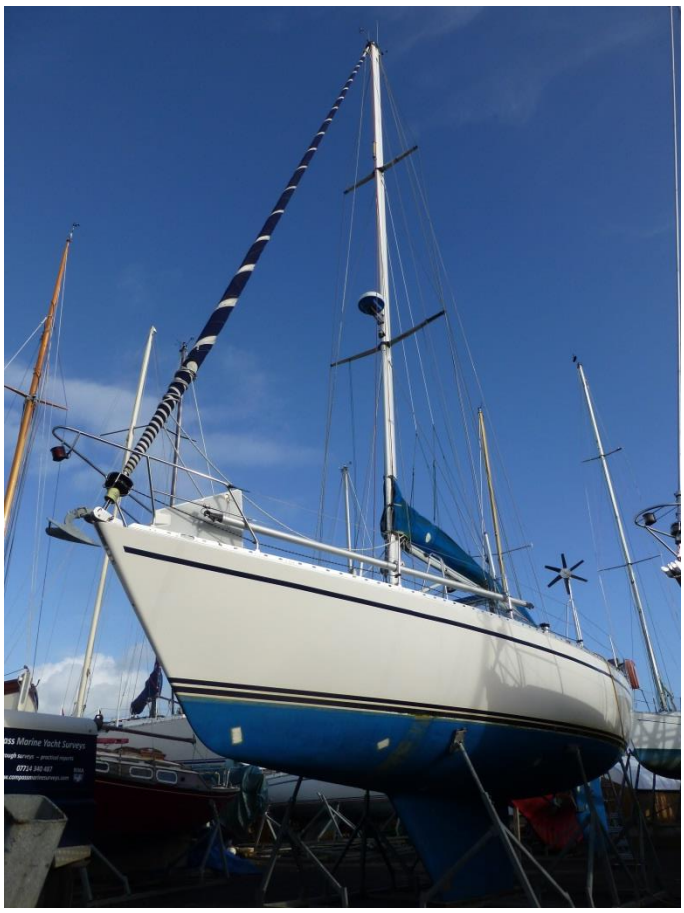
Pre-purchase Survey of Yacht ‘Dxxxxx ’ – 1991 Moody 376



Report number 021401

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General Notes

Survey carried out on **30th January and 2nd February 2014, ashore** at …….. (and on a sea trial on 19th January 2014) at the request of: **Mr ……..,** (the **Client**) by the surveyor: **Andrew Edmond, Compass Marine Yacht Surveys (www.compassmarinesurveys.com) .**

Recommendations and suggestions defined

Recommendation (Level A) - Items that should be addressed before vessel is used and, or, which may affect insurability. They relate to defects with a high risk of failure and moderate to serious consequences for the safety of the crew and the vessel.

Recommendation (Level B) – These require attention in the near future or a given time span and in this case before departure on an offshore passage. They pose less imminent risk but are likely to cause problems in future, with moderate to serious consequences for the safety of the crew and, or, vessel.

Suggestions may also be made regarding items that may lead to impaired safety or value in the future. Some suggestions may only have consequences for appearance or comfort of crew. These can affect value.

Where recommendations or suggestions have been made, quotations for the work should be obtained and any significant work checked by a competent person once carried out. Whether or not a recommendation or suggestion is made or at what level, there is no guarantee that an aspect or component will not fail unexpectedly.

Conditions of Survey

The vessel was examined ashore having been lifted three days previously and was also seen on a sea trial and at lift out. The Sovereign Moisture Meter's calibration was checked before taking moisture readings. The conditions when readings were taken were adequate. Details were as follows:

Air Temperature: 9.9°C
Surface temperature: 6.4°C
Relative Humidity: 61.4%
°C above Dew Point: 5.4
Precipitation: No precipitation

Please see Section J for more on moisture readings. Please see Section L on scope and limitations.

The mast was stepped so could only be inspected from deck level. Any defects found above that level were seen using a high definition x20 optical zoom camera. This does not allow full examination aloft.

The vessel had no epoxy coating and was seen washed down.

The survey included a visual inspection of the engine and installation both when stationery and when running under load (during a sea trial).

The survey and this report also take into account **certain comments made by the Client** prior to the start of the work in particular, the vessel was intended for a five year circumnavigation of the world. Although a pre-purchase survey, the client did not require a valuation.

Before the inspection ashore began the hull around the shoring and keels was examined for evidence of distortion.

No special conditions affected the survey other than as mentioned in the text.

Summary and recommendations

The hull and deck were generally in good condition with low moisture readings in most places and little indication of damage or repairs. There were two scratches close to the waterline and one may have let moisture into the laminate below. Through-hull fittings below or near the static waterline (other than exhaust and transducers) were all brass except one that was nylon. Two skin fittings below the waterline parted during the survey. All skin fittings and valves need replacing including the nylon fitting. It would be prudent to re-seal a number of deck fittings to maintain the deck's condition.

Keel studs, nuts and backing plates needed cleaning off and re-assessing with possible replacement of one or two and recoating of the remainder. One keel bolt should be drawn for inspection and the join needs re-sealing externally.

Talurit fittings on the steering cable in the pedestal needed replacing. Given the pending ocean passages, it would be prudent to draw for inspection the four bronze fastenings securing the half-round fitting around the rudder stock and the seal at the top of the rudder stock needs replacing. Some other minor work was needed to the steering.

The companionway steps were loose at the top, guard wires need some attention and no jackstays were fitted. The teak in the cockpit was in poor condition and checks are needed to ensure no water has penetratedg the cored areas (there was no access during the survey). The acrylic on all deck hatches and two of the opening portlights needs replacing and cotter rings at a number of locations need replacing.

Sails and spars were generally in good condition though the 'storm sail' may be too large and inspection of the mast and spreaders as well as replacement of standing rigging is recommended. Some lines were frayed, there was a problem hoisting the main sail, one winch was seized and chain plates need exposing below for inspection.

The engine and fuel installations were in fair order though there were possible defects with the drive belts and emulsified water in the coolant and both need further assessment. Delamination on the engine bearers needed repairing. The cutlass bearing and stern gland needed replacing. The main anode was not electrically connected to the engine or propeller shaft and a new shaft anode was needed.

The fuel filler unit and some fuel hose needed replacing. It would be prudent to re-coat the mild steel fuel tank.

Minor work was needed to bilge pumps and main anchor cables and new chain is recommended. There was no kedge anchor. At least three new fire extinguishers were needed in the accommodation and the automatic Halon extinguisher in the engine compartment also needs replacing. The liferaft was in need of a service and the radar reflector needed replacing. Additional navigation equipment will be required though comprehensive advice on this is not within the scope of the survey.

The gas system including the cooker and diesel heating needed attention. There may be a current drain on the service batteries or they will need replacing. The fresh water filler unit needed replacing and the pipework needed minor attention.

Cosmetic appearance was generally good both externally and below decks.

Recommendations

Clicking on a recommendation with the 'Control' (Ctrl) key down will take the reader to that part of the report.

Hull

Through Hull fittings (Level A) – *Before re-launch, replace skin fittings, ball valves, tail pipes and clips for forward heads inlet, engine inlet and nylon skin fitting for the engine raw water siphon loop vent and calorifier expansion valve, ideally with bronze, otherwise with DZR (dezincification resistant brass) and double clips. A valve to be added to siphon loop vent and that hose, plus forward head outlet hose, replaced (the latter ideally with sanitation grade*

hose). Wooden bungs should be located and secured with a line close to each through hull fitting, including transducers.

Deep scratch (Level B) – Scrape off paint by way of the scratch towards the starboard bow to confirm if high moisture readings are in the laminate and not the paint. If necessary, open up scratch as a V and repair to prevent ingress of water to the GRP laminate. In the meantime, a thick coating of wax polish will inhibit ingress. Repair damage to the sugar scoop.

Bulkheads (Level B) – Replace bulkhead through-fastenings wherever they have failed or are badly corroded including to port of the aft cabin/engine compartment bulkhead by stern gland opening. Seal cut section of this bulkhead from water ingress.

Through Hull fittings (Level B) – Replace skin fittings ball valves tail pipes and clips for the remaining ball valves near or below the static waterline, ideally with bronze, otherwise with DZR and double clips. Grind out exhaust tube join to the hull externally to the depth of the cracking, extending around the join into soundly bonded material and repair.

Ballast Keel

Keel Studs and external joint (Level B) – The keel studs, nuts and backing plates should be cleaned of all coatings and corrosion and subject to further inspection, those nuts, backing plates or stud threads found to be badly corroded should be replaced. Those found adequate should be treated for rust, replaced and recoated with flow coat or GRP. The last stud from the stern (forward-most) should be drawn for inspection and a further decision then taken on the remainder. The sealant along the join between stub keel and ballast keel should be gouged out as deep as possible and replaced ensuring the area is fully dry, clean and degreased before reapplying sealant.

Rudder and steering

Steering cable (Level A) – *Before she is re-launched, inspect and if necessary replace both talurit cable terminals inside the pedestal. Have an engineer check the position of the locating pin in the top of the rudder stock.*

Rudder fittings and cable (Level B) – Draw bronze machine screw fastenings on half round section of skeg foot fitting, inspect and replace or renew. Replace seal at top of rudder stock. Take up slack in cables. Replace corroded cable grips and fit the correct way round.

Deck, Cockpit Hatches, Portlights and Jackstays

Main companionway (Level A) – *Fit fasteners (eg screw down or toggle) to secure the top of the companionway steps while still allowing access to the bilges below.*

Guardwires and jackstays(Level A) – *Tighten guard wire lanyards. Fit jackstays.*

Leaking deck fittings, hatches and lights (Level B) – To prevent further ingress of water and potentially delamination and deterioration of the core material consideration should be given to removing, re-sealing the above fittings hatches and portlights.

Cockpit seating and sole (Level B) – Replace missing cockpit locker ladder fastenings. With headlining and sound proofing removed, take moisture readings from below cockpit sole and seating to assess condition of the core.

Hatch acrylic (Level B) – Replace all hatch acrylic (except main companionway).

Portlight acrylic (Level B) – Replace acrylic in the two aft opening lights on the transom.

Guardwires and mast pulpit (Level B) – Release guard wires from spinnaker pole fittings, inspect and replace wire(s) if damaged. Replace cotter rings on mast pulpit feet.

Rig

Back stay (Level A) –*Fit split pin to clevis pin at back stay chain plate attachment.*

Main halyard and frayed lines (Level A) – *Determine the cause of main halyard resistance.*

Rigging attachment points (Level B) – Remove all stem head fitting bolts renew any corroded bolts. Expose and inspect chain plates and bolts renewing any showing signs of crevice corrosion at

- inner forestay
- all four shroud chain plates (cutting access panels to reveal both sides of all - also inspect laminated knee for damage, delamination, debonding from the hull, water ingress or other defects)
- backstay internally. Tighten all backstay chain plate bolts.
- babystay chain plate

Spars (Level B) – Replace all cotter rings with split pins. Open split pin at kicker rod foot. From aloft or with mast un-stepped, inspect spreaders for damage to the leading edges, mast condition and fittings.

Standing rigging (Level B) – Replace standing rigging. Fit correct size clevis pins to shroud attachments. Fit split pins in place of cotter rings. Fit an extra toggle at the base of the forestay and backstay to provide two-way articulation. Remove aluminium protectors covering base of cap shroud and baby stay

Running Rigging (Level B) – Replace all frayed lines.

Storm job (Level B) – Consult a sailmaker to confirm the storm sail is of appropriate design and strength.

Winches and genoa cars (Level B) –Service or replace Lewmar 6 winch on the mast. Replace genoa traveller cars.

Engine fuel system, stern gear and cathodic protection

Drive belts (Level A) – *Identify cause of drive belt squealing.*

Fuel filler (Level A) – *Replace filler unit and drain tank to inspect for water in the fuel. Also check for 'diesel bug'.*

Stern Gland and cutlass bearing (Level A) –*Replace graphite ring in stern gland, check grub screws are holding the stainless ring in the correct position. Replace rubber boot using double clips at both ends. Consult manufacturers before omitting vent or water inlet on stern tube. Ideally, replace the entire unit with a PSS stern gland. Replace cutlass bearing.*

Anodes (Level A) – *Replace shaft anode. Re-establish electrical connectivity between the main anode and engine, gearbox and propeller shaft.*

Engine bearers (Level B) – Repair delamination on engine bearer(s). If the core material or underlying laminate is dry a repair could be effected by drilling and injecting epoxy. Re-attached vent loop to bracket and replace the vent hose with reinforced hose. Replace hose to exhaust elbow and its clips. Flush and renew coolant and monitor for emulsified oil. Replace exhaust elbow. Confirm the temperature alarm is working. Fit second clip to exhaust water trap outlet. Have the engine inspected and serviced by a marine engineer.

Fuel hoses (Level B) – Replace tank filler and vent hose with ISO 7840 A2 compliant hose and replace overbaided hose with ISO 7840 A1 compliant hose.

