Elizabethan 29 Owners Handbook

Preliminary Edition August 2002

1 Introduction

The Elizabethan 29 is a long-keeled GRP sailing yacht, designed by Kim Holman in 1962. Twenty nine feet overall, she has a beam of seven feet six inches, a draught of four feet and two inches and a waterline length of about twenty feet. Solidly built, graceful and a successful racer down the years she is strong and forgiving to handle and has attracted many devotees.

This handbook has been assembled from the combined experience and knowledge of the members of the Elizabethan Owners Association (EOA), starting in February 2002. After a summary of the Liz 29's vital statistics and character, including some sailing and handling tips for anyone thinking of buying one, there are two chapters covering projects and major repairs carried out by various members. The handbook is continually updated, and all contributions and suggestions are gratefully accepted.

2 Vital Statistics

LOA	29 feet
LWL	20 feet
Beam	7 feet 6 inches
Draught	4 feet 2 inches
Displacement	5.05 Tons Thames measurement, Approximately 3 tons
Mast(s)	main: 30 feet. Mizzen 18 feet
Main	27 foot luff, 11 foot 6 inch foot,
Genoa	182 $feet^2$
No.1 Jib	127 $feet^2$
No.2 Jib	62 $feet^2$
Mizzen	
Spinnaker	

3 The typical Elizabethan 29

This chapter could be quite short, as there isn't really a typical Elizabethan 29. Most of the earlier boats have some things in common with their peers, but all have been modified to a greater or lesser extent and later models, especially home completions, can be quite radically different. Even the Webster built boats evolved in design, with a new mould being produced by 1967. The Elizabethan 29 was also built under license in France, but as yet we know little about them.

The Elizabethan 29 is best envisaged as a long folkboat with overhangs. For those familiar with the Stella, Kim Holman evolved that design to become the Elizabethan 29. She has a long keel with the rudder hung on the after end and angled forwards. The propeller sits in a cut-out about halfway down the rudder. The first rudders were mahogany but later ones were encapsulated in GRP or constructed entirely of GRP. The forefoot is cut away, with quite a fine entry on her spoon bow giving long overhangs fore and aft. With her pronounced sheer, this makes for a particularly distinctive and graceful boat. The earlier boats had an external cast iron keel of 1.4 tons, but later boats had encapsulated lead ballast. The heads of the keelbolts are glassed into the bilges.

The deck moulding incorporates an angular cabin, designed to resemble plywood from the outside, and is usually unfinished on the inside except for a coat (or seven) of paint. There is a modest foredeck and after deck, usually sporting a single central cleat each, with adequate side decks. The deck is bonded to the hull and is covered by a teak capping on the short toerail all round. There are three small scuppers on each side. The cabin top sports handrails as far as the mast step. The forehatch is forward of the mast, and designs vary but the earlier models were wood framed with an obscured Perspex insert. It usually opens aft but may open forward. The main hatch from the cockpit has a sliding top and (usually) three washboards.

The cockpit is deep enough, not too narrow to brace your legs when heeled if you are over 5’ 8”, and self-draining unless there are more than three adults in the cockpit. The cockpit coaming is plywood with moulded and shaped corners. The winches, originally tufnol bottom-action Lewmars, sit on steel-bracketed plinths part way along. There are up to three carved mahogany cleats for the sheets on each side. The wooden seats, usually four of them, lift to reveal deep lockers which may or may not contain batteries and gas bottles. There are usually tanks beneath these, often water but occasionally fuel. There is a large lazarette under the after deck which may contain a small fuel tank, usually 2-3 gallons in capacity.

The basic rig is a masthead sloop with a low aspect ratio main by modern standards. Some 29s were yawl rigged, with a short mizzen mast mounted on the after deck. At least one is cutter rigged. The original rig was a single forestay and backstay, main shrouds via a single crosstree and a pair of lower shrouds. One variation is roller reefing, although the majority of the earlier boats have not succumbed to this. Some boats have twin forestay and backstay, enabling two headsails to be hanked on at a time, although it is not possible to achieve a high luff tension with this arrangement. The mast itself is stepped on a short girder that spans the two internal bulkheads, which are themselves reinforced with steel plates. The shrouds terminate in U-bolts through the beam shelf, or less commonly to external chain plates, the forestay to the bow fitting and the backstay to a chain plate inside the transom.

There was no internal moulding, so bulkheads and furniture were made of wood. The early boats contained a lot of wood, with a glassed in stringer and beam shelf. There is also often a timber deadwood at the after end of the keel, to which the prop-shaft bearing is attached. A length of curved timber is also glassed into the stem. By 1967 Webster’s were using a new mould, and much of this wood may have been dispensed with. Below there are usually four berths in two

cabins. The main cabin has a galley to port comprising a sink and a 2-burner cooker, with grill, along with stowage for utensils. The navigation area is under the main hatch to starboard and the engine lives beneath or behind the companionway steps. Original engines were Petters or petrol Fare Gotas, although Vires were fitted. This was because in 1963 the available diesel engines were considered too heavy for racing. Nowadays you are more likely to find a small diesel, such as the Yanmar, of 8-12 hp. The older Yanmar 1GMs were only 6½ hp, however, that last half being very important! Two berths are on either side of the main cabin with stowage beneath and behind. There should also be lee-cloths for these berths. Two small compartments forward of this house the heads to starboard and a hanging locker to port. Two vee berths are in the forward cabin, with more stowage below and an open cave locker in the bows. The Webster built boats have two side widows in the main cabin, one each over the heads and hanging locker and a forward-looking one in the forecabin.

