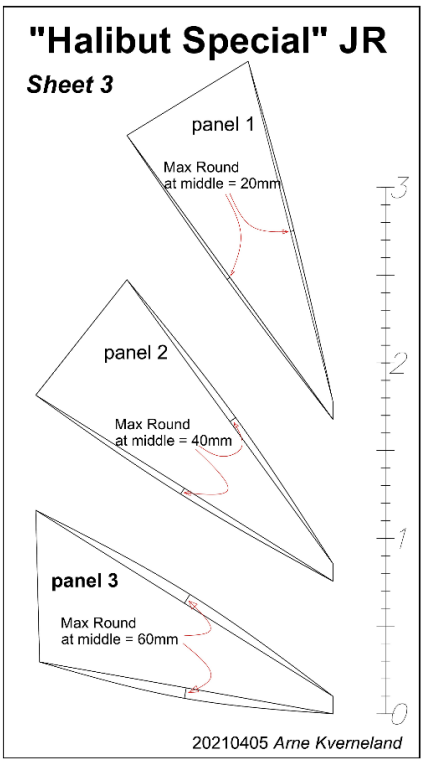
And then there are the fixed lines:

- batten parrels, probably a little slackish.
- mast lift
- tack parrel, TP
- tack line, TL(a bungee)

It is my hope that the "*Halibut* Special" rig will live its own life and be found useful on other tenders as well. It is not the simplest rig to put together first time, but the completed rig will be easy to live with, just as the real junk rigs are.

The two diagrams below contain the numbers needed to produce a sail of 2.5sqm.
Please, feel free to expand the sail to the size you want, but keep the planform unchanged to ensure correct stowing.





[*Fellow competitor David Tyler wrote: "I applaud Arne's vertically brailed rig, and think that with a few tweaks to optimise it, and subject always to sea trials, it's as good a solution to the tiny JR problem as is likely to come forward"*.]

6. ***KISS*** 2.20m x 1.10m designers: Slieve McGalliard's grandchildren

Slieve's Comments: Some 10 years ago I was having breakfast in my daughter's house when one of her sons asked, "Grandad, what are we going to do this morning"?
(The two boys were, at the time, aged about 6 and 4 years old.)
Looking around for inspiration I noticed the empty cereal packet, thought for a minute and answered, "You're going to design and build a boat". This prompted my daughter to say, "We're all going out this afternoon, so you will have to do it quickly".

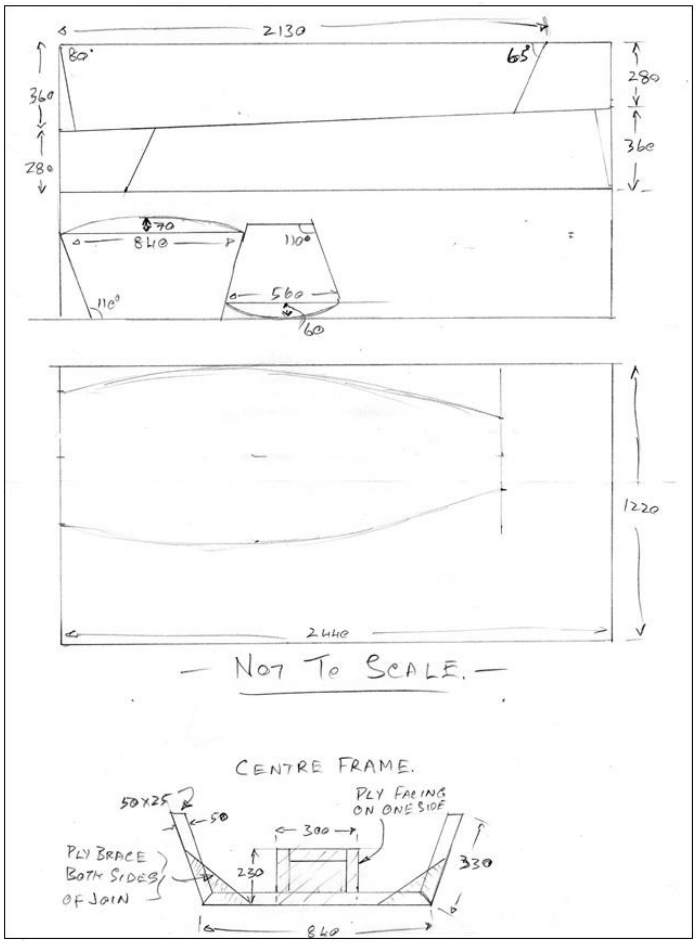
The boys decided that a sharp bow would cut the waves well, but would add more length than buoyancy and be of little help when it came to load carrying and stability. They decided that a square bow would need plenty of rocker to ride over the waves. They tried various angles of flare in the sides, and different width of central spreader and found that using simple straight edged side panels they could get a nice rocker shape. That took another cereal packet.

Points to note are-
Simplicity of straight-line lofting.
Minimum materials, and flexibility in material sizes.
Minimum tools and no requirement for wasteful formers.

Material requirements-
1 large cereal packet, preferably empty, but if not, eat the contents.
1 roll of Sellotape, or other sticky tape.

Tools required-
School ruler.
School protractor.
Pencil and eraser.
2 pair scissors, one for each 'work man'.

Alternatively the design can be scaled up so the material list would read-
2 sheets of 5 or 6 mm exterior grade plywood 2440 x 1220 mm.
Some lengths of 50 x 25 mm timber. Actual dimensions not critical.
4 lengths of 30 x 10 mm x 2150 mm long, knot free, for gunwale, dimensions not critical.
2 length 25 x 25 mm about 2000 mm long for runners.
Roll of glass tape.
Polyester resin and hardener. Much cheaper than epoxy, and perfectly adequate.
Panel pins, preferably brass, but steel will do if well painted over.
Wood glue. Again if well protected with paint one of the modern exterior PVA type glues will be adequate, such as Titebond 3 or the cheaper Gorilla Wood Glue white PVA.
Nylon fishing line. Cable ties? A few copper wire ties.
Paint.



The diagrams have been hand drawn to emphasise how non-critical this design is, and are not to scale.

Once a few measurements have been made the rest of the measured lengths can be made to match the dimensions of the first pieces cut.

Tools required-
Saw
Hammer
Wood plane or sharp knife
Drill and small bit.
Electric drill preferred, but not necessary.

[*Ed.: Slieve has given two pages of step-by-step instructions, not included here. Basically: sew the transoms to the side panels with monofilament … then spring the sides out to place the centre frame on the lines on the inside of the side panels. With all in position and squared up the sides will curve and give the pleasing rocker shape of the finished dinghy. Pin and glue the centre frame in place. Place the skeleton dinghy (braced square so as not to end up with a 'banana' boat) on the second ply panel with the transom on one end and the widest part of the beam close to the side, and rock it back and forth to get the outline of the bottom panel.*

Note in the drawing – the only curves lofted are the tops of the transoms. The rest is straight lines, and the curved outline of the bottom which is created by the "rocking" procedure described above. The result in 3 dimensions, however, is a pleasantly shapely little dinghy.]

There are four separate areas to consider in the conversion of a simple tender to a sailing dinghy and in the order that they have to built into the design are -

1. The keel, which is required to give windward ability.
2. The rig, consisting of sail and spars.
3. The mast and its mounting or staying, and
4. Some steering arrangement, be it oar or rudder(s).
5. Buoyancy.

[Ed.: Slieve has also written a page and a half, not included here, which discusses requirements for converting KISS to a sailing dinghy. Basically: daggerboard, simple balanced lug with camber, free standing mast, rudder and buoyancy bags recommended.]

*One fifth scale model of **KISS***

The name 'KISS' is printed at the top in an effort to emphasise the simplicity of this dinghy. I believe the two boys produced a good looking square box.

[*"**KISS**" is a well-known acronym. K.I.S.S. means "Keep It Simple Stupid"*

The plans comprise a 4-page text of suggestions and instructions, including measurements (in metrics) and two sheets of not-to-scale drawings. Ed.]

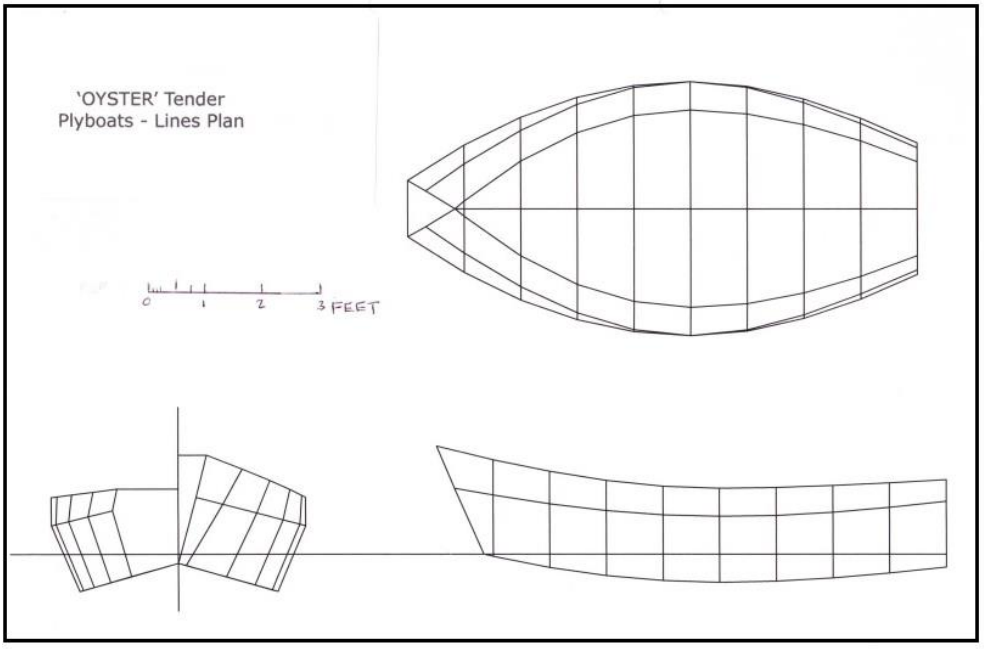
7. ***Oyster*** 2.70m x 1.18m designer Mike Howard

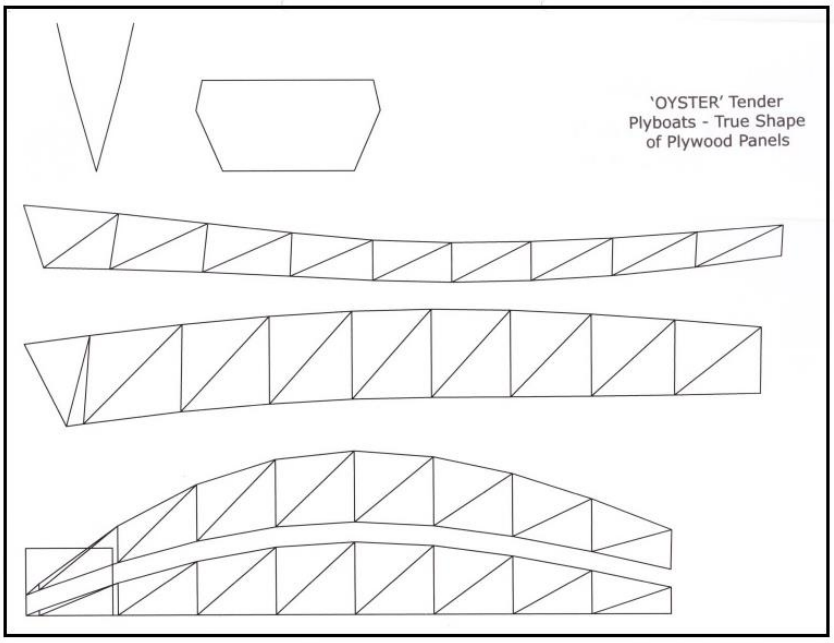
Designer's Comments: '***OYSTER***' has her origins in an article published many years ago in the Practical Boat Owner. John Teale's design was for a 'square' pram dinghy to be used as a tender for a larger boat. It was split in two so that one half stowed inside the other. His desire to adopt a reverse vee shape for the bottom panels was that it produced a much more stable dinghy than the conventional vee bottom version.