Safety and other Equipment

Bilge pumps (Level A) – *Secure main manual bilge pump strum box, service both manual bilge pumps, replace automatic pump strum box. Check strum box, hoses and clips on locker pump (restricted access). Fit outlet hose to portable cockpit locker pump.*

Firefighting equipment (Level A) – *Before she is used, the fire extinguisher should be replaced and at least two more added all to at least 13A/89B rating. Fire extinguishers should be serviced annually or replaced every five*

years. The Halon fire extinguisher should be replaced with an appropriate automatic fire extinguisher (FE36 type or other Halon replacement) and disposed of in an approved manner. Consideration should be given to fitting a smoke alarm in the galley and engine compartment. Secure fire blanket in accessible position in galley.

Liferaft (Level A) – *Check purchase date of liferaft and service if necessary. Replace radar reflector. Carry appropriate lifesaving equipment.*

Navigation equipment (Level A) – *Carry appropriate day shapes, ready to rig, and other navigational equipment.*

Anchor cable and windlass (Level B) – Splice warp to chain correctly. Tie off bitter end of warp in anchor locker with a lanyard that could be easily cut through the forecabin hatch. Fit a kedge anchor, chain and warp of appropriate sizes. Protect windlass control cables from chaff. Examine windlass power cable connections below insulation tape to confirm the connections are water tight.

Radar (Level B) Inspect Radar aloft.

Accommodation and on-board systems

Gas system (Level A) – *Fit clip to flexible hose-regulator join. Have cooker inspected by a gas-safe engineer or replace. Secure bottle(s) in locker. Have gas locker drain tested for any leaks into the vessel and, if necessary, repair by accessing through the panelling behind the upper heads unit lockers.*

Diesel heating (Level A) – *Ensure heater air intake is of sufficient diameter and is clear of any exhaust fumes. Re-route heater exhaust away from diesel filler hose and make safe the join in the exhaust hose. Replace damaged ducting.*

Gas system (Level B) – Replace regulator with marine grade regulator. Fit leak detector and gas alarm. Replace copper pipe and secure each 500mm along its length including securing it to the gas locker side and sealing this. Replace flexible hose to cooker. Replace lid seal.

Electrical installation (Level B) – Disconnect battery bank 2 and monitor any drop in voltage to confirm any current drain or replace batteries. Repair wind generator swivel bearing and repair the unit. Replace cotter rings on wind generator stays. Consult a marine electrician regarding the shore power connection. Confirm MCBS and polarity tester are working (when shore power can be connected). Prevent cabling from chaffing eg under forward heads sink unit.

Fresh water system (Level B) – Replace water filler cap unit. Repair water tank level gauge, replace forward shower hose.

The full report should be read to obtain an accurate account of the vessel's condition.

Details of "Dxxxx"

Type of vessel: Moody 376
Designer: Bill Dixon
Builder: Marine Projects (Plymouth) Ltd,
Year: 1991
Yard No. C8670
Serial no/ HIN: "LR BRS 0608 11". Seen on port side of transom.
Registration: UK Part 1: None; Small Ships: None
Lloyds Register Certification (HCC) "BRS 060811"
Construction: GRP hull, deck and superstructure with cast iron ballast keel and semi-balanced skeg hung rudder.
Rig: Masthead Bermudan sloop
Engine and transmission: Perkins Prima 50 HP, indirect cooled with Hurth gearbox.
Propulsion Two blade right handed 17" propeller on 1 ¼ " shaft

Length Overall	37'10"	11.53m
Length Water Line	31'3''	9.53m
Beam:	12'6''	3.81m
Draft:	5'6''	1.68m
Displacement:	16,250 lbs	7,373kg
Ballast	6,500 lbs	2,950kg
Fuel capacity	45 gallons	204 ltrs
Water capacity	55 gallons + calorifier	250 ltrs

The above measurements were obtained from the Moody Owners Association website and have not been checked by me and so no guarantee of accuracy can be given.

A. Hull skin, structure and through hull fittings

The vessel was seen afloat and sitting on her keel on a wooden block in a cradle with three supports to each side. The area of the hull around the keel and the shoring was checked for deflection before the vessel was boarded ashore. None was seen.

A.1. Hull below Waterline

The monocoque hull was constructed of a GRP utilising chopped strand matt and various woven rovings (seen internally). The inner side of the hull skin below the waterline was visible in several places though in most of these places it was coated in bilge paint.

a) Coatings - The vessel had a light coating of soft antifouling which was adhering well. Below the antifouling was a coating of antifouling primer and below that was the white gel coat.

b) Damage – No damage was seen to the hull below waterline.

c) Moisture readings - Readings were taken in Scale A (0-100) of a Sovereign Quantum moisture meter, shallow and deep mode, and scale 1 and 2 (both 0-100) of a Tramex Skipper moisture meter. All scales are relative and **do not** express moisture content as a percentage of dry weight. See section J for more information on interpreting moisture readings.

Readings were taken from 30 areas of the hull, rudder and skeg approximately 100 x 75 mm where the antifouling and primer was scraped off. Additional readings were taken through the antifouling but these were considerably higher and disregarded as the coating had retained moisture since the recent lift out. Readings were taken from these areas within two hours of lift-out and three days later when readings were effectively the same. Compare

these readings to the topsides (normally considered dry) in A.2. (c) where 13 shallow 10 deep (13/10) were the driest readings. These readings can be considered 'dry' for this vessel and the conditions.

Table 1: Moisture readings on the hull

Mode	Range below waterline	Range above waterline
Shallow	17 – 23	13 - 18
Deep	15 - 24	9 - 13

Moisture readings varied little across the hull (see Table 1) and were generally low. Highest readings were on the starboard bilge, and on both sides abaft the forward edge of the keel. The Tramex readings (Scale 1 0-100) were between 10 and 20 with highest reading being found close to the keel and a number of readings of only 10 in the bow, bilges and stern. These readings suggest that moisture levels in the hull are low or medium. Where low there is little cause for concern and where medium there is only a moderate risk of moisture related defects developing.

Readings were higher on the rudder (27 /28 deep being the highest) with no significant difference on the two sides. Here there is now a 'significant' risk of moisture related defects developing (see Section J). However, the highest readings were on the starboard side of the skeg (45 shallow and 28 deep), and two blisters were seen here (see d. below), while readings on the port side were low (18/16).

This pattern was confirmed by the Tramex meter, which reads deeper. Readings were mostly less in deep mode than in shallow. Only one reading on the Sovereign meter was higher in deep mode.

Internally, readings on the hull were 15 shallow, 15 deep (or 15/15) in the cockpit locker; 17/18 starboard of fuel tank; portside keel stub forward of fuel tank 13/15; 32/27 starboard side of the keel stub; below forward bunk 21/14 and 21/16. Only one of these readings was notably high. There has been water in the bilges and readings in a similar position externally were 21/20.

These readings could be expected to fall below 20 if the hull was given a period ashore to dry out. If this is done and if readings fall below 20, a preventative epoxy coating could be considered.

d) Blistering - No evidence of 'osmotic' blistering was found on the hull or the rudder. Two small blisters (<10mm diameter) were seen on the starboard side of the skeg (where moisture readings were highest). These were sampled and found to contain a vinegar smelling substance under considerable pressure and approximately pH 2-3. The blisters were directly under the gel coat and the laminate below was hard.

The above findings suggest that on the starboard side of the rudder skeg, osmosis is active and hydrolysis (the decomposition of the polyester resin by water and water soluble material especially acids) is also active.

While shallow blisters do not significantly weaken the hull, delamination or voids do and can be caused or made worse by the osmosis/hydrolysis. Hydrolysis also weakens the laminate especially when advanced. However any hydrolysis is thought to be very localised in this case and moisture readings were relatively low on the rest of the hull.

Suggestion – Given the very localised occurrence of osmotic blisters and the structural role of the skeg in supporting the base of the rudder, a localised but 'full' osmosis repair should be considered. A specification can be provided should this approach be adopted. It is also suggested that after a period ashore to dry out, a protective epoxy coating is considered.

e) Wicking and gel-coat aeration - Where antifouling and primer were scraped off, none was seen.

f) Voids and delamination - Hammer sounding revealed no indications of delamination or voids.

g) Stress cracking – No stress cracking was found externally below the waterline.

A.2. Topsides

The hull above the waterline (including the transom) is of GRP. The inner side of the hull skin above waterline is only visible in the cockpit locker and anchor locker. There was no rubbing strake. There were two black painted bands at the boot strap.

Findings

a) Gel coat condition - The appearance was generally very good although there were scratches in places. Most notably on the port bow about 300mm above the waterline just aft of the last stanchion from the stern there was a deep scratch in the gel coat about 100mm long. Moisture readings here were not elevated.

On the starboard side towards the bow, immediately aft of the two waterline skin fittings there is a deep scratch below the lower boot strap band. High moisture levels were noted here suggesting the scratch has penetrated the gel coat. This should be repaired by gouging out to a Vee and filling with gel coat or epoxy.

There is impact damage in two places on the sugar scoop either side of the boarding ladder. Moisture levels here were also high and a more substantial repair was required here.

Minor impact damage was also seen on the stem and on the port of the stem head fitting at the very top of the stem.

Otherwise no signs of repairs or damage were seen on the topsides.

b) Delamination and voids - Hammer sounding did not reveal any signs of delamination or voids on the topsides.

c) Moisture readings – Moisture readings were taken as described in Section A.1.c. above. Readings were below twenty and typically 16 shallow and 13 deep on the topsides (see Table 1). The lowest shallow reading was 13 and the lowest deep reading was 9. For this vessel, these can be considered dry.

Recommendation (Level B) – Scrape off paint by way of the scratch towards the starboard bow to confirm high moisture readings are in the laminate and not the paint. If necessary, open up scratch as a V and repair to prevent ingress of water to the GRP laminate. In the meantime, a thick coating of wax polish will inhibit ingress. Repair damage to the sugar scoop.

A.3. Bulkheads and Structural Stiffening including internal mouldings

A number of components contribute to the overall structure:

- The shell moulding.
- Lateral, over-laminated foam-cored ribs (approximately 50mm x 50 mm in section) running outboard from the stringers (where these are present) or centre line were seen under the forecabin V berth, forward of the water tanks under saloon berths, under the chart table seat and immediately forward of the rudder post. These terminated at various heights (none seen running up to the deck).
- Ribs approximately 150mm x 15mm in section running laterally up the topsides to the deck, only the top of one was seen in the forecabin. Feeling the headlining close to the deck revealed two on each side. Another was seen in the cockpit locker.
- Over-laminated stringers running longitudinally approximately 750mm (not measured) either side of the centre-line (providing longitudinal stiffening) where seen in the aft cabin, either side of the engine compartment, under the main cabin sole (either side of the keel 'floors') and forward to the forecabin on the portside.
- Partial bulkheads running laterally under the aft cabin seat, bunk and sole, forward of the aft cabin, forward of the engine compartment, aft and forward of the heads compartment, under the forecabin V berth and aft of the anchor locker. These were either over-laminated plywood, or a plywood-foam sandwich (seen around stern gland). These are bonded to the hull and through fastened in places with mild steel fastenings and penny washers.

- As described below, there is also a matrix of floors distributing the keel loads. This is addressed in Section B (c) below).
- The mast compression loads are transferred to the hull above the keel through a steel compression post and a substantial lateral floor below the mast.

a) Bulkheads - The bulkhead aft of the engine compartment has been cut to provide access for the stern gland and both plywood end grain and foam is exposed to bilge water. The bulkhead was firm to the spike and hammer. Here moisture readings on the plywood were not high. The protecting the bulkhead from water ingress should be considered to extend its life. Bulkhead bonding to the hull below aft cabin sole was sound to hammer though a fastening is in poor condition due to corrosion and should be replaced.

Where seen, other bulkheads and bonding to the hull were sound and secure. However, a number of fastenings were corroded (eg seen in the cockpit locker and forward of the saloon berths, under both heads sinks and in the chain locker). Those sampled were considered serviceable. The plywood is sound and there are minimal signs of any water ingress or seepage. Moisture readings did not suggest a problem with typical readings of: 12.6-22.6 shallow and 16.0-23.5 deep in the cockpit locker (on % moisture scale 0-30 – Sovereign meter). These readings are acceptable. The highest relative scale readings were 31/30 which is acceptable.

Below the forecabin bunk readings were 42/48; 42/48. These are higher though as the plywood was sound to the hammer and firm to the spike there is no cause for concern. No ventilation plus water from chain locker drain would explain these higher readings. Lifting the cushions and locker lids when leaving the vessel will help to dry out this area.

b) Stringers – To starboard of the engine compartment, fuel tank and companionway steps the moisture meter reading on the stringer was 20/22 and 18/28 (Sovereign meter – relative scale). These indicate the presence of water especially the reading of 28, but the stringers were firm to the hammer and are considered sound. The stringers outboard of the keel matrix could not be reached.

c) Ribs - Moisture readings on the rib in the cockpit locker were 19-20 shallow 19-18 deep (relative scale). On the rib in the forward cabin under the bunk readings were 18-22 shallow and 9-5 deep. These readings are acceptable.