3.1 Summary of the EOA survey

Prior to starting the handbook, all the Elizabethan 29 owners in the EOA were invited to return a questionnaire to try and establish just what we could expect to find on a typical boat. As I said before, there was a huge variation but the following is an attempt to summarise the replies we received.

Keel: 1.4 ton external iron (1 boat), $1^{1}/_{4}$ ton encapsulated (2 boats).

Rudder: Mahogany plank (1 boat), wood encapsulated in grp (1 boat) or grp (1 boat). Wooden rudders are earlier (up to 1965 or 1966?) and grp later. Encapsulated wooden rudders are probably the original wooden rudders that have been modified by their owners.

Rig: The sloops have a single pair of spreaders and two inner pairs of shrouds. Either a single forestay and backstay (4 boats) with hanked-on headsails (3 boats) or roller reefing (2 boats) or twin forestays and backstays with hanked-on headsails (2 boats). One boat has one forestay and two backstays. The single backstay may have two legs from head height to the deck (1 boat). The main can have one (2 boats), two (0 boats?) or three slab reefs (3 boats)and/or boom roller reefing (4 boats). One boat has in-mast roller reefing. The foresail is sheeted to a track on the toerail (all boats). The 4:1 mainsheet is on a traveller attached to the after end of the cockpit (all boats). There are two sheet winches in the cockpit and one or two halyard winches at the mast. Strong feelings were expressed on the desirability of foresail roller reefing. Those who have it seem quite happy but many of those who don't would not let such a contraption sully their decks. In the words of the owner of Tamarisk (No. 1): "NO! NEVER! Well, at least not until I am REALLY old." Similar sentiments have been expressed about sprayhoods, by those do not have one.

Engine: 7.5hp Yanmar 1GM (2 boats), 7.5hp Arona Nuova, 10hp Ducati, Bukh 10, 13.5hp Beta Marine, 13hp Yanmar 2GM and a 1500cc marinised BMC 4-cylinder diesel. The variation is so great that no comment is really possible.

Propeller: 12-inch diameter, two-bladed or three-bladed (3 and 2 boats respectively). Only one boat knew the pitch, quoting a twelve by nine inch prop., but not the number of blades.

Fuel tanks: 2-3 gallon in the lazarette (2 boats), 20 gallons under the port locker, 5.5 gallons under the port locker, 12 gallons in the lazarette and 5 gallons under the cockpit sole.

Water tanks: two stainless steel 20-gallon under each cockpit locker, two 5-gallon amidships, 30-40 gallons in the keel, 10 gallon under the bunk in the forecabin, 20 gallons under the port locker, 20 gallon (flexible) under the sink (2 boats). We think that on early boats the two stainless 20-gallon tanks under the cockpit lockers were the original water tanks and that the fuel was in the small tank in the lazarette. By 1967 the main water tank was a moulded 25-gallon tank under the cabin sole and the fuel was aft of the engine under the cockpit.

Anchor and chain: Bower of 20lb – 35lb CQR plough or similar, on chocks on foredeck or on the bow roller; chain stored on deck, in the bow locker (2 boats) or in the space between the V-berths (2 boats). Chain ¼ and/or $^{5}/_{16}$, 20-50 metres (nobody quoted the length in fathoms, interestingly enough) supplemented with up to 60m of Octoplait, Multiplait or 3-strand Nylon.

Most of the other answers were similar enough to be summarised in the previous paragraph without the need for further iteration here.

4 Sailing and handling

The Elizabethan 29 is designed to go faster by heeling over and dipping her overhangs in the water. This adds an extra four feet to her waterline length, and it is quite possible to exceed nine knots in flat water, if you hang on to the full rig on a reach in a force five. Most people will reef before then, but she goes fastest when the lee rail is solidly under or, according to Andrew Marshall on Freyja, when you see mullet through the windows. Even when she feels like she has been knocked flat the cockpit will stay dry, and as she rounds into the wind she will come back upright.

In a Force 1 or less you will struggle to get her to move at all. The main and full genoa are ok up to the top of a Force 3. In a Force 4 you change the genoa for the working jib or start to roll in the roller furling genoa and in a Force 5 you tuck one reef in the main as well, especially when going upwind. In a Force 6 you will need a second reef, and in a Force 7 a third although this will give her lee helm. Changing the working jib for the No. 2 will balance her but she will not go to windward very well. You would probably reef a force earlier than indicated, especially when beating, i.e. change the genoa as it gets above F3, etc. She will then stay more upright, and be a little drier with some reduction in boat speed. The original spinnaker is quite small, and is comfortably handled in anything up to a force 4. If you aren't setting the spinnaker then poling the genoa or jib out on a dead run is essential, the narrow beam makes it difficult to get the clew far enough outboard otherwise. Whatever you do she will still roll somewhat.

In "normal" cruising conditions, i.e. force 2-5, she will tack through 95-100 degrees fairly comfortably. Good sails and well-tuned controls will improve this. Like all heavier boats she benefits from keeping her going through the waves, rather than pinching up as hard as you can. Speaking of the waves, the fine bows and low freeboard mean that in more boisterous conditions

she will cut through the waves going to windward, throwing them high in the air so that they land in the cockpit. A sprayhood will make life comfortable but many feel that it spoils her lines.