The idea of utilising a reverse vee bottom was adopted by the fast-sailing scows raced in the USA in the late 19th and early 20th century. However, the design feature was outlawed by Yacht Club committees and so this type of hull shape has remained fairly obscure.

I have found several variations, namely the 'Sea Mite' a design dating back to the 1960's - a sort of sailing monohull catamaran. Recently, I came across another variation from James Brett, a New Zealand designer. Another John Teale derivative appeared at the Barton Turf HBBR in 2009, this version built by John Lockwood. All the above designs produced rather 'square' boats. I wanted a more curvaceous dinghy.

I developed '*OYSTER*' over a couple of years while still working full time.
I utilised a boat design programme called PLYBOATS, which constrained the curves generated to those which are permissible in thin sheets of plywood. I exported the true shape of the plywood panels from PLYBOATS into AutoDesk AUTOCAD.
I used this software to nest them on my plywood sheet.





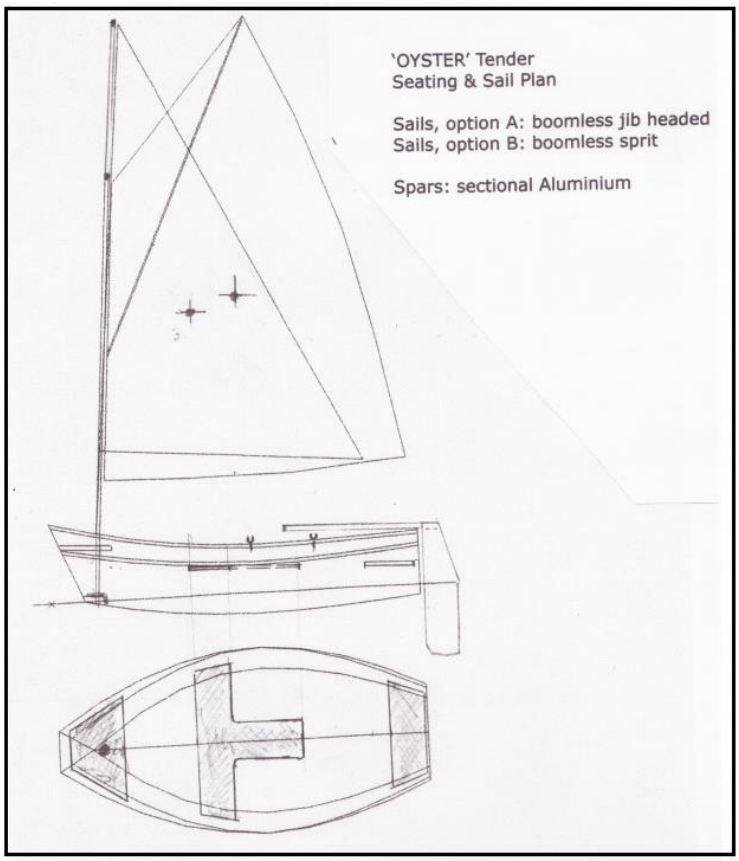
Full size templates were produced by my local print shop.
These were laid onto the plywood and the shapes 'pricked' through using fine nails.
The line of nails was then faired with a flexible batten.

I started the build in the Spring of 2000.

However, several months later, with just the 'stitch and tape' hull complete, we decided to convert our garage into an office, as both my wife and I began working from home, and so '*OYSTER*' was photographed and then broken up.

'*OYSTER*' was constructed from two standard 2440 mm x 1220 mm sheets of 5 mm thick exterior grade plywood. By utilising the offcuts to extend the side panels at the bows and the sheer strake at the stern quarters, it was possible to produce a dinghy which was actually longer than the standard sheet of plywood. The bow and stern transoms were cut from a half sheet of 12 mm thick plywood I had in stock. I used 3mm plastic cable ties to secure the panels together initially. The dinghy was consolidated by the 'stitch and tape' method.

OYSTER: Particulars
Length overall: 2700 mm
Length waterline: 2450 mm
Maximum beam: 1350 mm
Maximum Beam at waterline: 1180 mm
Maximum hull depth: 500 mm
Maximum draught (2 persons): 150 mm Dry hull weight: 27 kgs
Capacity: 2 persons (rowing) 3 persons (under power)



One fifth scale model of ***Oyster***

[*The plans comprise 4 sheets of drawings: lines plan, developed plywood planks, nesting of parts on plywood sheets, seating and sail plan. Autocad files, to enable the printing of full size templates are also available. Ed.]*

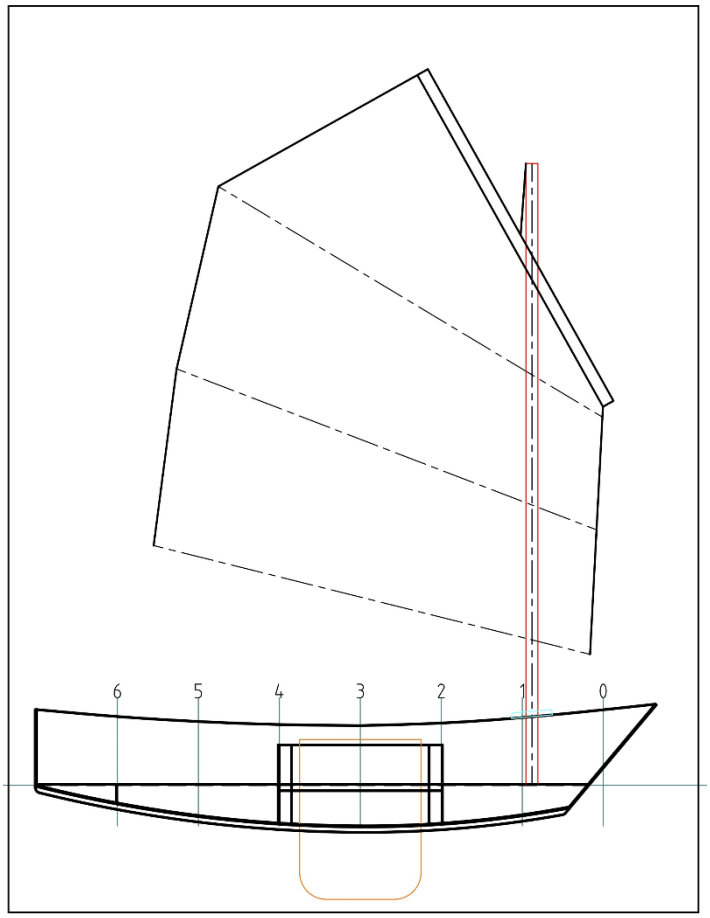
8. ***Tender to Sibling*** 2.40m x 1.15m designer David Tyler

(4th prize)

Designer's Comments: I think of this design in the same terms as the initial design brief for *SibLim*: given a very particular set of requirements, what design will best fulfil them?

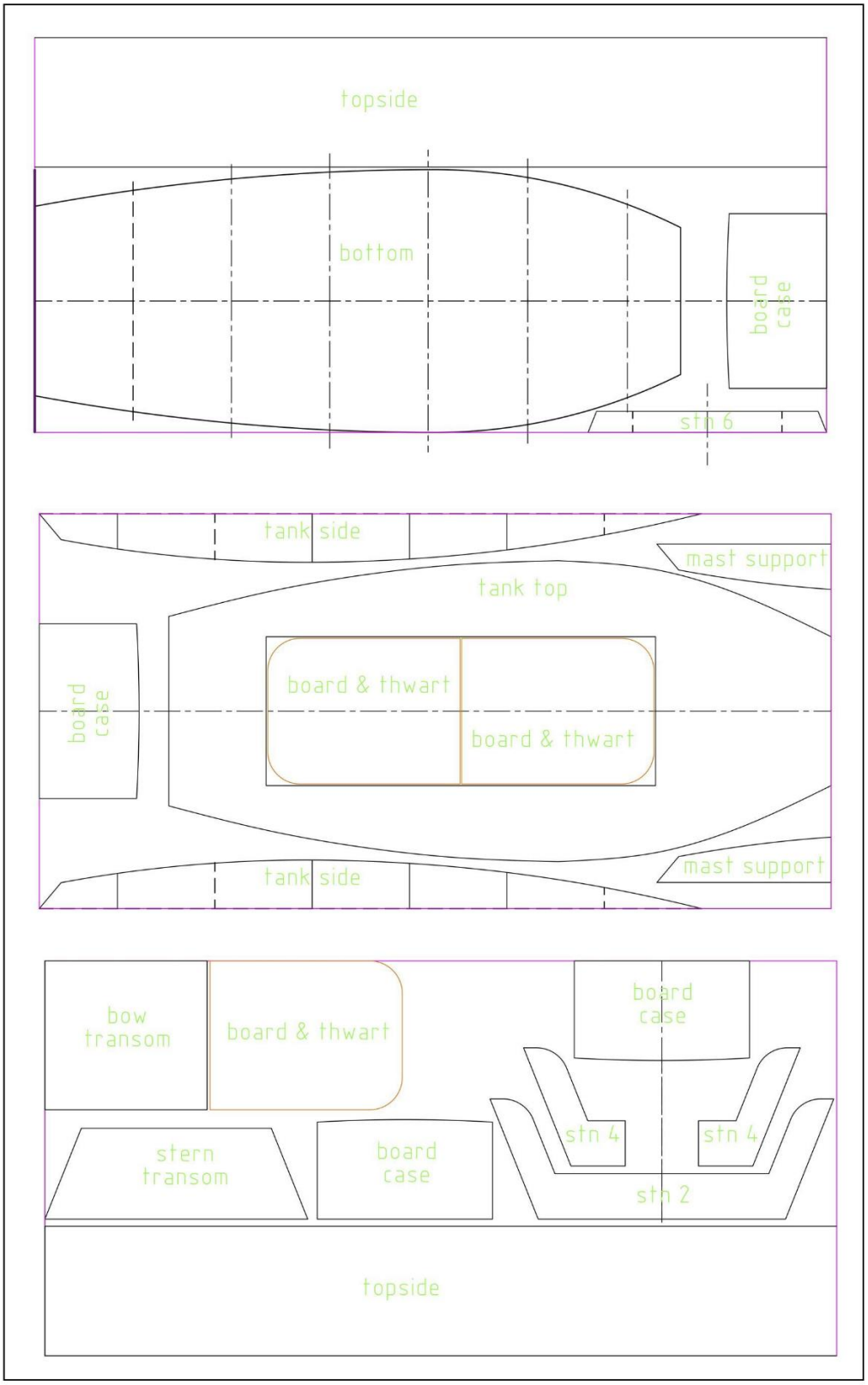
So I'm imagining a dinghy for a *SibLing*, a sistership to *FanShi*, planned to have davits and a complement of two people of average build who will require a workhorse of a tender that can carry them and a reasonable payload to and fro in anchorages that may not be entirely sheltered; and occasionally, will put a simple sailing rig aboard, just for fun. Alter any of those requirements, and a different dinghy is the result. Take away the davits, for example, and the dinghy must be an inflatable, stored on the foredeck.