Forward of water tank on the portside moisture readings were 30/31 below WL and 17/17 above waterline. On the starboard side moisture readings were 23/34 below the waterline, 19/18 on the waterline and 13/12 above the waterline. Forward of the rudder stock readings were 25/18. These readings are not considered high, though the reading forward of the port water tank will need to be monitored and ventilation of the area should be considered when the vessel is left. The ribs were sound to the hammer.

Recommendation (Level B) – Replace bulkhead through-fastenings wherever they have failed or are badly corroded including to port of the aft cabin/engine compartment bulkhead by stern gland opening. Seal cut section of this bulkhead from water ingress.

A.4. Skin Fittings and through hull apertures

Note: Ball valves and gate valves are usually separate from both skin fitting and tailpipe. A seacock usually refers to a fitting with valve and tail pipe in one piece and a skin fitting bolted through the hull. Only ball valves were fitted to this vessel. No skin fittings or valves were dismantled as part of this survey.

It is **not** usually possible to inspect the internal integrity of seacocks and ball valves without dismantling them and it is there that the worst corrosion will be found. Insurance may **not** cover seacocks and ball valves that cause a sinking when left open and, or, have not been maintained. Please check the relevant policy details and consult the insurer and the Financial Ombudsman Service. Whilst brass ball valves made from forged brass to the European standard CW617N are in very common use, this ordinary brass is subject to dezincification in seawater and fittings made from it frequently fail. Fittings above the static waterline, especially those close to it, are often below the water when underway.

The location and function of all through hull fittings, ball valves and tailpipes and other through hull apertures is as follows.

1. **Aft cabin –** Accessed under the forward end of the bunk is the aft heads outlet (below static waterline). Also accessed under the aft cabin bunk is a GRP pipe bonded to the hull with no valve attached to the exhaust hose. This is on the static waterline.
2. **Aft heads compartment –** Accessed under the sink unit are the heads inlet (below static waterline); sink outlet and shower outlet (both just above static waterline).
3. **Engine compartment** – Engine raw water inlet (below static waterline)
4. **Cockpit locker** – cockpit drains (a single fitting) just above the static waterline; combined outlet for engine raw water anti-siphon loop vent and calorifier expansion valve (just above static waterline). This has a nylon skin fitting and no valve. Above this fitting is the gas locker drain (see Gas – H.2.) Well above the waterline are the two bilge pump outlets. These are nylon with no valves. Forward of these is the Eberspacher heater exhaust outlet.
5. **Main cabin behind portside bunk** – Galley sink outlet (just above static waterline)
6. **Main cabin under forward end of the starboard bunk** – Forward heads outlet.
7. **Main cabin below the cabin sole** – Log and depth transducers.
8. **Forward heads** – Under sink unit is the sink outlet (just above the static waterline).
9. **Under starboard forecabin berth** – Forward heads inlet (below static waterline) and shower outlet (just above static waterline).

a) Skin fittings and ball valves- The skin fittings, ball valves and tailpipes for the engine inlet, heads inlets and outlets (fore and aft), sink outlet (fore and aft, heads and galley), shower outlets (fore and aft) and cockpit drains, were below or often below the waterline and were thought to be made from brass.

Additionally, there was a nylon skin fitting with no valve less than 12 inches above the waterline in the cockpit locker for the engine raw water siphon loop vent and expansion valve on the calorifier.

The fittings are mounted internally against plywood pads. Pads were all firm to the spike but can become saturated, rot and allow the fitting to become loose. The valves all operated freely, fully open to fully shut. Hoses below the waterline all had double clips and there were anti siphon loops on heads outlet, inlet and shower outlet (all, fore and aft) and engine intake.

Although all but two of the through hull fittings on this vessel passed the inspection, two skin fittings parted from the hull (engine inlet and forward heads outlet) and all skin fittings ball valves tail pipes and clips on, below or close to the static waterline should be replaced, ideally with bronze, otherwise with DZR (dezincification resistant brass). Bronze and DZR have a much longer potential life than brass. This should include the nylon fitting for the siphon loop vent to which a valve should be added (though left open when calorifier in use). Double clips should be used on all these hose attachments.

Hoses for these fittings were serviceable except for the forward heads outlet and the anti-siphon loop vent/calorifier expansion valve. These hoses should be replaced.

b) Exhaust - A slight crack is visible externally around the exhaust outlet where the tube is bonded to hull. This join should be ground out to the depth of the cracking, extending around the join into soundly bonded material and repaired.

c) Echo sounder and log transducers– Located under a hatch forward on the cabin sole board and easily accessed. These were secure. The log paddle wheel is the removable type with an internal valve or flap allowing removal for cleaning while afloat. The nuts and flanges were lying fair to the hull internally and externally and were sound to light hammer sounding.

d) Redundant fittings – No redundant through-hull fittings were seen.

e) Wooden bungs - No bungs were seen by skin fittings but a bag was found in bilges beside engine compartment. Wooden bungs should be located and secured with a line close to each through hull fitting, including exhaust and transducers.

Recommendation (Level A) – Before re-launch, replace skin fittings ball valves tail pipes and clips for forward heads inlet, engine inlet and nylon skin fitting for the engine raw water siphon loop vent and calorifier expansion valve, ideally with bronze, otherwise with DZR (dezincification resistant brass) and double clips. A valve to be added to siphon loop vent and that hose, plus forward head outlet hose, replaced (the latter ideally with sanitation grade hose). Wooden bungs should be located and secured with a line close to each through-hull fitting, including transducers.

Recommendation (Level B) Replace skin fittings ball valves tail pipes and clips for the remaining ball valves near or below the static waterline, ideally with bronze, otherwise with DZR and double clips. Grind out exhaust tube join to the hull externally to the depth of the cracking, extending around the join into soundly bonded material and repair.

Suggestion – Consider replacing plywood pads at the same time as skin fittings. Sealant (or light GRP laminate) around the internal flange or nut of the log and depth fittings will help to prevent flooding in the possible event of the fitting parting due to over-tightening or other cause. Consider replacing all remaining hoses to skin fittings (using sanitation grade hose on the aft heads outlet).

B. Ballast keels, keel fixings and keel matrix

The vessel has a cast iron fin keel attached to a stub keel by mild steel studs and nuts with backing plates. The stub keel is a separate moulding and, when scraped of antifouling, the join can be seen running along the hull approximately 8 inches out from the side of the stub keel.

a) Keel Condition - The keel had a blue soft antifouling paint coating. The undersides were corroded with minimal coating. The anti-fouling was adhering well, though spots of corrosion were visible across most of the surface.

b) Keel fixings – There were 11 substantial keel studs with nuts and backing plates all of mild steel. The coatings on almost all are either gone or breached and corrosion is quite advanced on some (though rust is more than 10 times the volume of the steel that generates it). Two are under the diesel tank and the remainder are accessible under the cabin sole.

Water was still seeping from the forward 1.25m of the join between the stub keel and ballast keel three days after lift out and when checked again after five days. The sealant should be gouged out and replaced. The keel was flexed with the vessel in the slings but no movement was seen in the join. Given seepage from the keel join, it is possible that sea water has reached the studs immediately above the keel.

c) Stub keel, keel root and 'floors' – The stub keel join to the main hull was seen externally in a number of places and considered sound. The join was not detected internally.

To distribute the keel loads, the hull in the vicinity of the keel is supported by a matrix of five 'floors' at approximately 15" centres (not measured) running laterally, they extend to the stringers approximately 750mm out from the centreline, stiffening and strengthening the hull. The floors also provide support for the cabin sole. Three are of plywood-foam-plywood sandwich over laminated (seen where holes had been drilled for cables and heater ducting). The aft floor under the fuel tank is more substantial and believed GRP, possibly with a hard wood core. The forward floor is reinforced with GRP (below the mast compression post). Where hammer tested here was no indication of debonding, delamination or rot on the floors but access was limited and not all were tested.

Moisture readings on the GRP floor below the fuel tank were 8/7 on the Sovereign meter. The next three floors running forward from below companionway steps were plywood over-laminated with readings as follows (readings taken either side of each floor – highest given): Floor 1: 23.2/18.9 (% scale); Floor 2: 20.2/22.0 (% scale); Floor 3: 18.1/22.6 (% scale). These readings are not excessive and are to be expected where water has lain in the bilges. The fourth floor was under the mast compression post and was reinforced in the centre section (approximately 12")

with GRP and probably a hardwood core and over-laminated plywood either side. Here moisture readings were 19.0/17.2. The reinforced section was sound to the hammer and no debonding was seen. There were no indications that the compression post had been forced down into the floor.

Recommendation (Level B) – The keel studs, nuts and backing plates should be cleaned of all coatings and corrosion and subject to further inspection, those nuts, backing plates or stud threads found to be badly corroded should be replaced. Those found adequate should be treated for rust, replaced and recoated with flow coat or GRP. The last stud from the stern (forward most) should be drawn for inspection and a further decision then taken on the remainder. The sealant along the join between stub keel and ballast keel should be gouged out as deep deep as possible and replaced ensuring the area is fully dry, clean and degreased before reapplying sealant.

Suggestion – After rubbing down, keying well with a coarse grit disc (eg 24 grit) and treating any rust, re-coat ballast keel with International 'Interprotect' or similar two pack epoxy product designed for use on iron keels.

C. Rudder and steering

a) Rudder blade The semi-balanced rudder blade is two halves of moulded GRP bonded over the stainless steel rudder stock with four tangs welded to the rudder stock. This was confirmed using a metal detecting tool. The lower end of the stock extended beyond the base of the skeg. No cracks or other defects were seen on the blade. There was slight damage to the starboard side of the base of the rudder blade. The blade was stress tested with the wheel tied off and found secure.

b) Skeg –The rudder skeg provides support for the base of the rudder. The skeg was stress tested using body weight and no defect found.

The rudder stock is secured to a bronze fitting at the foot of the skeg. This is fastened to the skeg with five bronze rivets staggered into two rows running from one side to the other.

The heel of the fitting has two half round parts, one forming the aft end of the main part of the fitting and the other is a half round part that is clamped around the rudder stock and fastened onto the main fitting with four bronze machine screws. This forms a bush in which the rudder stock can turn. No slack was detected here. The fitting was sound to the hammer, rivets and fittings showed no indications of corrosion or other defects. The four bronze machine screw fastenings on the half-round section were not tested and, given their key role in the steering system and the planned used of this vessel, they should be drawn for inspection.

c) Rudder stock and rudder tube - The non-magnetic (ie austenitic grade steel) rudder stock passes through the hull via the rudder tube which terminates some inches above the waterline with a bush and seal. There are four over-laminated plywood fillets providing reinforcement where the rudder tube exits the hull internally. These were

not hammer tested due to restricted access (for hammer and sighting) under the quadrant but no defects were seen using a camera.

No slack was detected in the top bush.

A seal prevents water entering the vessel between the stock and the rudder tube. This seal has been repaired with sealant. Although no sign of water leaking from the seal was seen while afloat (it was above the waterline when inspected afloat), the seal may be defective and should be replaced.

d) Wheel steering - A cast aluminium steering quadrant (15”), was fastened to the top of the rudder stock with secure bolt fastenings. There was a locating pin between the stock and the quadrant, though this was largely above the quadrant. The quadrant carries the ‘pull-pull’ steering cables which are the more flexible 7 x 19 stainless steel type. The quadrant was secure on the rudder stock.

Cables were running fair in the quadrant grooves and very little aluminium ‘dust’ was seen here. Cables were slack and need tightening slightly. Both cables are inside pins to prevent from exiting the grooves. The cables are attached to the quadrant via eye bolts. At the end of the cables are thimbles and wire rope grips. The aft two of these grips were corroded and need replacing. The grips are also fitted the wrong way round. The saddle (and not the U bolt) should be against the wire under tension.

The cable sheave aft of the quadrant was secure and both cable conduits were secure forward of the quadrant and at the base of the cockpit pedestal. The steering cable was routed under the aft cabin bunk and cabin sole, into the portside of the engine compartment and up to the cockpit sole. The route had a number of bends but none of excessively tight radius.

Inside the pedestal it was not possible to properly check the attachment of the cables to the chain which runs over a sprocket on the wheel axle. However, from a photograph of the installation from below, it appears that the ferrule on one of the talurit cable terminals is cracked and about to fail. This needs immediate investigation and, if necessary, repair. The steering lock operated effectively. The wheel is covered with suede leather.

The client reported that he felt the steering was stiff. The wheel turned just short of 2 ½ turns from lock to lock. This is relatively few turns but the sprocket inside the pedestal was thought to have 11 teeth, a common size supplied by the manufacturer). There could be other causes of the steering feeling stiff including tight rudder bushes, cable stiff in conduit or wheel shaft bearings.

Recommendation (Level A) - Before she is re-launched, inspect and if necessary replace both talurit cable terminals inside the pedestal. Have engineer check the position of the locating pin in the top of the rudder stock.