Under power she is predictable, if not entirely tractable. She carries her way going forwards well, and is affected strongly by the tide, less so by the wind. Reverse will slow her down but actually going backwards in a long-keeled yacht is a hit and miss affair. Prop wash will kick your stern to starboard (RH propeller) so build up a little speed then kick her into neutral. Better still avoid trying to reverse over any sort of distance and especially in a straight line. She will turn quite sharply at slow speeds, going forwards, and the turning point is a little forward of the main hatchway. Coming alongside under power with panache is a matter of knowing what the tide is doing, then going as slowly as she will let you.

5 Problems

5.1 Osmosis

The Elizabethan 29 suffers no more osmosis problems than any other yacht of her era. Boats from the early sixties may suffer from lay-up problems, and will have been built from isophthalic resins which absorb water better than modern ones. On the other hand they are tremendously over-engineered by modern standards and are repairable in even the worst circumstances.

One boat built in 1963 suffered very bad gel-coat loss and wicking in 1987. This was due to a bad lay-up, with lots of tiny voids just below the surface and pinholes through the gelcoat. She was left in the water for two winters and the gelcoat softened so much that it came off with the pressure washer. A lot of the fibreglass had to be taken off and made good, the boatyard said afterwards that if they'd known how deep it had gone they wouldn't have started, but the hull is so thick that she was still afloat with no recurrence fifteen years later. One tell-tale sign of such a boat is tiny blisters and half-moon cracks on the topsides and the deck.

Prevention is better than cure, and a 1960's boat should be taken out of the water for the winter. It helps if you can keep the bilges dry as well, but that is often asking too much! Applying epoxy as a preventative is not recommended these days, it has the effect of sealing the moisture in.

5.2 Rudder repairs

There are two types of rudder: the early boats had mahogany rudders while the late ones had moulded GRP rudders. Some of the wooden rudders have been encapsulated in grp. There seems to be quite a variation in rudder design, either from the modifications over the decades, variations in build between different yards or simply evolution of the design in the first place.

Case 1: Evadne. The rudder consisted of two sheets of mahogany, split with the stock inserted on a spline. An extension piece, not apparently part of the original design, was glued and pegged on the trailing edge with steel straps holding it on. In time, the spline stripped and later the extension piece fell off. A new stock with a large tang was fabricated from stainless steel. To get

this longer stock in, a hole had to be made on the after deck. Although stainless steel is the obvious material for the job, it needs to be carefully checked for crevice corrosion on a yearly basis.

The extension piece was replaced with 38mm square pieces, glued and screwed onto the rudder then each other then faired down by hand. New steel straps were added but they are probably there to reinforce the confidence in the repair more than the rudder, mahogany laminated with epoxy is more than strong enough on its own. Some years later the strips were seen to have rusted, but the repair had not shifted in the slightest. The finished shape is shown above.

5.3 Keelbolts

On an old boat, a surveyor or insurance company may ask that a keelbolt be withdrawn for inspection. Tamarisk had one drawn after thirty years: it was found to be “pristine” and replaced. Evadne had the same done in her fortieth year.

5.4 Replacing the mast step

6 Projects

6.1 Repairing a blistering deck

The problem:

Small blisters, barely visible, edged by curved or semi-circular cracks, allowed water and dirt to get between the gel-coat and the deck. Eventually these blisters lifted causing huge cavities under the deck paint, leaving holes where the gel-coat cracked away. Impacts over the years further damaged the gel-coat and added to the general effect.

The solution:

As with osmosis of the hull, the gel-coat has to be replaced and sealed over with a layer of epoxy. The recommended procedure from Mr Goldsmith of West Epoxy Systems is to remove the gel coat, or at least the damaged portions, paint the area with epoxy to prime it then fair with a layer of general-purpose epoxy and low density filler. In the end we used SP 106 epoxy (for convenience of supplier) and micro-balloons filler. Both West and SP (made by Blakes) are British-made products and widely available. If the damage is mild, you might get away with removing the paint, painting the deck with epoxy and re-applying the deck paint.

Tools and materials:

For the whole deck, excluding the coach roof you will need about 8kg of general purpose epoxy and 8 cartons of micro-balloons or low-density filler. In 2001/2002 the cost of this was about £18 for 1kg of epoxy and £8 for a 100g carton of microballoons. At least half of the epoxy should be rapid setting, for the priming. The stuff you mix with the filler can be either, although below 12^{o}C I'd suggest you use rapid hardener and above 20^{o}C use the slow. A half-litre mixing pot, even though you never mix this much epoxy in one go, spatulas and gloves (marigolds are better than latex one-use gloves). A proprietary (West systems) flexible spreader is worth the investment, even if it seems a lot of money for a small square of flexible plastic. Both West and Blakes make a set of pumps for their epoxy containers, which make life a whole lot easier, but if you don't get these then you will need some disposable measuring spoons. Scraping: a heavy-duty two-handed scraper such as the Sandvik 450 with at least six spare blades and safety goggles (essential). A drill with a wire cup brush or an abrasive disc. Acetone. Oh, and a brush, pan and a plastic bag without any holes in it.