I feel that a 3-plank sampan or whatever does a better job, thinking of all the tasks that a cruising yacht's tender has to perform, whatever strange part of the world it happens to be in. Carrying stores, fuel and water; laying out a kedge in a rising wind; landing on and leaving any kind of shore; knocking about on a crowded dinghy dock, when crews have to step from boat to boat to reach their own; these kinds of things require more stability and less draught than a 5-plank hull provides. Just occasionally, when the crew decides to take a day off and go exploring upriver, a 5-plank will be nicer to row and sail, but otherwise the 3-plank wins on practicality.



The sail is 2.4 sq m, large enough, I think. The battens are three equal lengths of 1.66m cut from a 5m tube. The mast is 2.4m long, to act as a cover ridge pole, and the yard is 1.4m, both from a 5m x 45mm dia tube. A 3-point sheet span with single part sheet, a single part halyard and the simplest possible lifts complete the rigging. Steering by oar permits sculling through the un-sailable bits.

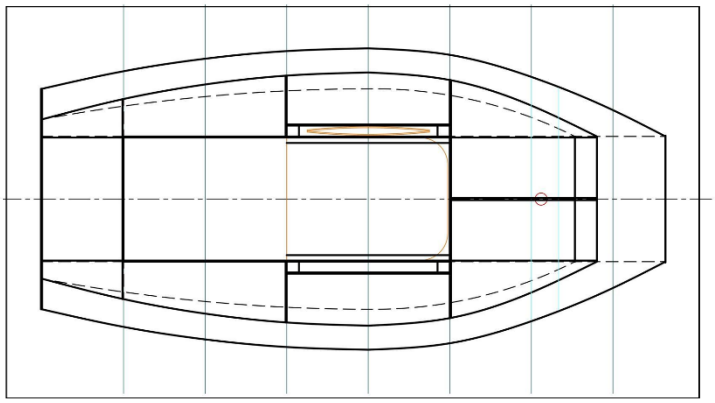
I'm thinking of a deck stepped mast, supported by four shrouds. Why? Because when rowing with 2 up, the rower will have to sit on the forward tank, and a tabernacle or thwart to support an unstayed mast would get in the way. Also, when used as a workhorse, this area will be used to carry stores aboard, clear of the potential wet bottom of the dinghy after a splashy beach launching.

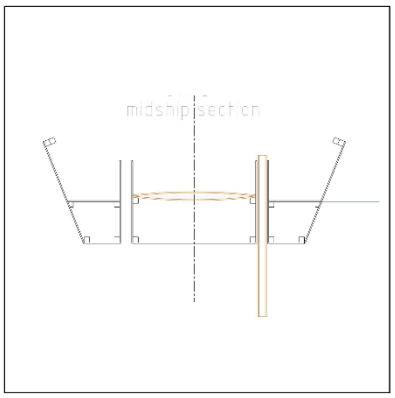


These drawings are for manual marking out and cutting from 3 sheets of 4mm plywood, and conventional framing using 20mm sq softwood. I would have to add dimensions and more details, and write down the building sequence, but the major components are there.

Alternatively, I could add the detailing necessary for CNC cut, slot-together construction.

A centreboard or central daggerboard is not good in a boat of this size, unless a solution can be found to stop water slopping up out of the top of the case, to the great discomfiture of the rower. The leeboard or bilgeboard is the right choice for a boat that is rowed most of the time.





I've put the centre of buoyancy further forward than on the other designs, because that's where the larger, stronger, and therefore heavier rower is going to be sitting, when two-up; and when one-up, that rower needn't move so far aft as to have his legs doubled up against the after thwart.

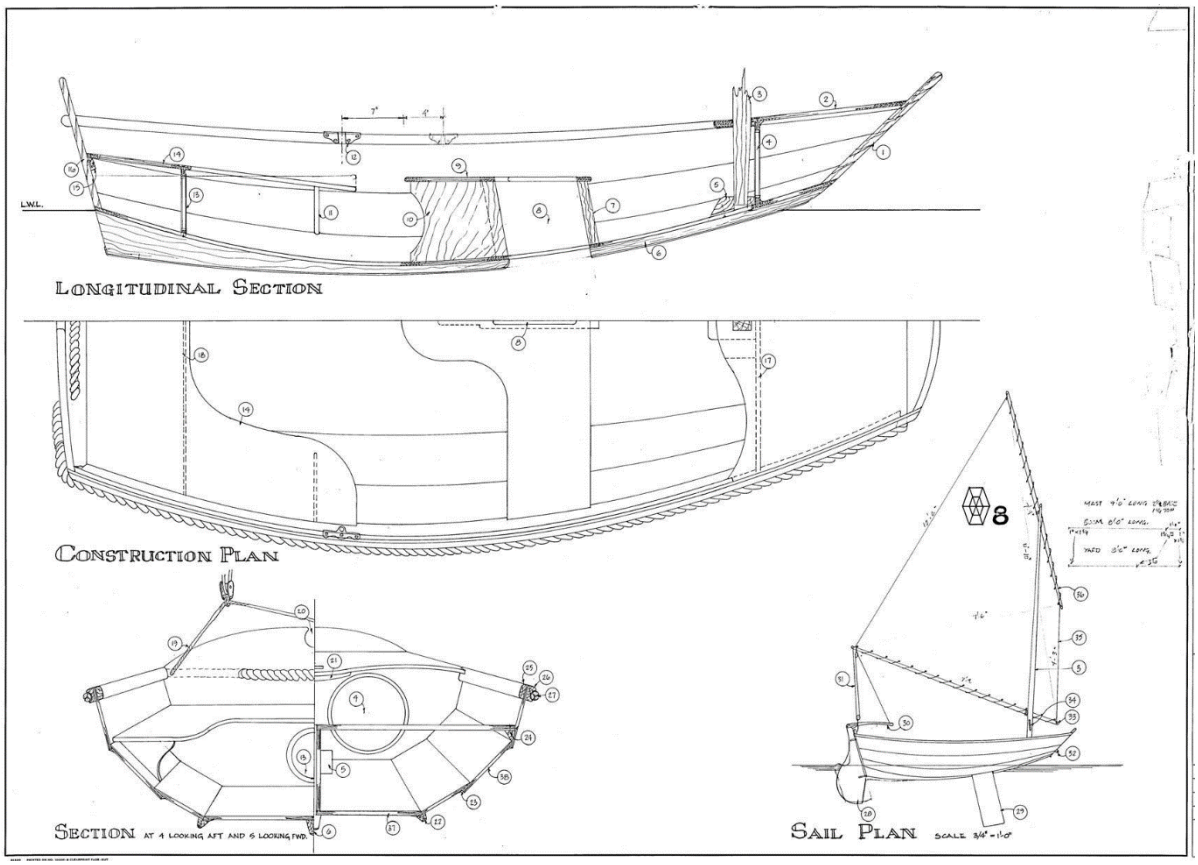
[Ed: note the use of materials. The off-centre bilge boards are made from offcuts. One of them is used as a thwart.]

One fifth scale model of ***Tender to Sibling***

[*Plans comprise 6 sheets: profile and sail plan, plan view, all panels nested on plywood sheets (3), cross section drawing. These drawings are for manual marking-out of plywood sheets. Details available for CNC slot together construction*.

9. ***Webb 8*** 2.74m x 1.22m designer David Webb

Designer's Comments: This is a design I did back in 1979 for an 8-foot dinghy.
I have built a number of these as well as a version stretched to 10 feet long. It has proved to be a very good dinghy design, rows well and sails extremely well (I used to sail rings around the Sabot fleet in Marina Del Rey with the prototype).



The sail on this is virtually the same as the one on my other design, so the junk sail I drew would also fit this, but would need a boomkin for the sheeting.

The prototype would actually produce a wake that trailed to leeward indicating that the forward-sloping daggerboard was lifting the dinghy to windward in excess of the amount of leeway she was making.

The dinghy looks quite complex but all three of the strakes have one straight side and a constant bevel on the plank edge that can easily be cut on a table saw or radial arm saw, which makes lofting quite easy.

When building the prototype I made a building jig of the whole dinghy from the lofting.
It had a frame at each of the stations and a false bow and stern transom lofted to the inside of the designed mahogany transom. I installed stringers at the chine points which helped in cutting the shaped edges of the planks. Two people could cut out the parts in the morning and assemble the dinghy in the afternoon.