Recommendation (Level B) – Draw bronze machine screw fastenings on half round section of skeg foot fitting, inspect and replace or renew. Replace seal at top of rudder stock. Take up slack in cables. Replace corroded cable grips and fit the correct way round.

Suggestion - To ascertain the cause of stiffness in the steering, free off the cables from the quadrant and turn both the rudder and the wheel. With the cables disconnected from the pedestal, test the steering shaft and bearings. This will reveal if there is any stiffness in either the bushes, the cables or wheel.

e) Pedestal – The pedestal was secure to the cockpit sole, fastened by four stainless steel bolts. These were showing indications of water seepage and crevis corrosion. Sealant had been used. Remove and replace any that have corroded and re-seal.

There was corrosion on the pedestal where water has got under the paint coating where machine screws are fitted. No paint was removed. From inside these screws can be seen to serve no current function.

The binnacle bars were agressivley swigged and found secure though the starboard pinnacle bar foot locating fitting is cracked and needs replacing.

Recommendation (Level B) - Remove, inspect and if necessary renew fastening bolts at base of pedestal. Replace brocken foot locating fitting to starboard binnacle bar.

f) Autopilot – The Raymarine Autopilot was seen operating at sea but not fully tested. The control unit is mounted in the cockpit with a remote control by the main companion way in the main cabin. The main unit is mounted below the aft cabin berth. This has a Type 2(S) mechanical linear drive to the quadrant. Access was restricted to properly test the security of the unit's fastening to the bulkhead. Where the drive is fastened to the quadrant, there has been a welded repair. Restricted access also prevented testing or full inspection of this repair.

Recommendation (Level B) – Have the auto-helm linear drive serviced and test the weld repair on the drive ram attachment to the quadrant.

g) Emergency tiller – No emergency steering was seen. Although this is included in the broker's details.

Recommendation (Level A) – Carry an emergency tiller.

D. Deck

D.1. Hull-Deck Join

The hull moulding has a horizontal flange and the deck is fastened on top of this with sealant and machine screws that also fasten the aluminium toe rail. This was seen in the chain locker and cockpit locker. Where the join was seen, there was evidence of adequate quantities of sealant and fastenings did not show signs of corrosion. Where sampled in the cockpit locker and on deck (at the toe rail) the fastenings turned and tightened. In the chain locker (below the anchor well) no fastenings could be reached. No sign of seepage were seen. There was one untidy section in the cockpit locker but this was thought to be acceptable.

The toe rail was in fair visual condition with a join on both sides just aft of pulpit.

D.2. Deck and coachroof

The deck, coachroof and cockpit are constructed of a single GRP moulding with extensive cored areas. Evidence of a cored foredeck was seen in the anchor locker and on the side deck from the cockpit locker by way of the genoa traveller (where the core material was plywood). Under the anchor locker lid the core was seen to be foam where a section has been removed to make room for the windlass. Under load bearing fittings no backing pads or indications of such were seen, though these are thought to have been included in the lamination. The gel coat finish is a non-slip surface. There were two teak hand rails running the length of each side of the coachroof (four in all) and two stainless steel handrails each side of the aft cabin coachroof.

a) Cosmetic condition - The appearance was generally good. There was some localised damage but this was average for the vessel's age.

b) Moisture Readings - Moisture readings were taken as described above and in Section J. Higher deep readings are believed to indicate moisture in the core. Moisture readings were highest close to all shroud attachments, the aft port fixed portlight (inboard of the traveller), both galley opening portlights and the opening portlights and below the fixed stern-facing portlight in the aft cabin, around the diesel filler, the aft cabin hatch, on the hinge side of the forward heads hatch and by some of the damaged areas (see below) and on the anchor locker lid where there was a stress crack (a repair is suggested below). While higher in these places, overall the readings were low and the highest readings in the wetter areas were 27/36 (by shroud attachments), 22/25 by the galley opening light, 28/32 below the aft facing light and 18/20 by the forwards head hatch hinges. Readings with the Tramex gauge were higher. Internally, no moisture readings were taken on the deck due to restricted access. Overall, the deck is considered comparatively dry for a vessel of this age. However some deck fittings are leaking and water was seen running down the inside of the hull after rain in some places.

Recommendation (Level B) – To prevent further ingress of water and potentially delamination and deterioration

of the core material consideration should be given to removing, re-sealing the above fittings hatches and portlights.

c) Delamination – The deck was sound underfoot and hammer sounding revealed no signs of delamination on the deck or coachroof.

d) Hand rails – All four teak hand rails on the main cabin coachroof plus the two on the aft cabin were aggressively tested and found secure.

e) Crazing, cracking and damage – There was a poor quality repair in the gel coat immediately below the port genoa winch and another repair aft of the starboard handrail on the coachroof.

There are unrepaired chips to the gel coat revealing the laminate on the starboard side of the coachroof just aft of the mast pulpit (though moisture readings were not high here) and immediately aft of the anchor locker. There was a crack in the coachroof coaming immediately below one of the forward starboard portlights. Stress cracks were also seen in the recess alongside the starboard genoa traveller and immediately forward and outboard of where the reefing lines and main halyard pass through the fixed part of the spray hood. There was also a crack underneath the anchor locker by the latch fastenings.

Star cracks were seen in the following places on the deck and coachroof: anchor locker lid, starboard on the coachroof aft of one of the handrails and on the port side deck immediately below the forward end of the fixed port light.

The core of the anchor locker lid had been cut away, it is assumed to make room for the windlass. This will have reduced the strength of the lid.

The moulded anchor locker insert (part of the deck moulding) drains overboard via a tube bonded to the stem. This has been repaired and no signs of seepage were seen in the anchor locker.

Suggestion – consider reinforcing under anchor well lid (eg with high strength quad-axial glass cloth and epoxy). It is advised that cracking or chips to the gel coat should be opened up as a V and repaired to prevent ingress of water to the GRP laminate. A wax coating will provide temporary protection.

f) Distortion and compression – Using a straight edge, no compression of the deck was seen adjacent to the mast.

The deck on starboard side by way of the shroud chain plates was slightly cambered as though it had been lifting. The deck was flat further forward and further aft. There was a smaller camber on the port side. Below is a recommendation to expose and inspect the chain plates. This will reveal if they have allowed the deck to lift and if any repair is needed.

D.3. Cockpit

The cockpit moulding was integral with the deck and coachroof moulding and appears to be a single GRP layer possibly with a core in the cockpit sole and under seating. The well is T shaped to accommodate the steering position. No metal or plywood pads were seen under load bearing fittings (except the bilge pump and safety line ring) though these may have been included in the lamination. There is a deep locker to port housing the calorifier. There are substantial cockpit coamings. Above the main companionway is a moulded instrument panel. There is a removable panel in the cockpit sole for engine removal, sampled fastenings were sound and secure. The seating and cockpit sole was teak laid.

a) **Moisture –** Moisture readings were low on the coaming and cockpit well sides. They were high (over 100 on the Tramex) over the removable cored area of sole (small areas not laid with teak).

b) **Cockpit Mouldings and Drains -** The self-draining cockpit has two drains (35mm diameter) in fair condition with little damage or wear and unobstructed from above, with hoses and clips in fair condition. These were joined under the sole board with a brass or bronze T fitting and a single hose continues to the skin fitting and ball valve on

the topsides. The bridge deck was 12inches from the cockpit sole. Hoses and connections were serviceable. There was a chip in the gel coat by the starboard drain.

c) Cockpit sole – This was mostly teak laid and planking in poor condition. Moisture readings in this area should be monitored to ensure the core does not become saturated and rot, weakening the structure including the steering pedestal structure. Ideally, moisture readings would be taken from under the sole though this would require removal of sound proofing (and wire netting) and this was not done.

d) Teak Seating - The locker lid and cockpit seats were also teak laid. The locker lid was cored. Otherwise there was no access from below. There were screw fastenings through the teak with teak caps (one was missing). The teak and caulking was in poor condition and is likely to have let water through to the laminate though this could not be confirmed with the teak in place and with no access from below. Reading under the locker lid were acceptable (25/28). Where water has reached screw fastenings it would have entered any core material ***if*** they are screwed through the laminate. Taking moisture readings from below after removing headlining would allow further assessment.

e) Locker lid and access – The locker lid seal had been poorly repaired. Some of the locker ladder screw fastenings at its feet and at its top were missing. These should be replaced.

f) Hand Rails - Hand rails either side of main companionway were secure when aggressively pulled.

g) Engine hatch lids – There was access to the engine through the cockpit sole. This was mechanically fastened and sealed (seen from engine compartment). Sampled fastenings were sound though nuts could be tightened.

h) Upholstery – No upholstery for the cockpit was seen.

Recommendation (Level B) – Replace missing locker ladder fastenings. With headlining and sound proofing removed, take moisture readings from below cockpit sole and seating to assess condition of the core.

D.4. Main companionway and other accesses to accommodation

These are main companionway, forehatch and aft cabin hatch. Other hatches include saloon hatch and forward heads.

a) **Main Companionway –** The acrylic hatch slides on an aluminium extrusion. It operated smoothly, was sound and in good condition. Two, one-piece washboards (one plywood and one acrylic) were in fair condition with rotary locking mechanisms (no key seen for plywood washboard). These slide between internal teak trim and a stainless steel strip fastened external on either side. As the bridge deck is only 12 inches, the fastenings could be reinforced. Teak vertical slides are serviceable. There were some signs of water ingress here. For offshore use the bridge deck is a low though the centre cockpit design makes this less of a concern. The companionway steps are not secure at the top.

Recommendation (Level A) – Fit fasteners (eg screw down or toggle) to secure companionway steps at the top while allowing access to the bilges below.

Suggestion – reinforce washboard slide fastenings especially internally.

b) Forehatch and aft cabin hatch– The forehatch and aft cabin hatch were both Lewmar, of good size for a person to exit (both 21” x 21” acrylic size), both fair to the deck, opening with hinges aft (forehatch) and forward (aft cabin), lockable from the inside and openable from the deck when unlocked. The acrylic on both hatches was badly crazed and cracked and was not tested under foot. The acrylic was seen to have leaked on both, especially the aft cabin.

c) Forward heads hatch – Lewmar, hinges are inboard, approximately 15” x 9.5” acrylic size, fair to the deck, acrylic was badly crazed and also cracked and had been leaking. The hatch could not be opened from outside.

d) Saloon hatch – Lewmar, hinges aft, approximately 19" x 15", too small for a person to exit through, fair to the deck. It was lockable from the inside and openable from the deck when unlocked. The acrylic seal appeared to have been repaired and was the acrylic was crazed.

Recommendation (Level B) – Replace all hatch acrylic (except main companionway).

D.5. Ports and windows

a) Fixed Ports – Three fixed ports on the starboard side of the coachroof (two by saloon and one by aft cabin) and one on the port side (saloon) were of toughened glass. Stainless steel fastenings on the interior were behind a plastic insert in the extrusion and none were sampled.

b) Opening ports – On the portside, there were four opening lights, two at the galley, one in the aft heads and one in the aft cabin. There were also two opening lights high on the transom. These were all in fair order with good seals and not seen to have leaked despite heavy rain. The acrylic in the opening lights on the port side was not cracked or crazed but the two opening lights at the transom were badly crazed. Hinges and locking mechanisms on all four were sound.

Recommendation (Level B) – Replace acrylic in the two aft opening lights on the transom.

D.6. Pulpit, stanchions, pushpit and jackstays

These consist of:

- Pulpit – stainless steel, split pins to bases that were bolted the toe rail.
- Mast pulpit – connected with clevis pins to bases fastened to the deck.
- Pushpit port and starboard sections – stainless steel, split pins to bases bolted the toe rail (at the two outboard feet on each side) and directly fastened from below to the deck at two central feet by way of gate above boarding ladder.
- Aluminium stanchions, split pins to cast aluminium bases bolted to the toe rail.
- Stainless steel 1x19 guard wires, with swaged terminals.
- Jackstays – not seen aboard.
- Cockpit safety line rings x 2

a) Pulpit – Secure and in good order.

b) Mast pulpit - Secure and in good order. Cotter rings secure the clevis pins through the base fittings on the deck. All rings in good order. These can foul and pull out and should be replaced..

c) Pushpit - Secure and in good order. The following were fitted to the starboard pushpit: Navtex aerial on Makefast bracket; Glomex GPS aerial; liferaft bracket (webbing serviceable). On the port pushpit were: solid teak outboard motor bracket in good order and secure; lifebuoy.

d) Stanchion and bases - Stanchions were in fair order, firm on the toe rail when aggressively swigged.

e) Stainless guard wires – These were sound 1x19 wire with swaged fittings at the ends. The lanyards that tighten the guard rails at the pushpit were slack, especially on the port side. On both sides, the top wire was pinched and held by the spinnaker pole fitting. One of the starboard wire was kinked above the midships fairlead.

f) Jackstay attachments – Jackstays not fitted and not seen aboard. When fitted route the jackstays along the coachroof to prevent crew falling over board, though retained, in an emergency.

g) Cockpit safety line rings – Two harness line attachment points in the cockpit were secure. Backing plates were not seen on the forward one as there was no access. The portside ring has no backing plate but the two bolts have large penny washers and are mounted though a cored area next to the bilge pump. This is considered adequate.