Method:

It is important not to bite off more than you can chew if you want to complete a section in the spring before launching. A third of the deck, from the bows to the sheet winch can be completely scraped in about six to eight sessions of 1-2 hours each, one of which is all an ordinary mortal can expect to do in one day. This will use about 2kg of epoxy and two cartons of microballoons.

Scraping off the paint is less strenuous and if two people are working at the job, the less muscular one can scrape the paint off first. This is worthwhile as it makes removing the gelcoat much easier. To remove the gel-coat, put your full weight onto the scraper and dig the corners

into any imperfections. Bits of gel-coat will fly everywhere. If there are any black markings on the surface, the gel-coat underneath will usually have to be removed. Dig into the gel-coat that hasn't deteriorated next to the blisters, but large areas of sound gel-coat need not be removed unless you have time and energy to spare. Score these large areas to help key in the epoxy coat. Use a dust-pan and brush to sweep up the large quantity of plastic and paint flakes as you go along, or it will get everywhere. Mind you, it will anyway.

Once the bad gel-coat has been removed, abrade the surface with a wire cup-brush or abrading disc to remove any black bits, loose paint etc. Then hoover and sweep the deck to remove the last flakes of gel-coat and paint.

The epoxy should be applied on a warm, dry day. Heat is needed to help the epoxy to set, and rain will ruin everything. Temperatures below 12^{o}C are probably too low. Our coat was applied on a warm April day at about 15-20^{o}C. On the day, give the deck a final sweep and degrease it with acetone.

After de-greasing the deck is first primed by painting it with a thin coat of epoxy. This will use about ¾ of a kilogram. In areas where not much gelcoat has been removed, this epoxy coat will be all you need. This coat is allowed to get just touch-dry; in warm spring sunshine this will take 2-3 hours. Use this time to plan out your work area, remembering you can't kneel on the deck you've just primed, and make sure everything is to hand so you don't have to search for things with epoxy-covered hands. Microballoons are then mixed with batches of epoxy and spread on the deck. Microballoons are microscopic glass balls, so only open the carton inside, or they will blow everywhere. As with all epoxy work, follow the instructions and do not mix too much at one time. The approximate amounts are $^{1}/_{3}$ of a 100g carton to 200ml of epoxy. This is a comfortable amount to work with. The pumps deliver about 5ml per push, so 40 pumps of epoxy to 8 pumps of hardener obtains this amount.

According to both manufacturers the three consistencies of epoxy and fairing are "ketchup", "peanut butter" and "mayonnaise". You are aiming for peanut butter. Getting the microballoons into the mix will delay setting, as will spreading it thinly so lay the mix on the deck first then level it with the spreader. Work fairly quickly, the mixture becomes "draggy" like a drying paint within 10 minutes or so. We found that you can get it nearly smooth enough with the spreader to reduce the need for sanding out marks and ripples to almost zero. You are aiming to get a layer of epoxy and microballoons the same thickness as the old gelcoat, so the areas of unscraped gelcoat provide a height guide for the spreader. Once one load of epoxy is spread out satisfactorily, do not delay in mixing the next batch.

If for some reason you can't complete in one day, you should let the epoxy priming layer cure, sand with wet-and-dry and proceed with the fairing layer as above.

6.2 Fitting a rubbing strake

The Problem:

The join between the deck and the hull was originally capped with a moulding which covers the fibreglass joint but is essentially decorative. It is quite thin on the sides and contact with pontoons and other boats over the years will cause it to crack and bits to break off.

The Solution:

A rubbing strake, a strip of mahogany or similar hardwood is fitted along the top of the hull to provide protection. This is stronger, and will provide protection as well as looking better.

Tools and materials:

A block plane, 1" chisel, battery drill or mains drill and extension, screwdriver bits, a cross-cut saw, a No. 8 plug drill or a large number of No. 8 hardwood plugs, as many G-clamps as you can lay your hands on, size 8 x 1" long stainless steel self tapping countersunk screws, long tape measure, pencil and ruler, epoxy glue. A portable workbench ("workmate") and a step ladder. Mahogany, 1½ " x ¾" (38mm x 18mm), approximately 17 metres total length.

Method:

It was decided that the strake should run along the length of the toe-rail capping, leaving the corner mouldings at the bows and transom intact. The hardwood used came in lengths of 2.1 metres, bought from B&Q and chosen mainly for the reason that they fit easily in the car. A timber merchant will probably be able to supply the wood at the same price or cheaper, and you may get a better choice of wood. If it isn't already planed, you will need to look for pieces with straight grain. Four and a half lengths per side were needed, and the offcuts were used to make the plugs from. A spare length was needed when one cracked while bending it.

The existing capping was planed flush with the hull using a block plane. Starting at the bows, the first length of mahogany was clamped in place. The positions of the screws were marked, so that they avoided the screws holding in the old capping and the genoa track. The end at the bows was chamfered, so that the forward end was flush with the existing moulding. The join was cut and planed at a shallow angle to make a scarph joint. The cut face should be outboard. Before putting in place, the angle of the join was scribed onto the next piece of wood to make the other half of the joint.