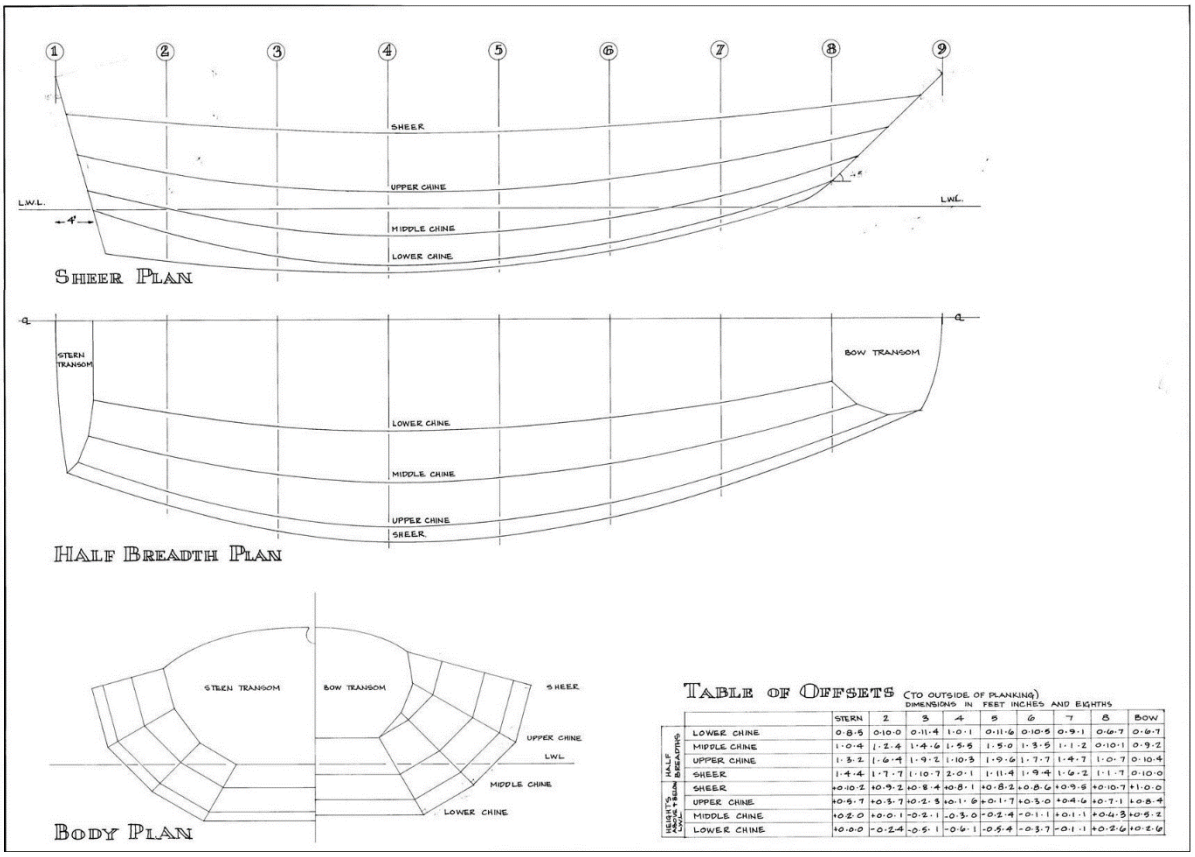


TABLE OF OFFSETS (TO OUTSIDE OF PLANKING) DIMENSIONS IN FEET INCHES AND EIGHTHS

		STERN	2	3	4	5	6	7	8	BOW
HALF BREADTHS	LOWER CHINE	0·8·5	0·10·0	0·11·4	1·0·1	0·11·6	0·10·5	0·9·1	0·6·7	0·0·7
	MIDDLE CHINE	1·0·4	1·2·4	1·4·6	1·5·5	1·5·0	1·3·5	1·1·2	0·10·1	0·3·2
	UPPER CHINE	1·3·2	1·6·4	1·9·2	1·10·3	1·9·6	1·7·7	1·4·7	1·0·7	0·10·4
	SHEER	1·4·4	1·7·7	1·10·7	2·0·1	1·11·4	1·9·4	1·6·2	1·1·7	0·10·0
HEIGHTS ABOVE BASE LINE	SHEER	+0·10·2	+0·9·2	+0·8·4	+0·8·1	+0·8·2	+0·8·6	+0·9·6	+0·10·7	+1·0·0
	UPPER CHINE	+0·3·7	+0·2·5	+0·1·6	+0·1·7	+0·3·0	+0·4·6	+0·7·1	+0·8·4	
	MIDDLE CHINE	+0·2·0	+0·0·1	-0·2·1	-0·3·0	-0·2·4	-0·1·1	+0·1·1	+0·4·3	+0·5·2
	LOWER CHINE	+0·0·0	-0·2·4	-0·5·1	-0·6·1	-0·5·4	-0·3·7	-0·1·1	+0·2·6	+0·2·6

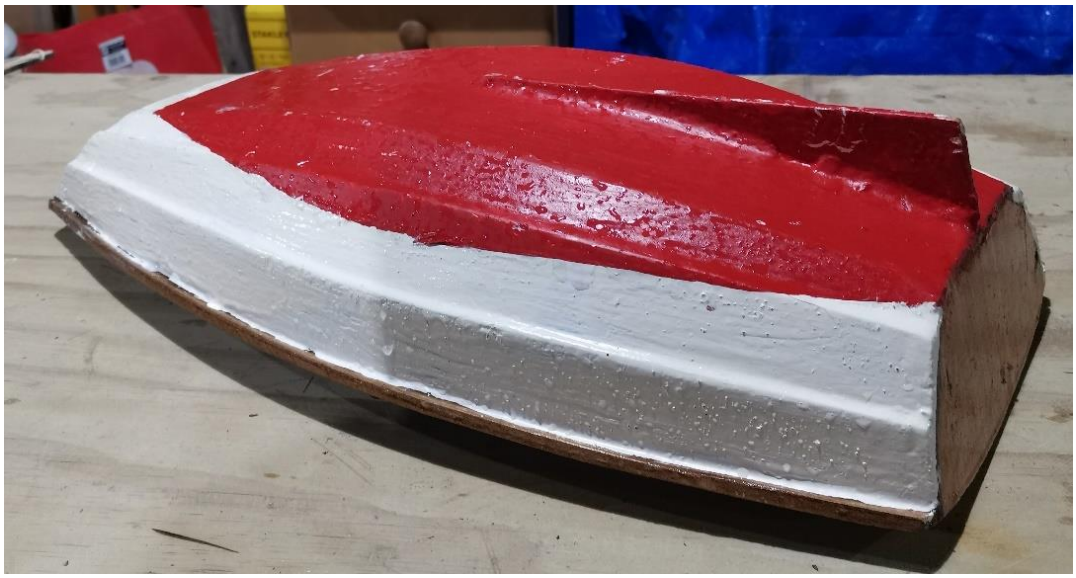
I have probably built twenty dinghies to this design and they have consistently pleased their owners. Once the building jig is made building additional dinghies is very easy, so she is suitable for small production runs. With this type of construction, I prefer not to rely entirely on the glue, although it has proved very reliable and I have not had a failure; I arm the jig stringers with a 3mm thick strip of steel (trim the stringer by 3mm to allow this) then can use 17mm copper tacks at about 100mm centers along the laps which then clench back against the steel face of the stringer and give additional support and clamping pressure to the lap joints.

I often had two people in this dinghy and it was no problem. On a few occasions, we even crammed in three and she managed that OK as well. About 20 of these have been built in Southern California, all as yacht tenders, and I have received no complaints with regards to its suitability for the task.

This design also rows very well.

One of the 10 foot versions was timed at just under five knots in a rowing race in Santa Barbara.

One fifth scale model of ***Webb 8***

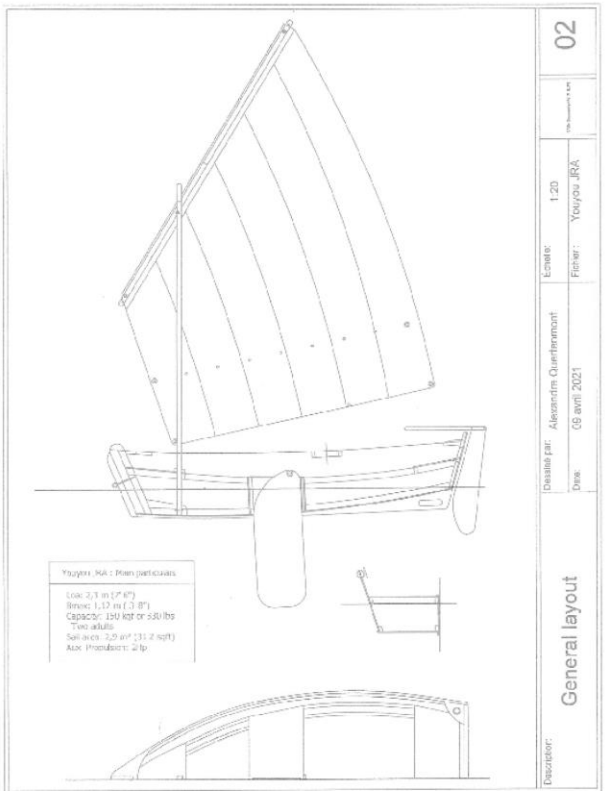


[*Plans comprise two sheets: (1) lines and offsets, (2) construction details and sail plan. Ed.*]

10. ***YouYou*** 2.30m x 1.12m designer Alex Quertenmont

Designer's Comments: Let me introduce my dinghy design.
In French we call this kind of boat a "youyou" and it appears that the name, like the junk rig is originated from China! So we have a link!

[*In modern standard Chinese dialect it is* "yáo yáo" 摇 摇.
Yáo *means, among other things, to row or to paddle. It is also part of the word*
"yáo lǔ" 摇橹 *which, in another dialect, is "yuloh" – the Chinese sculling oar. Ed.*]



In 1996, I successfully built a few of these, and also some kits for assembly.
Originally, I designed this sailing dinghy for children. I thought that it should be a better and cheaper alternative to the boxy Optimist, for those who want to learn sailing. But it appears that there were more people who wanted to own one for a tender for their proper sailboat, or fishermen who wanted a lightweight boat suitable to put on top of their quad.

Build out of two sheets of ¼'' or 6mm thick plywood and mostly readily available white pine planking, it's a classical construction. No fibreglass or stitches required.
The quarter inch thick plywood I used is a multiple ply type called Russian or Baltic plywood, made of yellow birch and glued with WBP. It's a bit heavier than Okume, but also cheaper and more rugged.

The overall length is 2.3 m by 1.12 m beam. It weighs, in this rowing version, 28 kg (about 62 lbs). The sailing version will be a bit heavier due to all the specific accessories, but I don't think that it will exceed 38 kg (83 lbs).
The capacity is about 150 kg (330 lbs) good for two adults, and we have still a lot of free board available.

So, you can still sail with two adults!

This unit is simple to build. We use five frames, the stem and the transom as a mould. We then glue all chines, thwart risers and their frames. A minimal amount of fairing is required. Then, we cut, apply and epoxy glue the three plywood panels on (two sides and the bottom). And there comes the outside gunwales.
So it's really easy and you don't have to use special tools to build it.

When all parts are ready it will take less than 20 hours to assemble the rowing version. A good jigsaw, a stapler and a couple of clamps could be useful. All parts are epoxy glued and for durability, all plywood edges are capped with half round moulding.

Structurally the rowing only or the sailing versions are identical, except that the sailing version will be equipped with a daggerboard trunk installed in the middle of the thwart, and also a step for the mast.

As a tender, when under tow, the small skeg will help to prevent yawing.

The rowing version is also very good for sculling.
I haven't shown an opening in the transom for sculling, but if sculling will be your main source of propulsion, I recommend you cut one in the centre of the transom, though If your intention is also to use a small outboard motor (2 hp or so) it will be preferable to offset this opening to the left or right depending on whether you are left handed or right handed.

In any case, I recommend making provision for sculling, while using oars for rowing (6 feet or more) so that if you lose one oar, you can still scull with the remaining one.