Recommendation (Level A) –Tighten guard wire lanyards. Fit jackstays.

Recommendation (Level B) – Release wire from spinnaker pole fittings, inspect and renew wire(s) if damaged. Replace cotter rings on mast pulpit feet.

Suggestion – Consider routing the jackstays along the coach roof and not the side decks to reduce the likelihood of crew falling overboard.

E. RIG

E.1. Rigging attachment points

a) Forestay – The forestay was attached to a stem head fitting bolted through the deck with five machine screws and through the stem with five hexagonal bolts. Three of the five machine screws were showing signs of crevice corrosion (seen from in chain locker). Very large penny washers were seen on two and a backing plate under the remaining three. There was a chain plate on the stem and one of its five bolts was showing signs of corrosion. None of these fastenings could be reached internally without removal of the panel forward of the anchor well moulding. Sampled machine screws were firm. Bolts were not tested externally. Fastening bolts were lying fair on the stem.

b) Inner forestay – The inner forestay was not fitted to the attachment point. Two fastening bolts seen in the anchor locker were not fair to the hull and sealant had been used. There was no access below to assess corrosion of the fastenings or security of the chain plate. This is the most likely place to attach jackstays and should be inspected regardless of whether the inner forestay might be used.

c) Main intermediate and lower shrouds – Cap or main shrouds and intermediate shrouds shared the same chain plate on each side. Lowers had their own chain plates approximately 500mm further aft. All shrouds were attached directly to the chain plates which protrude through light deck plates fastened to the deck with small screws. The chain plates are fastened below. Access to the portside cap/intermediate chain plate was through a panel in a locker. There was no access to the lower chain plate on either side and a similar panel (not removed) was seen on the starboard side. Only one side of these chain plates could be accessed. From the portside that chain plate could be seen to be 75mm x 8mm flat bar of unknown length and was fastened with stainless steel hexagonal bolts to a laminated flange perpendicular to the hull. There were signs of crevice corrosion and only one bolt could be seen. Water was seen running down the chain plate.

d) Back stay – This was attached via an external chain plate outside of the transom and through-bolted. It was not accessible internally. The top two bolts were turning.

e) Baby stay – This was attached to a chain plate through the deck. It was not seen from below.

Recommendation (Level B) – Remove all stem head fitting bolts renew any corroded bolts. Expose and inspect chain plates and bolts renewing any showing signs of crevice corrosion at

- **inner forestay**
- **all four shroud chain plates (cutting access panels to reveal both sides of all - also inspect laminated flange for damage, delamination, debonding from the hull, water ingress or other defects)**
- **backstay internally.**
- **babystay chain plate**

Tighten all backstay chain plate bolts

E.2 Spars

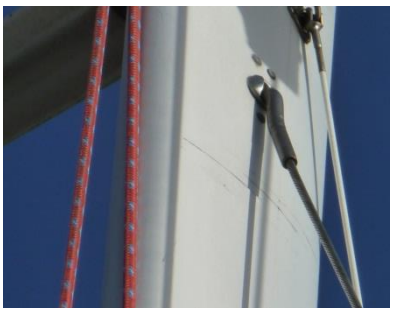
These include double spreader mast, boom and two spinnaker booms. The mast is deck-stepped.

a) Mast and booms– As far as could be seen with the mast stepped, the silver anodised aluminium Kemp mast and boom were in fair condition for their age with minimal corrosion around fittings and rivets. The mast was rigged straight. When swigged fore and aft the spreader roots appeared firm to the mast. Spreaders were of extruded aluminium secured to the cast aluminium roots by two clevis pins on each side of the mast with a cotter ring through each. Cast aluminium

spreader tips were also fastened to the spreaders (no fastenings seen or inspected). Cotter rings can foul in clothing and rigging and pull out, though all were secure. These should be replaced ideally with split pins folded back on themselves.

The split pin securing the clevis pin at the foot of the kicker rod was almost flat. There were clutches in the boom at the gooseneck to secure reefing lines but these are now fitted with other lines running aft.

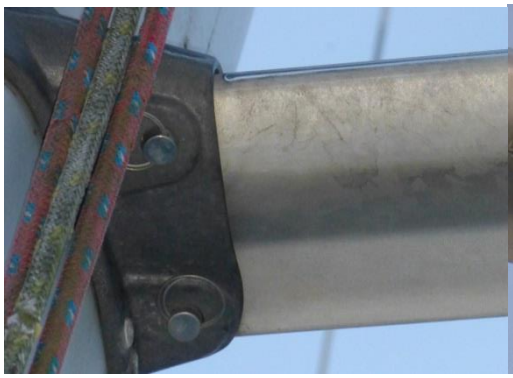
There was what appeared from a photograph to be a series of scratches to mast anodising below the top spreads on port side. This needs inspecting when aloft or with the mast unstepped.

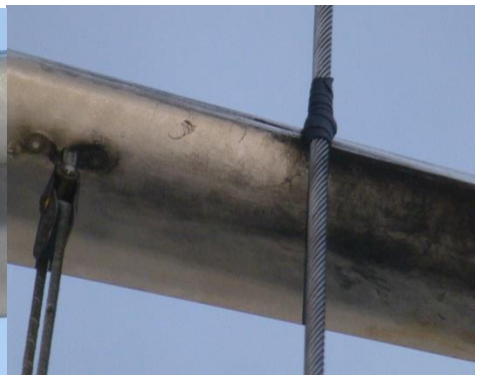


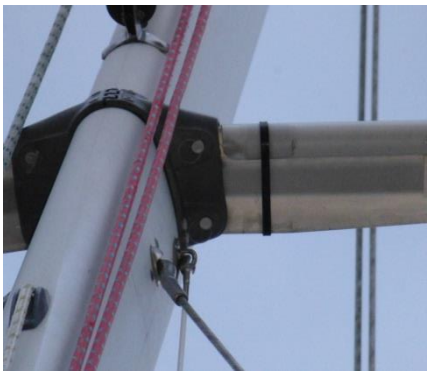
The mast is joined (from new) above the top spreaders. Photographs taken from the deck did not show any obvious defects with the join.

A Boombrake was fitted to reduce or prevent the main from jibing. This is controlled from the cockpit.

Halyards had been rubbing on the spreaders and there may be damage to the spreaders. The leading edge of the port side top spreader is protected and that may conceal damage. The upper spread root fitting was not flush with the mast on the port side. These should be inspected aloft or with the mast unstepped.







All fittings accessible from deck level were secure and serviceable (though see 'Winches' below).

b) Spinnaker poles – both spinnaker poles were considered serviceable. The end pistons operated.

Recommendation (Level B) – Replace all cotter rings with split pins. Open split pin at kicker rod foot. From aloft or with mast unstepped, inspect spreaders for damage to the leading edges, spreader root security to mast, mast condition and fittings.

E.3. Standing Rigging and Reefing

a) Wire and terminals – The swaged terminals were all in fair visual condition. No broken wires were seen projecting from terminals although it was not possible to view those aloft properly and no wire was flexed next to a terminal (as the mast was stepped). There were aluminium tube covers around the base of each cap shroud and baby stay. These can encourage corrosion and wear by the inclusion of abrasive material and chlorides. There were signs of crevice corrosion on one shroud at the portside.

It was not possible to inspect the backstay or forestay where they attach to the mast nor the shroud T terminals or their fittings on the mast.

Rigging was not tight and baby stay was slack and the intermediary shrouds were slack when on the lee side on the sea trial. The forestay was not visible at bottom or the top of foil. The baby stay was 8mm, removable inner forestay 8mm, backstay 10mm, the cap shrouds were both 10mm, intermediary shrouds both 8mm and a lower shrouds both 10mm. The inner forestay was removable with a 3:1 block system for tensioning.

All standing rigging was 1 x 19 stainless steel wire. The date it was last renewed is not known though sale particulars say 2006. It is common practice to replace standing rigging every 10 years or sooner. It is now thought to be approximately 8 years old (invoice seen which tallies with sales particulars) and given the planned use, it should be replaced.

b) Clevis pins split pins and bottle screw - Split pins were seen in all mainmast clevis pins. Bottle screws on the shrouds were chrome plated bronze. The threads appeared in fair condition.

The clevis pins between the chain plates and toggles had clevis pins but they are too small. Clevis pins should be a snug fit in the hole.

There was a Harken backstay tensioner. There was no split pin in the clevis pin at backstay chain plate. There were cotter rings in use at the backstay tensioner. These should be replaced with split pins.

c) Alignment and articulation– There was good alignment on all deck level rigging attachments. There was two-way articulation on all shrouds, the baby stay and at the top of the forestay and backstay but not at the bottom the forestay or backstay.

Alignment and articulation are necessary to reduce lateral forces on the wires or terminals and flexing as the wire continually tightens and slackens.

Recommendation (Level A) –Fit split pin to clevis pin at back stay chain plate attachment.

Recommendation (Level B) –Replace standing rigging. Fit correct size clevis pins to shroud attachments. Fit split pins in place of cotter rings. Fit an extra toggle at the base of the forestay and backstay to provide two-way articulation. Remove aluminium protectors covering base of cap shroud and baby stay.

E.4. Running Rigging

a) Roller reefing – There was a ProFurl NC 42 roller reefing system with twin groove foil. This system is rated for vessels of this size and larger. It has a 'Wrap Stop' at the top of the foil to prevent halyard wrap without the use of a halyard fairlead. The system was unfurled and furled under load and operated well. The furling line was frayed.

b) Main sail reefing – This was a single line reefing system for the main with two reefing points routed from the cringles on the leech to the aft of the boom and forward externally to the forward end of the boom, then through the cringles on the luff and down to the deck. This route adds considerable resistance to the additional forces on a single line system.

c) Halyards – All halyards ran free, although the genoa halyard was not fully tested. When the main was hoisted on the sea trial it required excessive force for the conditions. This may have been due to reefing lines or the external track fitted for the fully battened main. The cause needs investigating and remedying. The spinnaker halyard and spare genoa halyard were frayed.

d) Lazyjacks - Lazyjacks were fitted. A Cotter ring opening on the starboard side had opened and needs replacing.

e) Other running rigging - The running rigging seen was generally in serviceable condition however it is not new and there were a number of frayed lines including the inner forestay tensioner.

Recommendation (Level A) – Determine cause of main halyard resistance. Replace all frayed lines.

Suggestion – Consider fitting a more efficient reefing system on the main. Consider adding a third reefing point to the main sail. Replace open cotter ring on lazy jacks.

E.5. Sails and covers

These were:

- Fully battened main sail with 2 reefing cringles. Seen set on a sea trial. Fair to good condition
- Large genoa – Seen set on sea trial. Fair to good condition. At the tack of the genoa the shackle's pin was unscrewed.
- Asymmetric cruising chute with snuffer – inspected in the bag. Some signs of wear eg clew, tack and head and stains.
- Symmetric spinnaker – not inspected
- No 2 genoa – furling. Seen in bag. Good condition
- Hank on jib / storm sail – Seen in bag. Good condition. This sail is thought to be too big for use as a storm jib.
- Spray hood with a fixed and a canvas part – Check fastenings of fixed part. Some stitching to the canvas had parted. Unlikely to last five years more.
- Hatch covers for forehatch, heads and main cabin – Fair condition. None seen for aft cabin hatch.
- Stack pack- dirty and serviceable.

Recommendation (Level B) – Consult a sailmaker to confirm the storm sail is of appropriate design and strength.

E.6. Winches, clutches and other deck gear

a) Winches – Two Lewmar 52 two-speed self-tailing genoa sheet winches in serviceable condition and secure to the cockpit coaming (no backing plates seen). There was a large chip out of the aluminium base casting of the portside genoa winch. Spinnaker sheet winches (also used for main sheet and furling line) Lewmar 16 self tailing on both sides of aft cockpit coaming in good order and secure (no backing plates seen).

A single Lewmar 40 electric halyard/reefing line winch to starboard of the main companionway. Seen working manually and under power, though not under load. In fair condition and secure (no backing plate seen).

On the mast, there were two Lewmar 16 winches. On the starboard side this was self-tailing and was almost completely seized. It needs a service or replacement. Winch was firm on the mast. On the portside the winch was free though the genoa halyard was around this and so inspection was limited.

b) Jammers, deck organisers, genoa cars and genoa car travellers, turning blocks – all were considered secure and in working order. No Tufnol type fittings were seen.

Clutches on starboard side of main companionway (2x2) and on starboard side of mast for topping lift and spinnaker halyard (2x1) were working correctly.

c) Sheeting attachments and travellers – Genoa and main sheet attachments all sound and secure. Main sheet traveller firm to the cockpit coaming aft of the cockpit, fastenings tight. Genoa traveller fastenings firm to deck. Genoa traveller cars worn and need replacing.