Each screw hole was drilled, a pilot hole all the way through and a counter-bore to half the

thickness of the wood. The wood was clamped in place and the pilot holes were drilled through into the hull, being careful not to go all the way through! The wood was removed and epoxy glue was applied to the planed capping. The wood was then re-applied using the clamps, driving in the screws to draw the wood into place. An assistant is desirable to hold the other end as you start, and an electric screwdriver is an even greater boon. You will need at least three clamps for each length to start with. Excess glue running down the hull is removed with a cloth and solvent (white spirit or acetone) before it sets. The second piece of wood is fitted in the same way, except that the scarph joint is cut at both ends. The join to the length already in place is cut and planed, offered up to the boat and more wood planed off as needed. When the second length is screwed and glued in place you will need a clamp to hold the scarph joint together, or two if you have cut a longer joint than I did. It is important to make the joint without any gaps for the finished strake to look continuous. The photographs show the moulding before any work was done and the new strake being fitted.

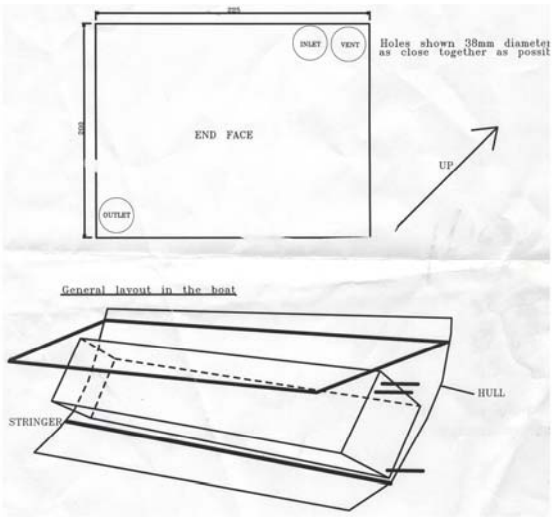
6.3 Fitting a holding tank

The problem: The original sea toilet is considered to be unsociable in crowded marinas and distinctly unfriendly in harbours or at beaches or where people swim or sail.

The solution: Fit a holding tank that can be pumped out in open water.

Tools and materials: A tank (see below for dimensions). An electric pump capable of handling solids. Woodworking tools: drill with hole saw, X metres of 38mm sanitary tubing, X stainless steel hose clips. A "Y" valve for 38mm tubing. 1.5mm^2 Copper wire (tinned for preference).

Method: The tank was fitted into the space beneath the starboard Vee berth and holes for the hoses drilled through the bulkhead. After quite a bit of measuring the rectangular "A" series tank number 208011 from Tek-Tanks of Four Marks, Hampshire was identified as one that would fit. It has an end face 225mm x 200mm. They come "as is" which means that you have to specify where you want the pipe fittings put. They are very helpful and will advise you, and we opted for three: inlet, outlet and vent. All were specified as the same size (38mm) and all were put onto the end face. The tank is placed against the hull, so the bottom corner is the position for the outlet, the top corner is the position for the vent and the inlet was placed as high as was possible as shown in the diagram.



The bunk slats and athwartship supports were unscrewed, or drilled out where the screws snapped or were corroded. The tank is designed to rest on the stringer and is stabilised by a 1" by ½" batten under the inboard corner. The

bunk support has a vee cut into it and fits snugly on top of the tank. The holes in the bulkhead (to the heads compartment) were marked out by dropping in the tank and moving it as far forward as possible. The pipe ends were drawn around and the tank removed. The holes were cut with a hole saw and finished with a router where necessary. The tank was re-fitted and the bunk supports replaced. A further block of wood was screwed onto the under-bunk supports to stop the tank from sliding forwards.

The plumbing was unashamedly cribbed from technical literature gathered at various boat shows from Tek-tanks and others. The toilet outlet enters a Y-valve that diverts waste to the tank or to the sea. The toilet inlet is unchanged (in this case the inlet has a separate pump anyway). The breather goes through a charcoal filter unit to a swan-neck on the deck by the mast step. The outlet goes via an electric pump to its own seacock. The pump is……

6.4 Adding a sprayhood

The Problem: Creating shelter from the spray thrown up as the boat cuts through the waves when sailing close-hauled.

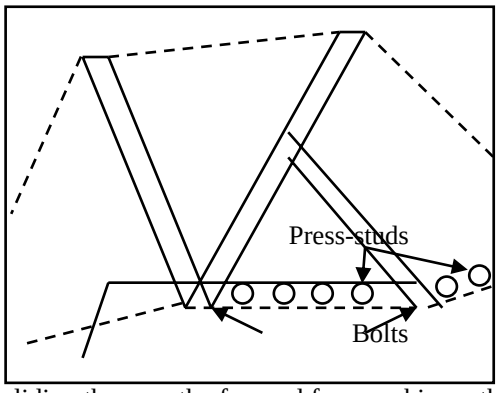
The Solution: Build a sprayhood.

Tools and Materials: 4m of acrylic canvas, 1 reel of sailmaker's thread, 6m of 15mm stainless steel pipe and a plumber's bending spring. A sewing machine with size 20 needles. Stainless steel bolts, washers and/or fittings as described in the text and photographs. Normal shop-bought thread will perish in less than two years, so get the same thread that a sailmaker would use for this job, ask when you buy the canvas. They are usually very helpful and willing to sell you anything you need.