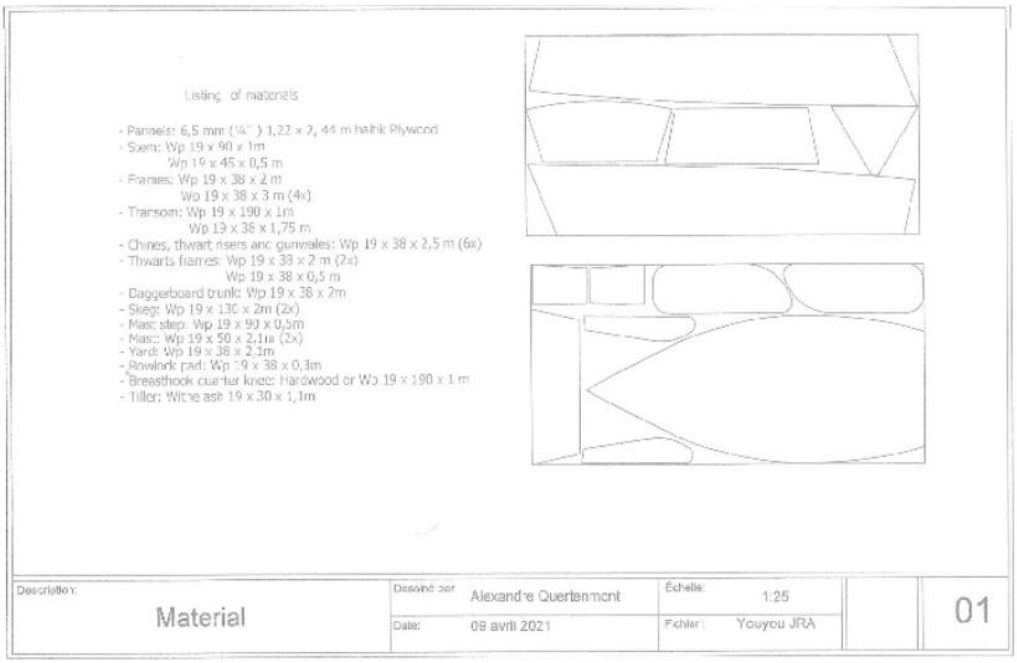
As you can see from the photograph, when you are rowing alone, location of weight in the dinghy is crucial.
The bottom of the transom clears the surface so you do not drag excess water.

On the sailing version I opted for a lug sail. The standing lug sail provides good performance up wind and down wind.
It's a simple sail without battens that can be reefed easily. There is no boom, so nothing to knock down a careless sailor!

The mast and yard can be stowed inside the hull when they are not in use. With only one halyard and a sheet you won't find anything simpler to use! The mast is locked at the step with a simple bolt and you can give it some fore or aft rake, if required.

The general layout is provided, and for anyone further interested, I can provide fitting out instructions (these still have to be translated) and all 12 assembly drawings.

I could also provide precision drawings, lines and offsets, and so on, but I think that a few drawings of the mould and the different parts required for the assembly are more useful.

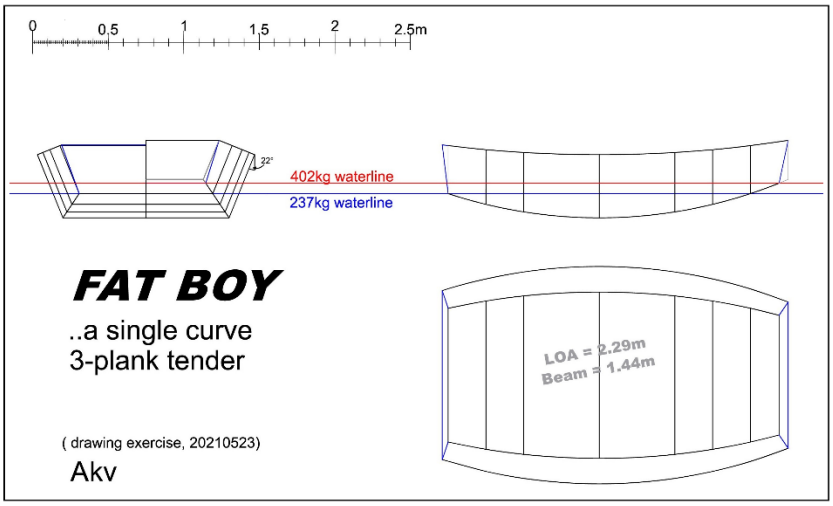


[*Plans comprise explanatory document plus two sheets: (1) sail plan and general layout (2) materials list and nesting for two sheets of plywood. Ed*.]

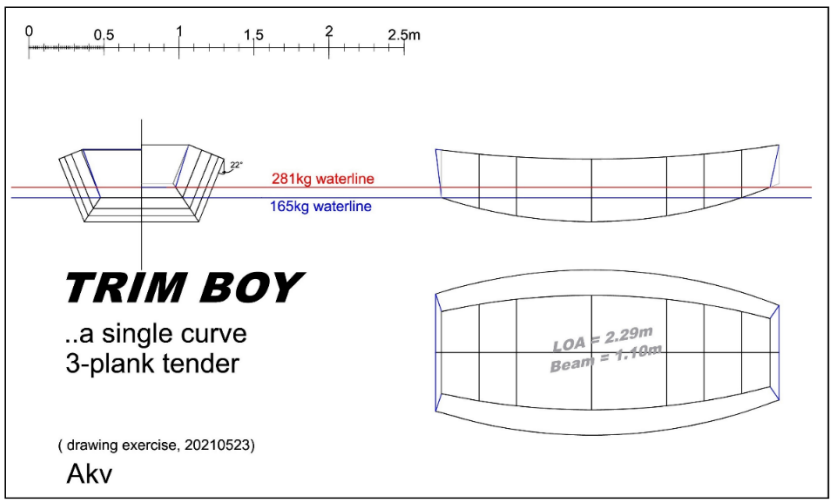
11. **Medium Boy** designer Arne Kverneland

Designer's Comments: I am aiming to design a 2.4m tender, by making use of my experience with ***Halibut***, and then playing around with the lines to get tenders with different displacements. I feel that a little bit of curve at the lower edge of the topsides will let one increase the displacement without dragging the transom(s) in the water.
The challenge is not to add too much complexity to the builder.

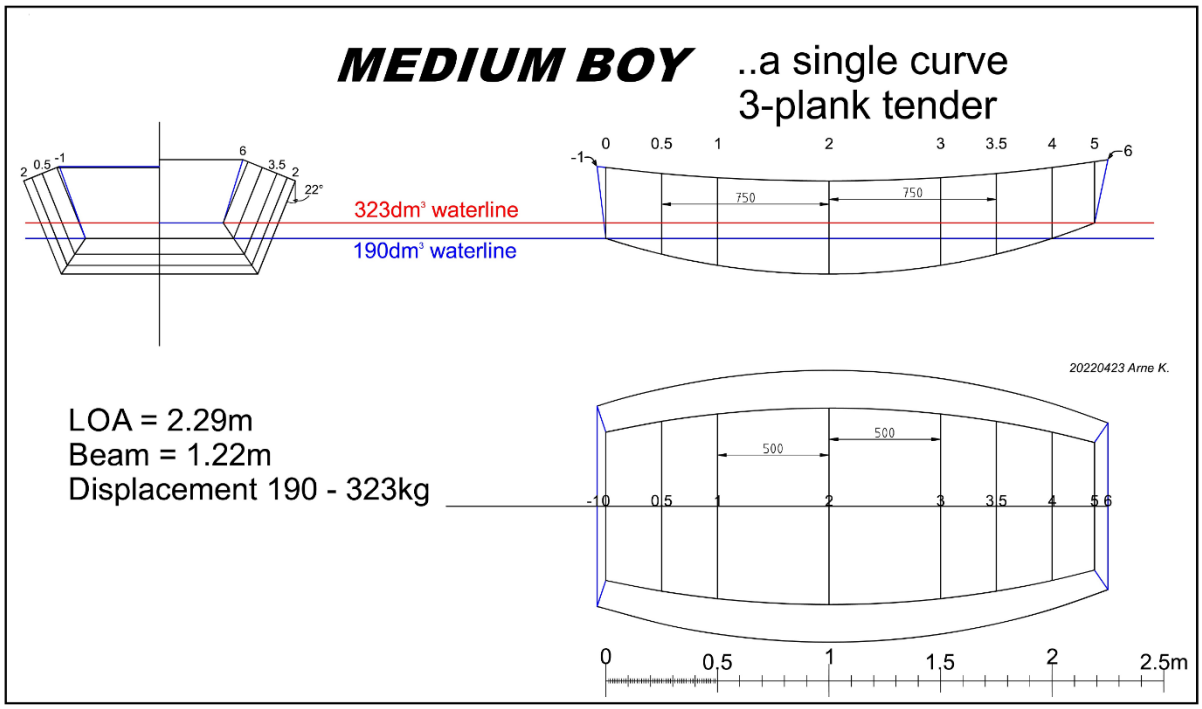
Below is the result of my first effort, ***Fat Boy***. I guess this will be the heavy-weight of the family. As can be seen, even with the stern transom just kissing the water, it can carry 238kg (in fresh water), or say 200+kg payload. It means it should safely take three persons. The overweight displacement, with the bow transom kissing the water, is a whopping 402kg.



I have now drawn the trimmed down version of ***Fat Boy***, with the beam reduced from 1.44m to 1.10m. I am not sure if I like the resulting ***Trim Boy***.
I feel that its waterline beam gets a little narrow (89cm). I guess I would stop at a total beam of 1.25m. If I want a lighter tender, it would be better to draw a new one from scratch, with slightly less rocker in the bottom, and with only 18-20° flare in the topsides.
However, for people used to handling these nutshells, ***Trim Boy*** may well work just fine.



Now for ***Medium Boy***. This is what I regard as a sensible compromise between the fat and the trim version.



This design was started after the design competition's deadline. Comments on the JRA forum on my *Halibut* entry hinted that a tender should have a higher initial stability than a 5-plank tender would have. I therefore went ahead with a 3-plank version, still an eight-footer and still a pram design. The first go resulted in *Fat Boy,* and then *Trim Boy*, before landing on the *Medium Boy* with a beam and displacement in between the other two. This was chosen for the model boat test series [*See Appendix Ed*.]
It actually went quite well there, in particular in the towing resistance test.

One fifth scale model of ***Medium Boy*** *(earlier version with buoyancy tanks)*

These were my 'design rules' for this 3-plank pram project:

- They are designed as shuttle ferries; that is symmetric around the centre frame. This adds buoyancy at the bow as well as stability in case of leaning over the bow (alone). Safer. 'Fast' is not on my list here.
- Circular rocker. This is not important, but it raises the prismatic coefficient to around 0.63. I think some fullness in the ends are good, but again without dragging the transoms in the water too frequently. The resulting easy curve also removes the need for making any sharp bends in the plywood.
- Single curve. Only one curve will be introduced; the one at the lower edge of the topside. When this has been lofted and cut out, it can be used as a pattern to draw the curved edges of the bottom panel as well. It was **Philip C Bolger** who introduced the idea of having the same rocker for the bottom and topsides. It was to minimise the crossflow over the chines. My motive for it was to make the boat quicker to build, but it may also have contributed to the easy towing of the 1:5 scale model.
- The displacement of any flat-bottomed pram can be adjusted up or down, simply by making the bottom and transoms wider or narrower.