Recommendation (Level B) –Service or replace Lewmar 6 winch on the mast. Replace genoa traveller cars.

F. Engine, fuel system, stern gear and cathodic protection

F.1 Engine and installation

A Perkins Prima M50 four cylinder 50HP diesel engine is mounted on GRP bearers (probably over-laminated hardwood). It is indirect cooled and driving a Hurth reduction gearbox (model not known). The engine number was BN 30144 U589052U (located on a horizontal plate on the port side of the engine and difficult to access). The engine was seen running on a sea trial under load. The overall external condition of the engine was fair to poor with a number of areas of surface corrosion. Engine hours: 874.3.

a) Engine bearers and mounts - Engine bearers are substantial and there was some delamination on the top of both engine bearers between the mounts. This needs repairing. Bearers were firm by the engine mounts. Moisture readings on starboard engine bearer were 11-17 shallow and 13-19 deep and on portside engine bearer they were 17/20. These readings are acceptable. No stress cracking seen.

Engine mountings were in fair condition and none lifted excessively under the crow bar test. The aft two look more recent than the forward two. When some are older than others this can cause premature failure.

b) Air supply/intake – There was an air intake on the cockpit coaming with an aluminium fitting. It was not confirmed that this had baffles. Air can also enter the engine compartment through the cockpit locker though with a better seal on the lid, this will be restricted. The coaming intake is possibly not sufficient for heater and engine. A blower was fitted on the underside of cockpit sole. This was not tested. If working that would assist in ensuring an adequate supply of air to engine and heater.

c) Engine Oil – No significant oil leak was seen. The sump was in fair condition. There was no evidence of water in the oil or in the rocker cover and cap. The oil was black. No date was seen on the filter. An oil and filter change may now be timely. There is a pump to facilitate removal of oil from sump when changing oil.

d) Gear box– Transmission oil was not checked. The casing had signs of corrosion over much of the surface though this was not considered very serious though if unaddressed it will continue to deteriorate. Consider recoating to protect. With the engine running, a noise was heard emitting from the stern gear immediately forward or reverse gear was engaged. This stopped immediately the throttle was opened. This may be the cutlass bearing or could be the gear box. As the cutlass bearing needs replacing this noise should be assessed again when that has been done.

e) Cooling Water system – Raw water hoses were reinforced and serviceable. There was a siphon loop and vent on the raw water inlet. The vent loop had come away from the bracket to the underneath of the cockpit sole. The vent hose had buckled and was not reinforced. This should be re-attached to the bracket and the vent hose replaced with reinforced hose. The raw water pump is located accessibly at the aft of the engine. It does not have wing nuts facilitating speedy access to the impeller. The impeller was not inspected. During the sea trial one of the drive belts parted, the coolant pump stopped working and the engine overheated as a result, while the raw water pump continued to operate normally. The coolant pump was not seen or inspected. No alarm was heard though the No-Charge light came on though this is difficult to see when standing at the wheel (the tachometer also stopped functioning). It is suggested spare belts are carried and both are regularly renewed.

Those core-plugs seen appeared in good order and were sound, though they corrode from the inside. It is not known if there are others, nor when they were last replaced.

The cylinder block was examined as far as possible with very restricted access especially on the port side and no cracks were seen.

The hose to the exhaust elbow and its clips were in poor condition and should be replaced.

No water leaks were visible even with the engine running at full throttle.

There is no sacrificial anode in this engine.

The temperature gauge in the cockpit was seen working and the engine temperature was seen to rise considerably when the drive belt parted. Otherwise, with drive belt repaired, the temperature was approximately stable at about 175°F (80°C) below 2,000 RPM and above that, at full throttle for 5 minutes the temperature rose slightly and remained stable at approximately 180°F (82°C).

A small amount of emulsified oil was seen on the lid of the heat exchanger. This may indicate a fault such as a defective oil cooler or cylinder head gasket. With coolant flushed and replaced this should be monitored. If emulsified oil returns the fault will need to be identified and repaired.

f) Exhaust – The exhaust elbow was sound to the hammer with corrosion visible by the exhaust hose. These corrodes from the inside and require replacement periodically. Failure not only results in loss of cooling but also

fills the engine compartment/cabin with exhaust gases. As the age of this elbow is not known and it is clearly not recent it should be replaced.

The exhaust hose was in fair condition where inspected aft of the engine and in the lazarette. There was an anti-siphon loop (in the cockpit locker). A stainless steel water trap (to prevent water entering in a following sea) was mounted on the hull aft of the engine. It was not checked. Double clips were in use at all exhaust hose connections. These were sound to the hammer though those on the outlet from the water trapped were not reached. Here only single clip was seen.

The electrical loom from the engine to the cockpit had been routed very close to the exhaust water trap. The loom might be damaged in the event of raw water failure. It is suggested it is moved.

g) Engine Controls including stop – These operated freely and were securely connected to the diesel pump and gear box. The stop solenoid operated on four occasions. **Note** that some insurance underwriters will not cover claims resulting from failed engine controls when these have not been serviced.

h) Electrical – The alternator drive belt failed on the sea trial and was replaced. Subsequently, the belt was heard to 'squeal' when the engine was restarted after a deliver passage of approximately 13NM under power (when the batteries had been charging). This should be examined as the one of the belts may be the wrong size or defective.

There were two alternators. One rated at 50 amps in good order mounted on top of the engine. The rating of the second was not seen. It also was in fair visual condition externally.

Recommendation (Level A) - Identify cause of drive belt squealing.

Recommendation (Level B) – Repair delamination on engine bearer(s). If the core material or underlying laminate is dry a repair could be effected by drilling and injecting epoxy. Re-attach vent loop to bracket and replace the vent hose with reinforced hose. Replace hose to exhaust elbow and its clips. Flush and renew coolant and monitor for emulsified oil. Replace exhaust elbow. Confirm the temperature alarm is working. Fit second clip to exhaust water trap outlet. Have the engine inspected and serviced by a marine engineer.

Suggestion - Replace forward engine mountings. Replace engine oil, and fuel filters and record date on filter with permanent pen. Move engine loom away from exhaust water trap.

F.2. Fuel System

a) Tank material and bearers – The mild steel tank (with a paint coating) is located forward of the engine under the companionway steps. It is mounted on GRP bearers (presumably with hard wood core). No attachment points were seen or tested. Access to the tank was very restricted and was seen only by camera and on the base at the aft side and at the top through a small hatch. The underside was showing signs of corrosion especially along the weld at the aft edge of the base immediately forward of the engine. There was corrosion around the drain, which was also located there. There was a shut off valve on the outlet on the top of the tank.

There was a fuel gauge at the chart table. This was seen to operate but calibration was not checked.

b) Filler/vent unit and hose - The flush type filler unit is secure to the filler hose and the tank but the nylon filler cap thread is damaged and leaking water and the unit needs replacing with a more durable design. Only a single clip was used on the tank end of the hose. Water in the fuel can encourage 'diesel bug' as well as cause the engine to stop especially during rough weather. The tank should be drained of any water.

The filler hose and vent were corrugated and not thought to be an appropriate grade. They should be replaced with ISO 7840 A2 hose. The filler unit was electrically bonded to the tank.

c) Filters and bowls - The primary filter had no inspection bowl and was mounted above the forward end of the engine. The secondary filter was on the aft of the engine to port. The primary filter was upstream of the lift pump. No dates were seen on the fuel filters.

d) Fuel Pipe – Copper pipe was used between the tank and the port side of the engine compartment. There, braided hose was used for the feed and return. The braiding was intact but it was not possible to see the condition of the hose inside nor its grade. This hose is not thought to be compliant with BS EN ISO 7840 A1. Given the proposed use of the vessel, this should be replaced before departure

Recommendation (Level A) – Replace filler unit and drain tank to inspect for water in the fuel. Also check for 'diesel bug'.

Recommendation (Level B) – Replace tank filler and vent hose with ISO 7840 A2 compliant hose and replace overbaided hose with ISO 7840 A1 compliant hose.

Suggestion - Replace fuel filters and O ring seals and mark the date on the filter with permanent felt pen.

F.3. Stern Gear

A flexible coupling takes the drive from the gearbox to a single propeller shaft through a stern gland (mounted to a GRP stern tube bonded to the hull) and a cutlass bearing mounted on a P bracket.

a) Shaft Coupling – The flexible coupling and fastenings between the gearbox and propeller shaft were sound to the hammer and when tested for slackness.

b) Propeller Shaft - This was not magnetic and is therefore 304 or 316 'austenitic' stainless steel with low susceptibility to corrosion though it is susceptible to crevice corrosion where oxygen is excluded and water present (eg inside the stern gland). Shaft rotated freely and straight. It measured 31.7mm (1 ¼").

Suggestion - When the shaft is next removed, check for pitting or crevice corrosion and wear especially where it passes through the stern gland.

c) Stern tube and stern gland – The stern tube was bonded to the hull and was sound. The stern gland was a Maucour ERCEM face seal with rubber boot in fair condition and not leaking. The boot was fitted to the stern tube aft with double clips (firm to hammer). The face was between a static graphite ring and the rotating stainless steel ring had been running dry and the graphite ring is likely to be worn and in need of replacement. This may also have scoured the face on the stainless ring suggesting replacement of the entire fitting. According to the manufacturers, the ERCEM seal should also have a water inlet or air vent fitted to the stern tube but neither was fitted and the gland therefore needs to be primed or 'burped' on re-launch. When the gland is replaced (with the same or with a PSS gland) fit vent or water inlet.

d) P Bracket – The P bracket (thought to be bronze) was offset to starboard to allow removal of the propeller shaft clear of the rudder and was secure to the hull with four bolts and two backing plates all in fair condition seen below the aft cabin sole. The bracket was bonded to the main anode and connectivity was good.

e) Cutlass bearing – The P bracket houses the neoprene cutlass bearing and this had excessive play and needs replacing. This could possibly account for the transmission noise at low revs.

f) Rope cutter – A simple disc-type rope cuter was fitted. It was secure however there is some damage to the blade.

g) Propeller – This was 17" two bladed right handed and of bronze. It was secure on the shaft with a locking nut and split pin. The propeller was in fair condition with no signs of dezincification or cavitation damage. Light hammer sounding found it sound. There was slight damage on one of the trailing edges close to the centre. Shaft and propeller rotated true in relation to the hull to within approximately two millimetres.

Recommendation (Level A) –Replace stern gland with the same or with a PSS stern gland (including rubber boot) and fit vent or water inlet on stern tube. Replace cutlass bearing.

F.4. Cathodic protection

For galvanic protection a single main hull anode (believed zinc) was fitted to starboard and slightly aft of the stern tube. Another had been fitted to the propeller shaft and was completely corroded.

The main anode is not working very hard (5% depleted). The two studs were secure. The propeller shaft had poor connectivity to the main anode. This suggests that the shaft anode was doing the work of the main anode until it is depleted. The main anode was bonded to the P bracket (good electrical connectivity), steering gear (good connectivity) and also shore power earth (though the entire cable route was not exposed). The engine and gearbox were also connected to the main anode and the shaft, though the electrical connection was not good.

Recommendation (Level A) – Replace shaft anode. Re-establish electrical connectivity between the main anode and engine, gearbox and propeller shaft.

G. Safety and other Equipment

G.1. Ground tackle and mooring arrangements

a) Main anchor – This was a 35lb CQR plough anchor attached to the chain via two shackles: one galvanised with riveted pin in fair condition and the other stainless steel with a wire-mouse. There was no swivel mechanism. All moving parts were free and the anchor was not excessively worn or slack at the pivot between neck and shank. According to the Department of Transport's Marine Guidance Note (MGN) 280 (which is not mandatory for this vessel as long as she is used privately), the anchor's weight and type are adequate for the vessel. There was provision to secure the anchor to the stem head fitting but no room in the windlass/anchor locker and no means of securing the anchor to the deck.

There were two rollers on the stem head fitting. The portside one was in fair condition; the starboard was not seen under the anchor.

b) Main anchor chain and warp – There was 27m of 10mm chain the first 23m from the anchor was in fair condition. From about the 23rd meter, toward the warp, the chain had mostly lost its galvanised coating but was serviceable.

According to MGN 280 (not mandatory for this vessel as long as she is used privately), this vessel requires a minimum of 40m of chain (when no warp is also used).

There is also 18m of nylon warp (20mm dia). This is adequate size and length and the warp is in fair condition. The warp and chain are connected poorly and a proper warp-chain a splice is required.

The bitter end is tied fast through a hole at the base of the anchor locker and would be awkward to cut with a knife in an emergency.

c) Kedge Anchor – No other anchor was seen aboard.

d) Anchor windlass – There was a Lofrans Cayman 88 1000 watt anchor windlass (serial number CM000230). This was seen operating under no load. There was a handle for manual operation. This was not tested. Where the cables passed through the bed of the windlass well to the gland for the remote control, there was no protection for the cables from chaffing against the GRP. Windlass cables were also seen wrapped in electrical insulation tape. The integrity of the connection was not seen. There were four nuts and bolts with penny washers fastening the unit to the anchor locker bed. These could not be reached but showed no visible sign of crevice corrosion.