Method: Precise measurements are not included here because this is a summary of two sprayhood designs, illustrated here on the yachts "Andani" and "Cyano". The basic design is two curved frames in a "Vee" formation to support the main structure with provision for tensioning both the front panel and the side panels. On Andani (photo, below left,) the forward pointing frame tees onto the after one whereas on Cyano (photo, below right,) the frames are

independently attached to the coachroof. In both cases the forward frames are secured by fabric loops to the roof of the sprayhood. The forward fabric edge on Cyano is secured to the coachroof with press-studs (sketch, below, left). On Andani a cord runs through the hem and is tensioned by a shock-cord passing under the grabrail (photo, below, right). The latter method tensions the edge

evenly but would not work on a yacht without a hatch garage. Cyano has press-studs placed on the hatch in the open position, but reports they remain redundant after several seasons' use. Andani's sprayhood is tensioned by sliding the forward frame up on its tee-piece. Cyano's has two forward-pointing support bars that are teed onto the forward frame with plumbing pipe clips,



sliding them up the forward frame achieves the same result. Cyano's side panels are tensioned by tail ropes leading to small clam-cleats on the cockpit coaming. Andani's are tied to fixed points and a webbing bridge from the panel to a lug on the aft frame provides tension (see first photo). In both cases these are used to provide an aftwards pull on the fabric as a whole and on the aft frame. The main frames on Cyano are through-bolted to the side of the coachroof. This is a strong and simple solution but if the sprayhood is removed the holes need to be plugged. Andani's fit into a stainless steel bracket, with an end-piece held in by a clevis pin. This allows the sprayhood to be folded flat or removed entirely, but the two fittings take the full weight of the sprayhood and any stresses imposed on it, so backing plates should be fitted. The fittings would also need to be bought from a sailmaker (who also makes sprayhoods) or other source or specially manufactured. The choice of windows is up to the builder, although Cyano reports that one large window would have probably been better than two. The height is also a matter of choice, but ensure that the boom will never foul it in normal use, and give some thought as to what happens when the topping lift is let go. A boom strut in place of the kicker may be a good investment here.

Having decided on your design, carefully measure your attachment point separation and chalk out the profile of your main frames on the ground. Use the plumbers spring to bend the pipes to shape, offering the frame up to the coachroof at intervals until the desired shape is reached. Stainless steel work-hardens quickly so avoid bending it back and forth to get the shape. Try wrapping the pipe in cloth and bending it over your knee, rather than using a vice. This will help you achieve the large radius ends required. VERY IMPORTANT: attach a wire or rope to the spring before inserting it, or it will become irretrievably stuck. You can only get it out because its diameter decreases as you pull on it, the diameter of the pipe having warped or decreased on bending. If you are attaching the pipes directly to the coachroof sides, gently flatten the ends in a vice (practice on a scrap piece first) before drilling. Also, use rubber washers to prevent crushing the pipe, and stainless steel washers on the inside of the coachroof.

Drape the canvas over the assembled frame and mark where the first seams will go with tailor's chalk. You will end up with two banana-shaped panels, but allow plenty of extra for the seams on all the edges. Sew them together. You will find that even one of the small £100 electric

sewing machines will sew through two or three layers of standard weight canvas without too much trouble. Then drape the canvas back over the frame, the forward bar on the join. Mark where you want the after frame to be on the canvas with chalk, and measure the size of the side screens and cut from the last of the canvas. Attach them to the main cover and make the seam in the roof for the after bar to thread through. The forward seam either houses the tensioning cord or has the press-studs attached through it. Sew a pair of canvas loops across the seam to secure the hood to the forward bar. Where the canvas may chafe, for example over the grabrails, leather patches may be added (e.g. from an old handbag). Stick on with "Uhu" or similar glue then sew in place. The side screens are what holds the sprayhood in shape, and they also take the most wear in use. On Cyano an additional bar was inserted between the two main frames after it was assembled to provide extra tension. Other finishing touches include the wooden extension pieces (see 2nd photo of Andani) to bridge the gap between the hatch and the coachroof.

It is possible to add the window(s) yourself using a modest sewing machine and a size 20 needle (plus spares!). Obtain sufficient $^{1}/_{8}$" (3mm) clear acrylic from a sailmaker. Cut to shape allowing a 2" (50mm) overlap. Cut the aperture in the canvas and glue the window in place. Cut the corners of the canvas and fold it back. Sew together: you will need the size 20 needle to stitch through the acrylic and two layers of canvas! As with all the other seams, a double row of stitching at least is recommended. If you find you are struggling, this (or any other part) could be made up for you by your friendly local sailmaker.

6.5 A new cockpit grating

Problem: Even the best teak grating can deteriorate beyond redemption, when you need to replace it

There are a number of approaches, depending on your ability and financial ability. Starting with the most expensive, but easiest, there are several companies that will make you a custom-built grating. These will cost between 50p and £1 per square inch. All you do is measure the space (it is vital to get it right, so "measure twice and cut once"). Try the London, Southampton or other boat shows to get a bit of discount. Many companies, but notably the Onward Trading Company, (Shamrock Quay, Southampton and various other outlets) will sell you a kit to build your own. The expensive bit is the frame, so if it is just the grating itself that has gone, this is a more cost-effective option.