Building method and interior layout.
I haven't built any of the "Boys" yet, so my hints here will be vague. What is sure is that it will be built using some sort of stitch and glue technique. The (6mm) planks will be cut out first, from the lofting plans. I imagine building my boat right way up, either with a permanent centre frame (station #2) plus a couple of moulds, or by using three female (cradle type) moulds. In any case, this will give me maximum access to the inside of the boat so stitching together and then gluing can be done there first. Frames will then be added at stations #1, #2 and #3 (8mm ply). All frames have the same angle at the chine. Instead of the usual epoxy, I will use some sort of putty glue (a Sikaflex derivate). I have made a number of gluing test with this stuff, and find it to be very strong and easy to deal with.
I hope to write a report after building mine. The use of frames will free one from needing thwarts to keep the shape of the boat, so anyone will be free to make their preferred interior, basic or fancy, be my guest.

Only when the interior is finished will I release the boat from the building jig. Then it can be turned over, the chines rounded a little and the bottom and chines glassed. Finally, a couple of skegs will be added. These help the boat to go straight, as well as serving as runners when hauling ashore.

For my own part, I will not bother with fitting buoyancy tanks. Instead, I will fit a string of fenders along the rail (sewn into a 'sausage' of pvc cloth).
This will do triple duty as fenders, as spray-rails and as extra buoyancy.

A sailing rig, for instance the '*Halibut* Special', may come later, but I will never install a centreboard trunk in that dinghy.

Instead, I would try leeboards or a bow-board.
To me, good rowing, alone or with a passenger or two, has priority over sailing.
(I would not sail across the fjords around Stavanger in any boat shorter than 12'.)

Finding a beam to achieve your needed carrying capacity.
The needed maximum working displacement (blue waterline) will vary between users. While the 110cm wide *Trim Boy* only displaces 165kg, the 144cm *Fat Boy* can carry 237kg on the same waterline. The 122cm wide *Medium Boy* displaces 190kg.
You can make your own version to your own needs. Just remember that when you vary the beam by varying the width of the bottom and transoms, the displacement will go up or down 2.14kg/cm (blue waterline - 3.59kg/cm on the red wl.).
(I have simplified a little here and equated 1000cm3 displacement with one kilogram (kg). That is correct in fresh water.
In salt water the boat can carry 2.5% more on the same waterline).

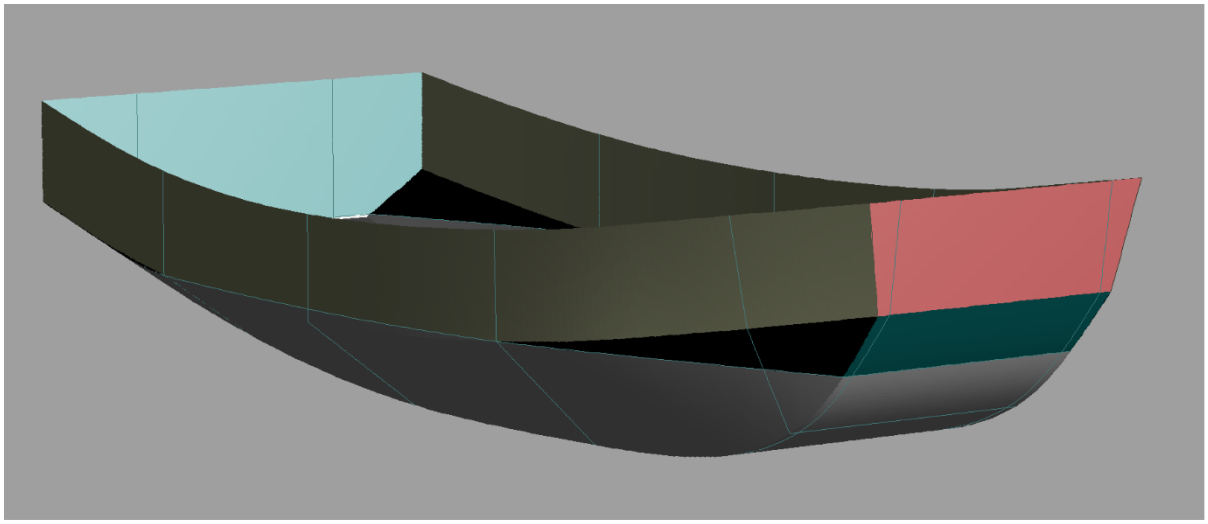
One fifth scale model of ***Medium Boy***

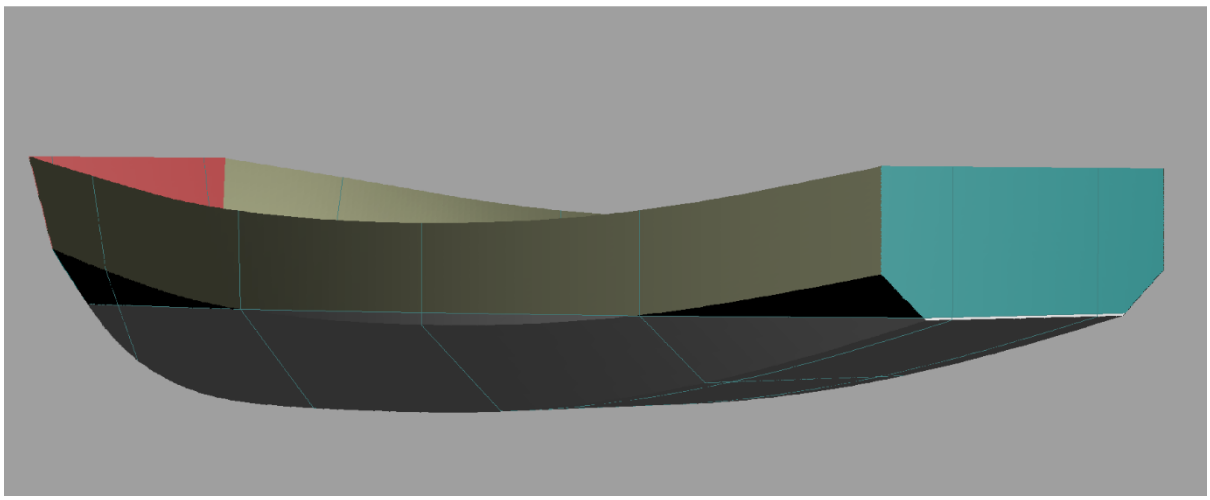
13. Wuban designer David Tyler

Designer's comments: An atmosphere of friendly collaboration spurs me on to do better than I can do on my own, and has got me thinking about how to combine the better sailing and rowing qualities of Arne's 5-plank *Halibut* with the stability and practicality of my 3-plank *Tender for Sibling.*

So I've used the transformation tools in Freeship to make the original *SibLim* form into a dinghy with a bow resembling the bluff bow of the Northern China junks. The width of the flat bottom is not as great as my 3-plank, but is enough to give a flat area to stand on over the whole of the non-tanked area.

Here's my **Wuban**

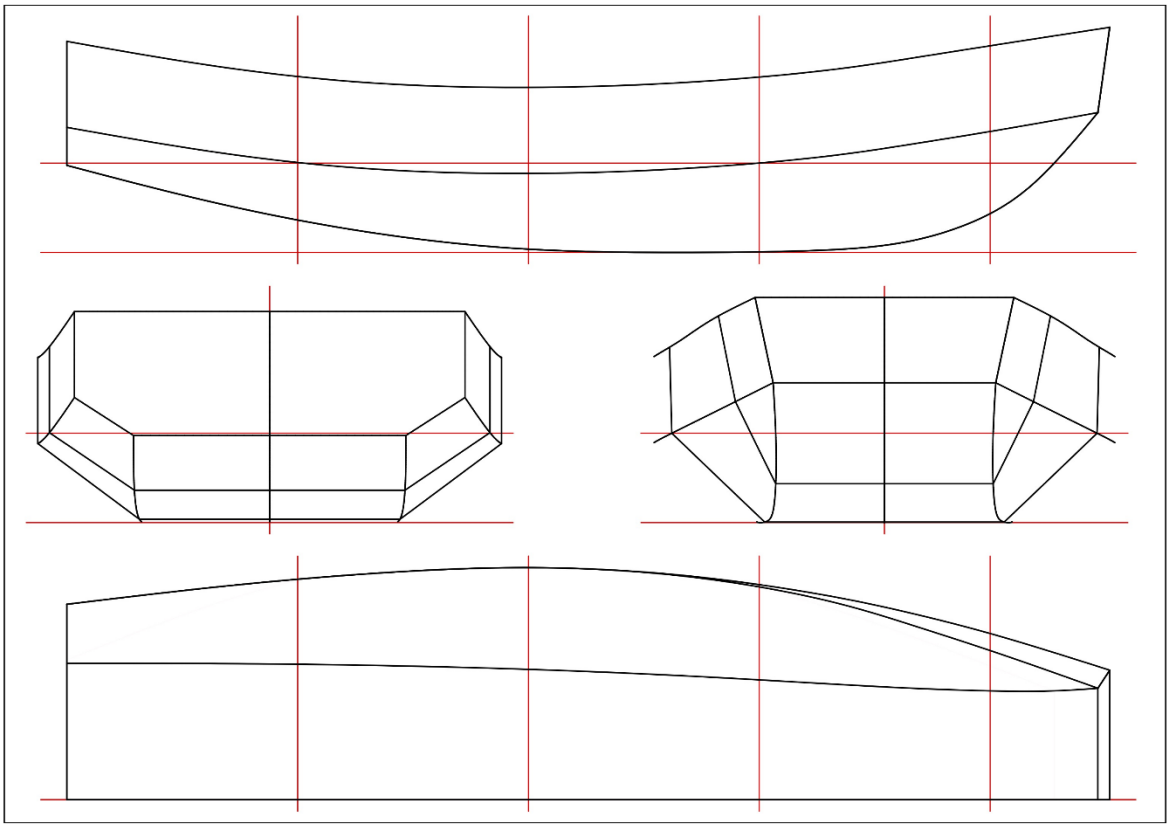




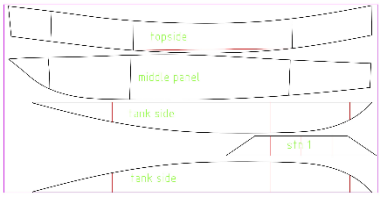
It's 2.335m long with 1.04m beam and a draught of 0.2m when laden to 250kg displacement, which just immerses the bottom of the transom.

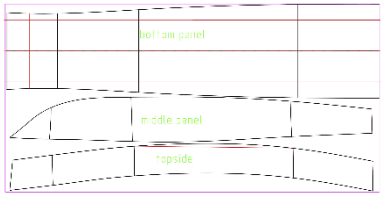
I can nest the components onto three sheets of 4mm or 5mm plywood. There is enough surplus plywood to make a daggerboard case, when I figure out how and where it goes.