Where the chain enters the chain locker under the windlass these was no hawse pipe and water entering the anchor/windlass locker from the forward end could drain into the chain locker and into the bilges. Consider fitting a hawse pipe.

e) Mooring cleats and fair leads – There were six anodised aluminium mooring cleats, two in the bow, two amidships and one in each quarter. No backing plates were seen. All were secure to the deck. There were two stainless steel fairleads in the bow, two amid ships and one in each quarter. All were serviceable.

f) Fenders - Seven fenders seen in various condition, mostly serviceable, though at least one deflated and needs inflating with air or renewing

Recommendation (Level B) –Splice warp to chain correctly. Tie off bitter end of warp in anchor locker with a lanyard that could be easily cut through the forecabin hatch. Fit a kedge anchor, chain and warp of appropriate sizes. Protect windlass control cables from chaff. Examine windlass power cable connections below insulation tape to confirm the connections are water tight.

Suggestion – Consider replacing the riveted mild steel shackle on the anchor, and the corroded anchor chain (ideally all the chain) and fitting a hawse pipe.

G.2. Bilge pumping arrangements

There were two manual bilge pumps (both in the cockpit locker), draining that locker and the bilges (main) and a 12v bilge pump (with manual/automatic switch) draining the bilges. There were also electric shower sump pumps in both heads and an electric pump in the cockpit locker with hoses coiled in the locker and no strum box.

a) Manual pumps – The main manual pump is a Whale gusher Mk 3 rated at 65 litres per minute. The main pump strum box and pump were secure though one screw was missing from the strum box. The cockpit locker manual pump had no outlet hose and was heard to pump air. The strum box was not reached and clips showed signs of significant corrosion. Judging by its size, the cockpit locker pump is thought to be of similar capacity to the main pump. Handles were stowed close by. Bilges were dry and so the pumps were not properly tested.

Manual pumps should be serviced periodically especially replacing the diaphragm. Whether or not spares are still available has not been confirmed here.

b) Automatic and electric pumps – This was a Rule 2000 electric pump rated at 7.5 litres per minute. It operated on automatic and manual. The float switch and the strum box were secure though the pump was not secure to the strum box.

The heads bilge pump/shower pumps and the electric pump in the cockpit locker operated but were not fully tested. The aft heads shower pump was rated at 20 litres per minute

c) Hoses Corrugated hoses were in serviceable condition though this type of hose can significantly reduce a pump's output. The outlet for the main manual and automatic pumps were high on the topsides by way of the port cockpit locker. The hoses were looped into the cockpit coaming therefore syphoning is not likely.

Recommendation (Level A) –Secure main manual bilge pump strum box, service both manual bilge pumps, replace automatic pump strum box. Check strum box, hoses and clips on locker pump. Fit outlet hose to portable cockpit locker pump.

G.3. Davits and Boarding Ladders

There were no davits. A stainless steel boarding ladder with teak steps bolted to the stainless steel tubing was permanently fixed to the boarding platform part of the sugar scoop transom. A single step was secure to the transom and access to the aft deck was through a gate in the pushpit. There was no access internally to check fastenings.

The boarding ladder was secure and in working order, although the port side hinge was bent. The ladder extends into the water approximately 600mm, considered just adequate for MOB recovery. The teak steps had signs of wear but were secure and considered serviceable.

G.4. Navigation Lights

The navigation lights and their performance were as follows:

- 25w white stern light fitting on pushpit – approved fitting – working. Bulb wattage not checked.
- 25w red and green bi-colour light fitting on pulpit - approved fitting – working. Bulb wattage not checked.
- Steaming and deck light –working. Bulb wattage not checked
- Tri-colour fitting at masthead – working. Bulb wattage not checked
- Anchor light at masthead – working – wattage not checked.

The vessel's navigation lights were thought to conform to the Collision Avoidance Regulations though wattage of bulbs was not checked.

G.5. Firefighting equipment

This included the following:

- 1 x 1 kg ABC dry powder (rating 5A/34B) – laying in a portside main cabin locker, not secure, service record shows no service. The extinguisher had exceeded its manufacturer's time limit for use.
- Fire blanket (not inspected) to BSEN 1869 standard, located by galley and accessible in an emergency, though it was not secured.
- 1.36 kg Halon automatic extinguisher – located in the engine compartment.

a) Fire extinguisher Service or replacement – The single fire extinguisher was in need of replacement. For a vessel this size, the RYA recommends fitting at least one fire extinguisher with a minimum fire rating of 13A/89B **at each** exit to the open deck from each accommodation space. In this case, one in the main cabin, one in the fore cabin and one in the aft cabin. An extinguisher at the galley is good practice.

b) Halon fire extinguisher – The use of Halon fire extinguishers has been outlawed internationally by the Montreal protocol since 31 December 2002 and if used, insurers can disallow claims and regulators can impose large fines. See: www.safety-marine.co.uk . This should be replaced with an appropriate automatic extinguisher (when used, dry powder extinguishers can damage an engine).

c) Engine compartment – The compartment could be sealed from the rest of the vessel, though the hatch to port of the engine was a single sheet of plywood. No smoke alarm was seen in the engine room. Consideration should be given to fitting one. Sound-proofing around engine was **not** fire retardant (sample tested away from the vessel).

d) Galley –No smoke alarm was seen in the galley.

e) Petrol – No petrol was seen aboard. This should be stored on the aft deck where fumes cannot enter the vessel.

Recommendation (Level A) - Before she is used, the fire extinguisher should be replaced and at least two more added, all to at least 13A/89B rating. Fire extinguishers should be serviced annually or replaced every five years. The Halon fire extinguisher should be replaced with an appropriate automatic fire extinguisher (FE36 type or other Halon replacement) and disposed of in an approved manner. Consideration should be given to fitting a smoke alarm in the galley and engine compartment and replacing sound proofing with fire-retardant material. Secure fire blanket in accessible position in galley.

Note – Insurers may repudiate claims arising from fire damage where firefighting equipment was inadequate.

Additional information can be obtained from the RYA website:
http://www.rya.org.uk/infoadvice/safteytips/Equipment/Pages/fire.aspx

G.6. Lifesaving equipment

The following lifesaving equipment seen aboard:

- Seago offshore Type G 6 person liferaft (Serial G0906345) was seen. No service date had been entered. An invoice for the same was seen dated 2006. The service interval on this raft is 3 years. There was a liferaft bracket mounted on the starboard pulpit, all sound and secure.
- One lifebuoy was seen aboard with line but no light and there was no mounting for a second. Two lifebuoys are recommended for offshore passages.
- No dan buoy was seen aboard. This is recommended for offshore passages
- Ocean Safety offshore flare pack (4 red, 2 orange buoyant, 4 red parachute) was seen aboard replacement date 2014. Replace before departure.
- No thermal protective aids (TPAs) seen aboard (eg 'space' blanket)
- No EPIRB was seen
- Radar reflector on mast. From a photograph, this appeared to be broken but it was not fully inspected.
- Buoyancy aids and lifejackets seen (but no safety harness) were seen aboard but are not on the inventory.

Recommendation (Level A) – Check purchase date of liferaft and service if necessary. Lifejackets should each have crotch straps and a spray hood. Carry safety harnesses. Replace radar reflector and carry full set of offshore flares. Fit a second lifebuoy with a light and fit light to first. A danbuoy is recommended by the RYA along with MOB recovery system, 406 MHz EPRIB/PLB and grab bag. Carry other appropriate lifesaving equipment (consult RYA).

More information can be obtained from the RYA.

The RNLI operate free inspection and advice service concerning levels of safety equipment (SEA Check) and can be contacted on 08003280600 or via https://rnli.org/Pages/All%20forms/142-enquiry-sea-check.aspx

G.7. Navigation equipment

The following were seen aboard operating unless stated

- Helmsman's pinnacle compass – checked with a hand bearing compass and found approximately 3 degrees difference. When deflected the card did not return to exactly the same place.
- Autohelm log/speed – seen switched on and functioning at sea but not fully tested. Was thought to be over-reading and in need of calibration when compared to SOG and tide.
- Autohelm wind speed/direction – seen switched on and functioning but reading incorrectly
- Autohelm GPS repeater - seen switched on and functioning at sea but not fully tested
- Stowe Navsounder Depth – seen switched on and functioning at sea but not fully tested
- Stowe Log indicator at chart table. Reading did not change during Sea Trial or on passage from Littlehampton to Shoreham and presumed disconnected.
- Furuno 1715 Radar - seen switched on and functioning at sea but not fully tested. Where the radar cable passed through the mast there was no grommet. One of the rivet heads on the radar bracket to the mast appeared (seen on a photograph) to be on its way off. Inspect aloft.
- Two VHF radios (EME Seacom m-168 F and Shipmate RS8110) both seen switched on and functioning (receive and transmit – using as hand held) but not fully tested. Neither was a DSC radio. Two aerials were seen at the top of the mast.
- MLR DGPS FX412 seen operating at sea but not fully tested.
- ICS Nav 4 NMEA Natex receiver/printer with spare paper rolls– not tested
- Clock, thermometer and tide clock– not tested

No day shapes were seen aboard.

Recommendation (Level A) - Carry appropriate day shapes, ready to rig. Other navigational equipment will be needed for the intended use.

Recommendation (Level B) Inspect Radar bracket aloft.

Suggestion Consider servicing or replacing compass.

G.8. Other inventory items

a) Outboard motor bracket - A teak bracket was secure on the pushpit.
b) Dinghy - Seen aboard but not inspected as client had done this and said no further inspection was required.
c) Mooring lines - Various mooring lines seen some very stiff and others were significantly chaffed.
d) Ensign pole – not serviceable and needs replacing. Its position is considered dangerous as a crew member might grab it for a firm hold while boarding and it would not support much weight. Consider moving.
e) Sony AM/FM/SW/LW receiver – Not tested
f) Kenwood KDC504 10 disc CD autochanger. Not tested

H. Accommodation and on-board systems

H.1. Accommodation General

The accommodation was in good condition throughout especially for the age of the vessel. Upholstery, headlinings, curtains, varnished teak-clad plywood timber and teak trim were all in tidy condition. Good handholds on the portside of the main cabin which were secure. The teak and holy cabin sole boards were in fair condition. Blinds under hatches and carpeting in fore and aft cabins were less tidy.

In the forecabin were 2 single berths that can be converted into a double berth. The forward heads compartment was to starboard, aft of the forecabin with two entrance doors (main cabin or forecabin), marine WC, washbasin, shower, hot and cold pressurised water. The saloon had an L shaped settee to starboard with a single settee berth opposite. The table was fitted centrally around the mast compression post. The U shaped galley was to port, aft of the saloon and immediately adjacent to the companionway with refrigerated ice box, gas stove (with cover) and twin sinks (with teak covers). The chart table and instruments are to starboard opposite the galley. A passage to the aft cabin was to starboard, with a pilot berth forming an extension of the chart table seat (when the backrest was removed). The Aft cabin has fore and aft double berth to port and a bench seat and large hanging locker to starboard. To port was a second heads unit with a marine WC, washbasin and shower with hot and cold pressurised water system.

Ventilation was good with opening lights and ventilators on fore and aft cabin hatches as well as both heads compartments.

Cosmetic condition of the heads compartments was considered good.

H.2 Gas Installation

This vessel was not built to be RCD/CE compliant as she is too old. She is not being coded for commercial use and the surveyor is not 'Gas Safe' registered. Some Insurance companies require a declaration from the assured that the gas system conforms to ***current*** standards and if that is the case here upgrading may be required as a condition of the insurance policy. Some insurers judge a gas installation against ISO 10239. Even if the vessel is not required to comply with that standard it contains much advice. Information can also be found at www.boatsafetyscheme.com.

The vessel had the following gas installation:

- One Calor Gas butane bottle in a gas locker on the port side deck adjacent to the cockpit. This drains overboard down a plastic pipe bonded to locker base and the topsides.
- A regulator with shut off valve mounted directly to the gas bottle.
- A flexible hose on the low pressure side from regulator is clipped to a 'male' fitting at the locker side.
- A copper pipe from here to the galley with a shut off valve in locker below and a flexible reinforced hose to a gimballed Plastimo Atlantic cooker.
- No other appliances.

a) Bottle storage: There was a strong small of gas when the locker was opened. Gas was found on. The vent overboard was about 30mm which is considered adequate. The single 4.5kg Calor Gas butane bottle was loose in the

locker. The seal around the locker lid was missing. From the aft cabin heads unit, water could be seen to have leaked out of the gas drain (or from where the copper pipe passed through the gas locker side) and gas could follow the same route into the bilges. There had been a rudimentary repair (access from under the heads sink unit is possible but very restricted) but its integrity was not confirmed. The locker lid catch was loose.

b) Flexible hose: Condition was serviceable and it was in date (replacement due 2016). There was a clip on the male fitting to copper pipe but **no** clip on the regulator end of the hose.

c) Regulator condition: Good externally. This is not a marine grade regulator and these require periodic replacement in marine conditions.

d) Copper gas pipe on low pressure side to cooker: Fair condition where seen through flexible hose conduit but the majority of the pipe's length was inaccessible. Where seen it was clearly not fitted recently. Where the pipe passes close to the hull, any leaks would cause unseen corrosion. The locker was not sealed where the pipe leaves locker.

e) Connections and armoured flexible hose to cooker: Condition was fair. The hose was not fouling on the cooker as it swings. Hose date not seen but from its visual condition, the hose was not recently fitted.

f) Cooker and other appliances: Cooker condition was poor. It was gimballed and had a shut off valve which was clearly visible and accessible when the locker door was open. The valve was thought not to be a needle type though this was not confirmed. **Only** the flame failure device on the oven was heard to work. The other three were not heard and it is assumed they were not working. There were two opening portlights immediately above the cooker. There were no other appliances and none requiring flues.

g) Leak detectors: No gas alarm nor leak bubble tester was seen.