If you have to replace the whole lot, and don't want to buy ready-cut bits, you can make it all yourself. If you can't afford or get hold of teak, mahogany is a perfectly adequate substitute. Make a frame from 3" by 1" (planed) timber, use a half-lap joint at each corner (or a tenon joint if you're feeling adventurous and your carpentry skills are up to it.) Glue with araldite or other epoxy glue. Make the strips from planed 1" by 1" wood. Cut each join to ½" deep and chisel out. Leave 1" between joins. A routing table or bench-top circular saw will make this much easier. Make the grating 1" bigger than the inner size of the frame all round. Glue it together and lay it on the frame. Mark and cut a half-lap joint into the frame for each end, and glue in with epoxy. You can then oil or varnish as required.

The grating should be held in place in the cockpit to avoid it floating away in the unlikely event of a wave washing into the cockpit. One method is to have pins that push sideways into the wooden strip that runs the length of the cockpit. Another is short lengths of wood, ½" x ¼" x ¼", screwed at intervals to the wooden strip near one end that are rotated to prevent the grating from lifting. You could screw the grating down directly, but lifting it for cleaning the cockpit sole, accessing the hatches or retrieving small change will be inconvenient at best.

An alternative design that is slightly less demanding of carpentry skills is to make a duckboard-style grating with longitudinals only, as shown on the left. You will still need to make a snug-fitting frame, to join the grating to it with half-lap joints and epoxy and to secure it to the cockpit, but you will avoid having to cut and glue 77 half-lap joints (as shown above). Use larger section than for the traditional design, 1½" by 1". For a grating that is all or most of the length of the cockpit fit one or two supports at intervals along the frame.

The type of design which has 1" square longitudinals and 1" x $^{1}/_{8}$" lateral strips glued or held in by panel pins is not recommended, it takes less wood but needs just as many joins, and the laterals are prone to damage.

6.6 Modifications to make life easier

6.6.1 Washboard windows

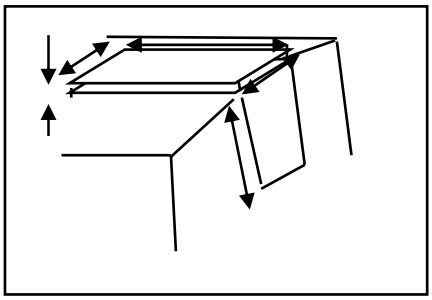
If you have ever sat inside the boat with the hatch closed and the washboards in place, you will know how gloomy it can get. (It's usually raining from a black sky at the time!) Fitting acrylic windows as shown lets more light in. The acrylic is cut to shape and an aperture ¼" smaller is cut in the washboard. The window is held in place with sealant and a length of ¼" section hardwood can be bent around and glued in to hold it in place. The four holes in each washboard are for lashing lines to hold the boards in place.

6.6.2 Main hatch cover

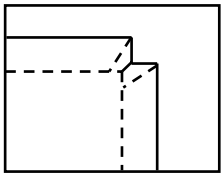
Problem: Keeping out the rain when the hatch is shut but the washboards are out, and waterproofing it generally.

The solution: A hatch cover with an integral "roller blind"

Materials and tools: 1.5 metres of acrylic canvas, sailmaker's thread, 2m of ¼" shock cord, a small sewing machine, a short length of $^{3}/_{8}$" (10mm) dowel, 2m of soft string, 2m of 5mm (or similar) braidline, $^{3}/_{8}$" eyelets and tool, six 1" x 6 brass round-head screws, one turnbuckle-type fitting. Note that shop-bought thread will perish after a couple of seasons, so get the thread when you buy the canvas.



Method: The cover and blind are made separately. Hatches can vary, so I'm going to cop out and tell you to measure your main hatch as shown on the left: Chalk out a rectangle of canvas to slightly greater than the area of the main hatch then add the depth of the hatch and 2" of seam to each side. As you will find later, this seam wants to be as big as possible although it can't be bigger than the depth of the hatch. Cut out each corner as shown on the right, then sew the short edge leaving a small seam inside the cover to make a large, flat lidless box. Put two small eyelets into the centre of the forward edge, as near to the centre of where the long seam will be. Now sew



up the long seam all the way around and thread the shock cord through it, exiting at the eyelets. Put a knot in one end before you thread it through, and do heat seal the ends. Use a knitting needle to push it and work it along inside the seam, and fine-nosed pliers to pull it back through the eyelet. It is not easy.

The “blind” is made to the dimensions shown. A pocket is made near the lower edge for the dowel to slide into, the ends being sewn shut. The lower flap is secured on the washboard tie-down point. On most Webster’s boats this is a central metal turnbuckle type fitting (as often found on sprayhoods, etc.). Put three sets of small eyelets evenly spaced down the side seams.

Next attach the blind to the main cover. Sew the blind to the inside of the cover; to the outside sew two small loops of soft string (attach to the inside of the main cover). To the inside, sew two lengths of soft string in the same place as the loops (hand sewing is easier here). They should be just shorter than the blind itself. Now attach a length of 5mm braidline down the sides. Sew it to the top, then pass it down the outside to the first eyelet, through it and back out through the next to make a small loop. Repeat for the other two pairs then sew it to the lower hem, as tight as you can without creating any bunching.

Now put the cover over the main hatch in the closed position. Pull the shock cord as tight as desired, knot the end and trim. Fix the lower edge to the turnbuckle (or however you have chosen to fix it). In the edge of the washboard slides, exactly halfway between the eyelet pairs, make a hole with a bradawl and screw in a brass roundhead screw to leave ¼”- ½” sticking out. The braidline will loop over this and holds the cover down in any wind. The blind will go a long way to making the standard hatchway watertight, and if it rains on holiday, you can keep the rain out without putting the washboards in.