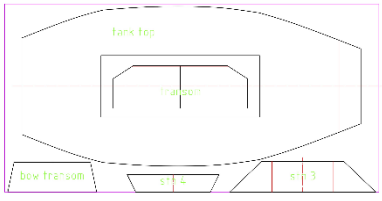
The lines drawing shows a pretty stable midship section.



Stitch, fillet and tape construction, with some locating tabs and slots in appropriate places, would be used. The building sequence would start with laying down the tank top, upside down, onto a flat surface, and assembling onto it the tank sides, stn 1 and stn 4 which would be made to slot together like a # - that would make a stiff structure ready to receive the bottom panel, then the middle panels.







It will of course be fitted with the Halibut rig in due course.

[*Ed: Wuban is a Chinese word meaning "Dancing partner"*. wǔ bàn 舞伴

However, like many words in Chinese, if the right characters are chosen it could have another meaning. wǔ bǎn 五板 "Five Plank"]

One fifth scale model of ***Wuban*** *Self-jigging construction*

13. "***Simplicity 8***" (a box barge) designer Arne Kverneland

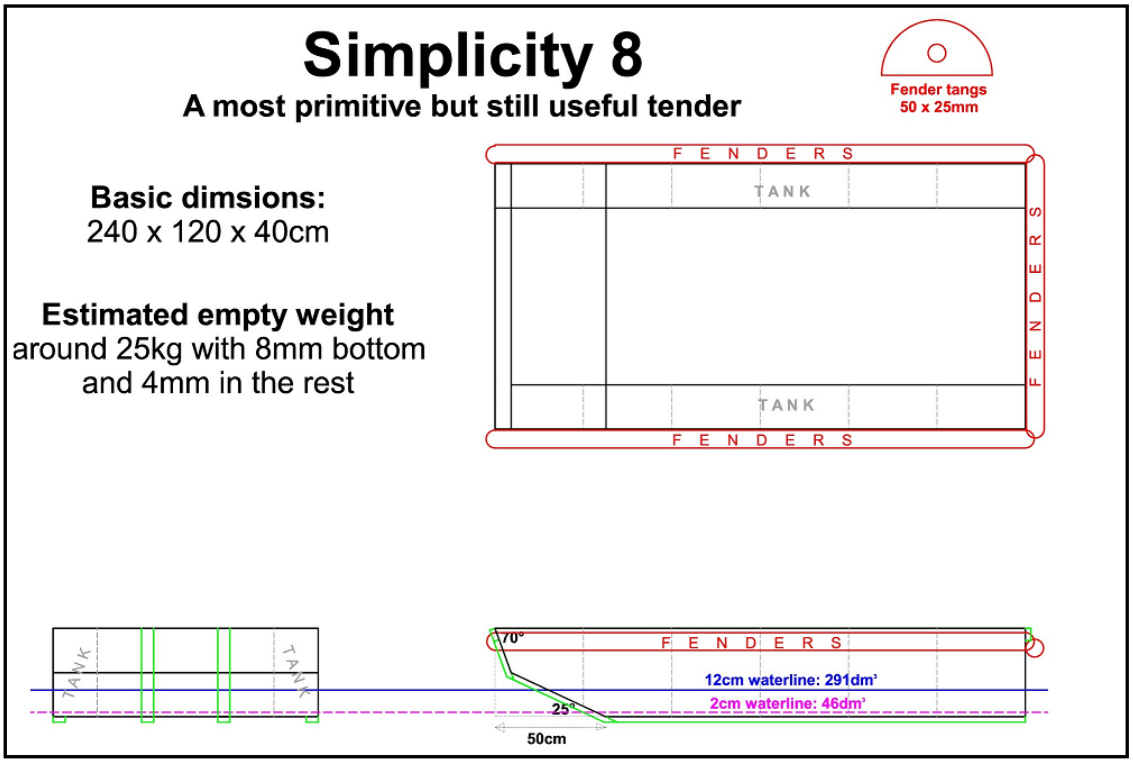
Designer's Comments: When David Tyler showed us his inflatable tender for sale, I thought to myself: "How bad can one make an 8-foot plywood tender and still make it row better than an inflatable?" So, I started with a clean file and drew up a box measuring 2.4 x 1.2 x 0.4m. Obviously, that thing would protest if towed at speed, so I adjusted the front panel a bit, but that was all I did. For the sake of strength and safety, I added two tanks, set 20cm inside of the topsides (with a few bulkheads in between).
A row of 80mm fenders around the gunwale will both act as fenders and as stout spray-rails to keep waves from climbing on board.

Advantages:

- Maximum stability and carrying capacity compared to length and beam.
- Minimum draught.
- Super-simple construction. That thing can be assembled right side up on a flat floor or table, using one's favourite glue, paint and techniques. No bending of wood.

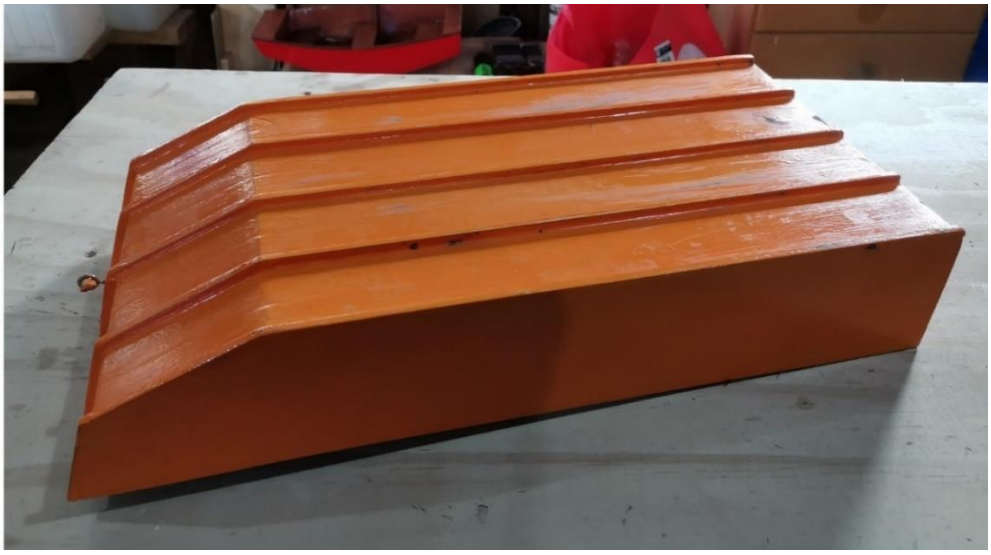
Disadvantages:

- Less than sublime rowing characteristics - but still better than most inflatables.
- Not the most sexy look...



[David Tyler comments: I think that in your S 8, you've succeeded in designing a dinghy worse than any inflatable, unless equipped with a motor large enough for planing.
Add some rocker, to get the transom out of the water, and it becomes tolerable, but still not good. The one I built like this had a beam of 3ft 6in (I think), which was plenty for stability and load carrying, and permitted the use of 7ft oars that would stow inside the 7ft 9in length (important).]

One fifth scale model of **Simplicity 8**



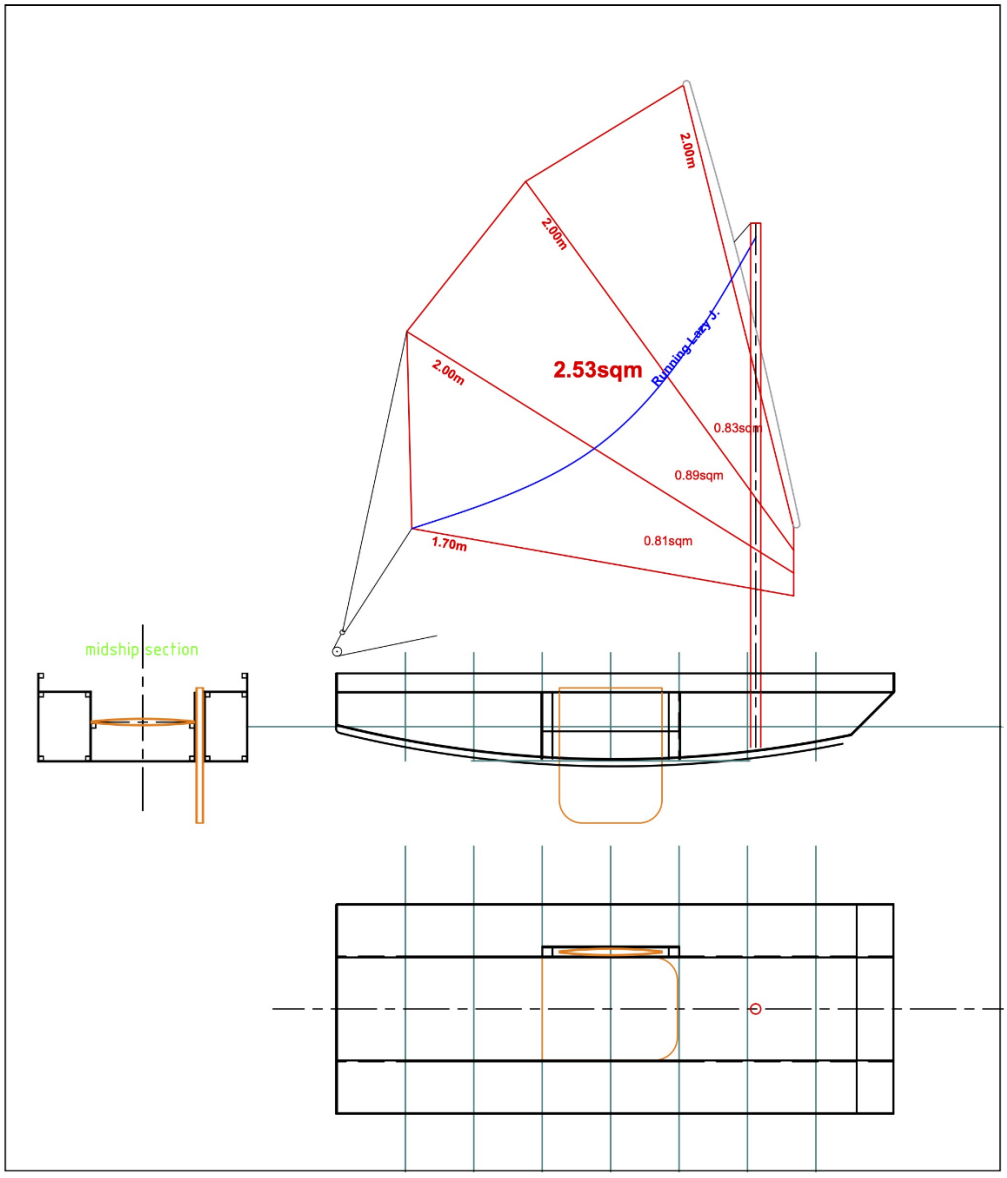
Of course, Arne was never really serious about his box barge. He wrote recently:

Scaled up to 16', it could have served as a self-propelled marina kiosk for selling ice-cream and soda...