Recommendation (Level A) –Fit clip to flexible hose-regulator join. Have cooker inspected by a gas-safe engineer or replace. Secure bottle(s) in locker. Have gas locker tested for any leaks into the vessel (eg drain) and, if necessary, repair by accessing through the panelling behind the upper heads unit lockers.

Recommendation (Level B) –Replace regulator with marine grade regulator. Fit leak detector and gas alarm. Replace copper pipe and secure each 500mm along its length including securing it to the gas locker side and sealing this. Replace flexible hose to cooker. Replace lid seal.

Please note this survey is not a gas safety certificate, that is only obtainable after comprehensive pressure testing and assessment by a qualified person listed on the Gas safe register (formally CORGI) www.gassaferegister.co.uk.

H.3. Electrical installation

There was one 12v DC battery (engine start) in the aft cabin under the starboard side bench (amp hrs not seen) and two service batteries in parallel (105 amp hrs) under the aft cabin bunk. A four-way isolating switch is beside the chart table.

Charging was by twin alternators (one rated at 50amp) and an Ampair Aquair 100 water/wind turbine wind/water generator and a 240v charger.

240v AC shore power was fitted with circuits for the calorifier, battery charger and ring main. The ring main had sockets in the forecabin, galley, chart table, engine compartment and aft cabin. A sure Power multi battery isolator was fitted.

h) Batteries and charging– All were well secured and the compartments had lids. All were seen charging at 14.5 volts dropping to 13.0 volts when engine shut off. After 5 days, battery 1 had fallen to 12.8 volts, and battery bank 2, had fallen to 12.4 volts on a battery voltmeter/drop charge test meter. Electrolyte levels were not seen on any as batteries were sealed. The drop charge test produced a fair result suggesting that there could be a drain on the service batteries. Disconnecting them and monitoring any drop in voltage would either confirm this or may indicate the batteries need replacing.

The installation was clean and tidy and well maintained and cabling was flexible.

Ventilation over the batteries was minimal with the upholstery in place (this is as designed). When batteries are charging they produce hydrogen gas, which is lighter than air but very explosive.

A second isolator switch under the chart table side panel overrides the four way switch on the panel.

A Waeco Mobitronic Controller gives data on battery load and battery charge levels. This was not tested though it was seen to give a higher load reading (amps) with the fridge on. The analogue voltmeter is thought to under read considerably. There was a digital voltmeter that gave similar reading to the drop charge test meter.

A 240v Aquaman heavy duty marine battery charger was seen in the engine compartment. It was not seen working as shore power was not connected.

A wind generator was mounted on an aluminium mounting pole which was secure to the deck though corroded below the paint coating. There was a support pole fastened forward onto the aft cabin coachroof and two wire stays fastened to the toe rail in each quarter via two bottlescrews. Cotter rings secure clevis pins and one Cotter ring has opened. The swivel bearing at the top of the wind generator pole was badly worn though working during strong winds. Despite being on board during strong winds, it could not be confirmed that the wind generator was working as no voltage variation was seen.

The wind generator was connected electrically via a gland on the starboard quarter. There was a second gland adjacent to this which was not in use and is therefore thought to be the for the water turbine. The water turbine was a separate (believed interchangeable) unit (seen stowed in the cockpit locker) with two spare water turbines (seen in the forecabin).

An overcharge regulator was fitted between the two battery banks.

i) Circuit protection – 12v DC circuits had switches mounted on a panel by the chart table. There were push switches and toggle switches. The push switches were stiff and need freeing up for ease of use.

j) Lighting –There were three halogen lights in the main cabin. The central one had no bulb. The other two were working. All other cabin lights worked except the far portside bunk light in the aft cabin and both heads lights which did not operate when switched on. There was a light in the engine compartment that was working and variable brightness chart table light also worked (on the bunk light circuit).

k) 240 volt shore power – An RCD with a 30 milliamp trip was not tested as the power could not be connected. An earth wire was thought to be connected to the main anode (as the same yellow and green wire was seen at the anode and the shore power connection in the cockpit locker) but this was not confirmed as the route was not traced. There was no galvanic isolator.

The socket in the cockpit for the shore cable was rated at 30Amps and 125Volts. The thread on the cap did not turn over the fitting. The pins in the fitting were flat and there was an adaptor for use in the UK.

Under the forward heads sink the cable to the socket in the forecabin passes through bulkhead bonding with no protection from chaff. Not all cabling was checked.

Polarity test unit on chart table panel, not tested as shore power was not connected. Isolator switches/MCBs (not tested) at chart table panel for ring main, battery charger and water heater. There was also a polarity test unit at the chart table. This was not tested.

Recommendation (Level B) - Disconnecting battery bank 2 and monitoring any drop in voltage to confirm any current drain or replace batteries. Repair wind generator swivel bearing and confirm the unit is working. Repair if necessary. Replace cotter rings on wind generator stays. Consult a marine electrician regarding the shore power connection. Confirm MCBS and polarity tester are working. Prevent cabling from chaffing eg under forward heads sink unit.

Suggestion –Removal of the paint coating on the turbine pole should prevent further corrosion. Replace cotter ring on port side. Consider fitting a galvanic isolator.

H.4. Fresh water tanks and delivery

The starboard tank had sealant on the outlet which may indicate a crack or fracture. Water filler unit needs replacing as it was not closing properly. The filler hose and the hose connecting the two water tanks were not seen. The filler cap on the deck was not sealing and the unit should be replaced. There was a water tank level gauge at the chart table but this was not seen to work.

The engine water heating was seen to work.

The calorifier was in poor visual condition but not tested as shore power could not be connected.

Some freshwater hoses were loosely connected and leaked when pressed, eg in the engine compartment and under the sole board in the cockpit locker. The armoured cover to the forward heads shower hose had parted and needs replacing.

Pump and accumulator delivered water to all three sinks and the cockpit shower unit. There was also a manual freshwater tap at the galley. The water did not taste tainted.

Recommendation (Level B) – Replace water filler cap unit. Repair water tank level gauge, replace forward shower hose.

Suggestion – Consider exposing and checking/replacing water filler hose and clips.

H.5. Heads

Both the WCs were manual sea water flush with direct overboard discharge and were securely mounted.

Both units were in good visual condition and pumps operated though not tested afloat. Hoses and clips were sound to the hammer and secure. All shower, toilet discharge hoses and toilet inlet hoses had anti-siphon loops but no siphon breaking vent was seen. No holding tank was fitted. Outlet hoses were not sanitation grade.

Both heads shower sump outlet pumps operated when switched on but were not tested with water.

All clips close to fittings at or below the water line needed to be replaced along with skin fittings, ball valves and tail-pipes (seeA4).

Suggestion - Consider replacing heads outlet hoses with sanitation grade hose. Consider replacing all water hoses close to or below the waterline.

H.6. Heating and refrigeration

The vessel was fitted with an Eberspacher Airtronic diesel fired hot air heating system with ducting to all cabins. There was a 12v fridge compressor to port of the companionway steps with a cooling plate/freezer in the fridge box in the galley.

a) Heating – The Eberspacher unit had been removed for repair. The air intake was from the cockpit locker and once the locker lid seal is repaired may not be adequate. To avoid exhaust gases being blown into the cabin by the unit, care should be taken to ensure the air intake is adequately isolated from the exhaust fumes. The exhaust skin fitting is damaged externally. The exhaust hose has a joint that was not fully examined but appears not to have any insulation and is therefore dangerous. This should be addressed and the exhaust should be routed away from the diesel filler hose.

The heating fuel feed is taken from the engine feed. The heater's external fuel pump was in fair visual condition. Ducting was not completely checked though some defects were found such as in the cockpit locker, the ducting through the aft cabin heads bulkhead had parted and elsewhere it had been flattened.

Fridge – This became cold when switched on.

Recommendation (Level A) – Ensure heater air intake is sufficient and is clear of any exhaust fumes. Re-route heater exhaust away from diesel filler hose and make safe the join in the exhaust hose. Replace damaged ducting.

I. Security

Insurers may not honour claims arising from theft if insufficient measures have been taken. For details, policy wording, insurers and the Financial Ombudsman Service should be consulted.

a) **Main cabin access –** Secure and lockable with a barrel lock.
b) **Deck hatches –** As manufactured. Lockable and adequate.
c) **Cockpit locker –**Lockable with a padlock.
d) **Outboard Lock –** A proprietary outboard lock was not seen aboard. Consider using one.
e) **Liferaft –** No liferaft security seen.
f) **Anchor locker -** Anchor locker cannot be secured with a padlock.

J. Moisture Readings

High moisture content is not generally a structural defect, and is to be expected in older GRP/FRP vessels. However where some moisture has been absorbed the likelihood of moisture-related problems occurring is higher, and the actual state of the laminate cannot be completely guaranteed without destructive testing and chemical analysis. The opinion given in this survey is based on all the evidence available at the time without destructive testing.

The readings reported need to be considered in conjunction with the period the vessel has been ashore and the weather conditions when obtained. The difference between readings above the water line (normally dry) and below should be noted.

The interpretation of the readings in shallow mode range for a monolithic hull is as follows:

- 0 – 15 For all practical purposes may be considered dry; 16 - 20: Some moisture present at low levels but of no great concern;
- 21 – 30 Considered medium, but those at the top of the range i.e. 30 are at the point where the risk of moisture related defects developing is significant;
- 31- 45 Considered high and at a level where the risk of moisture related defects being present but not yet physically detectable is significant;
- 46 – 60 Very High and will usually be accompanied by physically detectable signs. Likely to be accompanied by a significant increase when switched to deep mode;
- 61 – 100 extremely high and indicative of possible laminate damage in addition to osmotic blistering. Likely to be accompanied by a significant increase when switched to deep mode.

K. This Vessel and VAT, RCD, and Part 1 Registration

The vessel surveyed here is believed to have been built in the EEA in 1991. The RCD would not apply to her unless she has been exported from the EEA and then re-imported after 1998.

Unless she is used commercially she will not require to be certified by one of the MCA's certifying bodies.

She has not been Part 1 Registered (under the Merchant Shipping Act). The RYA advises Part 1 registration is especially valuable when sailing beyond UK waters.

As this vessel was commissioned after 1st Jan 1985 (whether or not she was also in the EU on 31st Dec 1992) then she is not eligible for 'deemed VAT paid' status from HMRC and VAT status may need to be proved. Proof of VAT status may be required on re-entry to the UK after a number of years away from British waters.

As much information as possible about the vessel's history should be gathered. The above is not intended as advice but only as an introduction to these subjects. If there is any doubt, contact the RYA, MCA, or HMRC Recreational Boat Helpline in Portsmouth.

L. Scope, Limitations and Declaration

This full condition survey was carried out in accordance with my standard Terms of Business. Its purpose is to establish the structural and material condition of the vessel and systems.

- Where equipment was tested this is detailed in the text.
- References to condition are in relation to the vessel's age (i.e. good condition does not necessarily mean new).
- Mechanical condition of the engine is not covered under the terms of the survey, only the installation and visual condition were inspected.
- The survey is not a parts and labour guarantee and it should be noted that defects may exist in the vessel that the survey could not detect due to the limitations of time, vessel presentation and the range of tests (excluding destructive testing or dismantling) acceptable to the owner.
- Some components may appear serviceable but are found defective when under load.
- Parts of the vessel that were covered, unexposed or inaccessible due to fixed panels, mouldings etc were not examined, so I cannot say these areas are free from defects other than where specified.
- No fittings or fastenings were removed for examination other than where specified.
- The survey carries with it no guarantee against faulty design or latent defects or suitability of the vessel for any particular purpose, nor any guarantee of compliance with any particular national or international rule, requirement, regulation, law, standard or code unless specifically stated in this report.

The survey is for the client. No liability is extended to anyone else. The international copyright of this report is retained by the surveyor.

Declaration - This report is as true and accurate a description of the vessel as could be ascertained at the time of the survey, but no guarantee is given or implied.

Andrew Edmond (5th February 2014)