6.6.3 Extra scuppers

The Problem: Insufficient provision in the way of scuppers, only two per side usually.

The solution: Add some more, especially at the stern and bows.

Materials and tools: Power drill and 22mm carpenter’s drill bit, 22mm white plastic conduit, epoxy glue (araldite), Stanley knife.

Method: Drill the extra holes from the deck side out, angled downwards. Be especially careful as the drill bit comes out on the other side. Mark where you want the scuppers before starting, so that they are evenly spaced. Remember that the join you are drilling through holds the boat together, so don’t add too many holes or put them too close together. Cut a short piece of conduit to length, and trim it in-situ. Evenly coat the hole with araldite, and slide the tube into place. Finish trimming once the glue is dry. This modification is especially useful ashore, to prevent puddles forming if the boat isn’t chocked perfectly level.

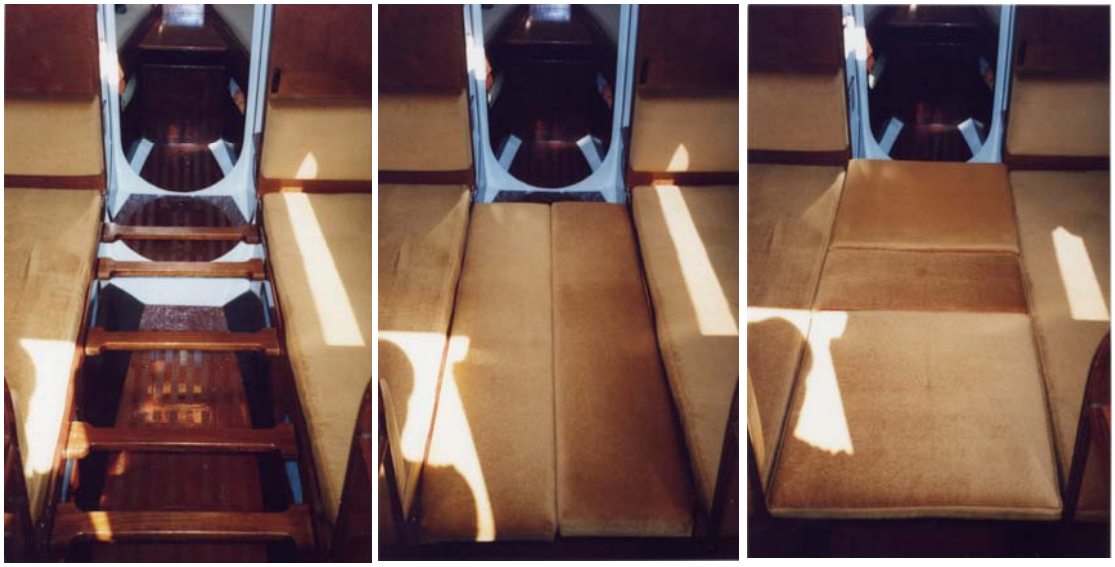
6.6.4 Convert the hanging locker to a cupboard

The hanging locker in the middle of the boat is of limited use, especially if you only sail in nice weather…. Two conversions are shown, one, on Andani, to a set of shelves for clothing. In

this boat the door is hung on the heads' side. The hull-side of the shelves is lined with polystyrene insulation to cut down condensation. The front of each shelf is faced with a deep fiddle, varnished to high gloss. On Evadne the door is on the cupboard, the new (china) toilet bowl protruding too far into the boat to accommodate a door. The hanging locker has been converted into a larder, being one of the coolest spots on the boat in hot weather. Small shelves with fiddles and shock cords against the bulkheads house tins and jars, the central area houses a spare 5-gallon water container and picnic-style cool bags. Everything is painted with white gloss, using Toplac or similar for preference. The top shelf is for toilet rolls etc., the bilges for fruit juice, wine and beer. A 3-way coat hook is mounted on the bulkhead aft of the larder for wet weather gear.

6.6.5 An athwartships berth

Here the port trotter box has been sacrificed to recess the cooker. A series of small wooden blocks support the slats across the companionway. The seat backs sit side-by-side on these and a set of cushions (stored in the starboard trotter box) form the rest of the mattress. This makes a 6'-plus length double bunk athwartships.



6.6.6 A forehatch curtain

Screw four small ($^1/_8$") brass eyes into the underside of the forehatch frame. Cut two lengths of net curtain wire to 1" shorter than the distance between the eyes and screw a brass hook into the end. Make a square curtain to fit between the four hooks, with a seam at each end for the curtain wire and enough width to tastefully pleat it. Voila, privacy for those inhabiting the forecabin without having to close the hatch. It even keeps the dew off you.

6.7 Modifications to make your boat more beautiful

6.7.1 A new toilet seat

A laminated seat and lid engraved and varnished:

6.7.2 Wooden window frames

A frame is made up from thin laminates of hardwood, bent around a form and glued. The ends are joined with finger joints along the straights to the underlying frames, the whole being varnished before fitting:

6.8 Assorted pictures of interiors and cockpits

Clockwise from top:

Main and fore cabins (Andani)
Main cabin and hatchway (Evadne)
Chart table(Andani)
Galley (Andani)
Single Cockpit seat (Andani)

Appendix 1: The 1963 Brochure