14. ***David's Box Barge*** designer David Tyler

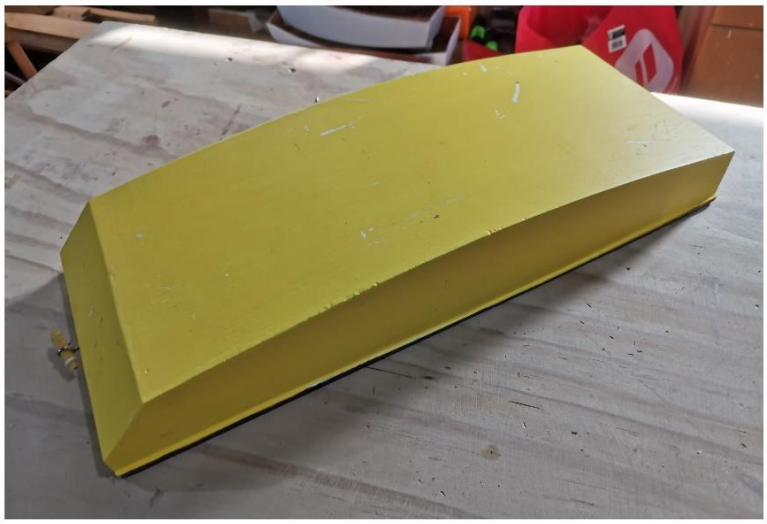
[*Ed: Evidently this was David's reply to Arne's box barge.*
David has made used of Arne's "Halibut Special" sail plan, with slightly simpler sheeting.]

Designer's comments: Horses for courses, yes indeed. I seem to remember that in pre-marina days, boatyards had cuboid boats like this to go a few metres out to moorings, but rowing 100 metres?
I'd want a rockered bottom.
It's interesting to think about what can be done with a boxboat, though.
I find that I can build quite a nice one measuring 8ft x 3ft overall, with long side tanks, using three sheets of plywood.



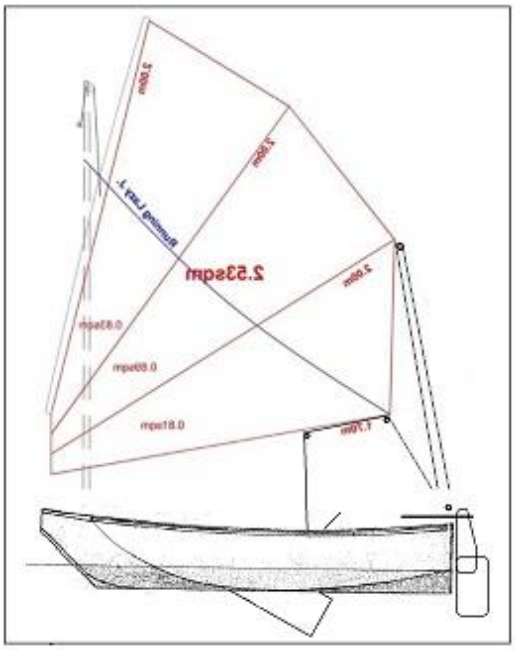
[*Drawings also provided showing layout on three plywwod sheets*]

One fifth scale model of ***David's Boxboat***



15. ***A NZ Scow type*** concept Graeme Kenyon

Comments: I am currently building a NZScow for junk rig, a live-aboard, the hull based on a Brian Donovan design. I thought it might be fun to consider a barge-type dinghy based on the same hull type, which is a kind of box barge hybrid, with a distinctive rising chine, giving a sort of “sharp” (but rather bluff) bow.



There are no plans, but from the original Donovan hull drawing I made a model, and found it performed much the same as the other models.

Maybe it will sail quite well with a swinging off-centreboard and a “Halibut Special” rig.

The hull (bottom and bow) is plywood planked in four pieces, two each side of a strong-back. This is unconventional, but easy to do, and being curved, its strong and rigid when finished.

Some fairing/bevelling of the cleats, near the forefoot and “stem” – and on the fore part of the chines, is now done with a chisel and plane. A straight-edge between stem and chines is used for a guide for this bevelling of the fore part of the chine (see straight lines drawn on photograph below.) This is the only bevelling or even slightly challenging joinery in the build.

Explanation: this wrapped-around surface, which is marked with straight lines, is part of a cone.
(In a larger vessel this section could be cross-planked with planks which are tapered and not bent at all).

The rest is flat (at the bow) or a simple roll (aft).

Laying the plywood over this simple shape is hard to explain but it’s easy to do. However, that bow/bottom panel is not straight forward to loft. These days people seem to do it with computer software. Otherwise, a cardboard mock-up of the bow/bottom piece may be cut and fitted, to ascertain the correct shape The ply is now cut, glued and fastened to the bevelled cleats. (If the ply is difficult to wrap around the curve, the surface can be score-cut, through the outer layer of the plywood, along the lines shown in the above photograph.

These cuts should be on the outside of the ply, they will open somewhat when the ply bends, and can be filled with thickened epoxy later.)

The more simple, rectangular aft bottoms are cut and fitted, its a simple and easy roll and no bevels are required here. The two bow/bottom and aft/bottom panel pairs are joined with a simple butt strap join, from plywood offcuts.

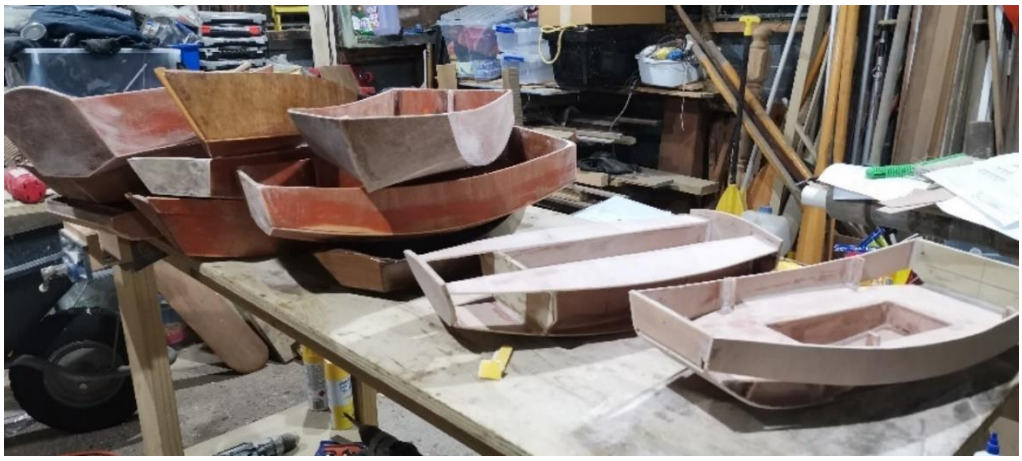
After the bottom/bow is completed, the chines can be dressed with epoxy and fibre-glass bandage, the outside of the hull painted and the hull turned right way up.

One fifth scale model of NZScow

It’s a good shape for laying alongside a full-size scow.
The NZscow I’m building has 9’ beam, so has a 9’ wide transom.

Maybe someday I’ll build a 9’ version to fit in davits, across the transom.

Appendix

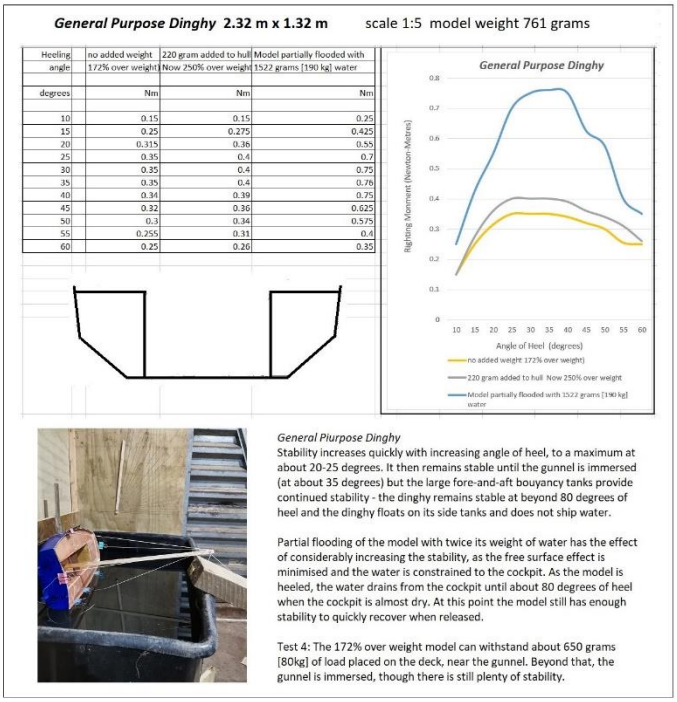


The set of models was made, mainly for fun and to see what the dinghies would look like in reality. An unexpected benefit was some insight into the ease or otherwise of building them.

Just for fun, each of the models was given two forms of towing test, one by tow line, the other with a strain gauge, in moving water Also each dinghy was subject to a test to simulate their resistance to clumsy boarding (an oaf jumping onto the gunnel).

These light-hearted tests enabled some comparisons but should not be taken too seriously. The actual tests may be viewed on the following video clips:

Tow test: https://www.youtube.com/watch?v=M9PFpAM5zUs&t=407s
Strain gauge test: https://www.youtube.com/watch?v=jjhVt5T6s48&t=105s
Oaf test: https://www.youtube.com/watch?v=worESi7dFa8&t=438s



***General Purpose Dinghy* 2.32 m x 1.32 m** scale 1:5 model weight 761 grams

Heeling angle	no added weight 172% over weight	220 gram added to hull Now 250% over weight	Model partially flooded with 1522 grams [190 kg] water
degrees	Nm	Nm	Nm
10	0.15	0.15	0.25
15	0.25	0.275	0.425
20	0.315	0.36	0.55
25	0.35	0.4	0.7
30	0.35	0.4	0.75
35	0.35	0.4	0.76
40	0.34	0.39	0.75
45	0.32	0.36	0.625
50	0.3	0.34	0.575
55	0.255	0.31	0.4
60	0.25	0.26	0.35

General Piurpose Dinghy
Stability increases quickly with increasing angle of heel, to a maximum at about 20-25 degrees. It then remains stable until the gunnel is immersed (at about 35 degrees) but the large fore-and-aft bouyancy tanks provide continued stability - the dinghy remains stable at beyond 80 degrees of heel and the dinghy floats on its side tanks and does not ship water.

Partial flooding of the model with twice its weight of water has the effect of considerably increasing the stability, as the free surface effect is minimised and the water is constrained to the cockpit. As the model is heeled, the water drains from the cockpit until about 80 degrees of heel when the cockpit is almost dry. At this point the model still has enough stability to quickly recover when released.

Test 4: The 172% over weight model can withstand about 650 grams [80kg] of load placed on the deck, near the gunnel. Beyond that, the gunnel is immersed, though there is still plenty of stability.

Finally, each dinghy was given a static stability test and an attempt made to derive stability curves.

Stability reports like this one, for each dinghy, have been compiled into a separate document.