MEDUSA
MARINE

S1382 – Pre-purchase full condition survey report on:

Nicholson 39 [redacted]

For

[redacted]

Surveyed at [redacted] **on** [redacted]

Richard R Thomas BA(hons) AMYDSA MRINA T/A Medusa Marine
236 Walton Road, Walton on the Naze, Essex, CO14 8LT
01255 674074 –07831 160402 Skype Richard0Thomas
email richard@medusamarine.co.uk

www.medusamarine.co.uk

Nominated Coding Surveyor for small commercial vessels

Member Royal Institution of Naval Architects

Accredited Member Yacht Designers & Surveyors Association

Tonnage Measurer for all Red Ensign Flag States

Report on sailing yacht [redacted]

This survey was carried out on the instructions of:

[redacted]

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1) General notes.

a) Responsibility

Any responsibility is to the above client only and their insurers, and not to any subsequent owner of the vessel under survey or holder of this report. Copyright is retained by Medusa Marine and copies must not be made or distributed without specific permission of the copyright holder.

b) Location

The vessel was laid up ashore at [redacted]

c) Purpose and scope of survey

This survey was carried out under Medusa Marine standard terms and conditions. These are available on our website:

http://medusamarine.co.uk/index.php/terms-and-conditions/

The survey was commissioned by the purchaser for the purpose of establishing the condition of the vessel prior to completion. Unless otherwise stated, the vessel was not surveyed for compliance with any build standards (RCD) or operational codes of practice or local licenses. The vessel has also not been surveyed for suitability for any particular purpose or location. This survey report is a factual statement of the surveyor's examination as carried out and his opinion given in good faith as to the relevance of disclosed facts and defects so far as seen. It implies no guarantee against faulty design or latent defects.

d) Limitations

Areas inspected were limited to openings and access available during normal operations and maintenance of the vessel. No fastenings or skin fittings were removed, keel bolts drawn or joinery or head linings removed. Closed compartments were visually inspected by means of a snake camera. Materials used in the construction were tested as far as was possible by industry standard Non Destructive Test (NDT) test equipment.

Unless the vessel was afloat, the mechanical condition of the engine was not covered by survey, only the installation and components normally available to routine maintenance could be assessed. If afloat, only assessment of the engines no load running condition was possible. Surfaces coated with layers of paint cannot be examined for damage evident on the substrate beneath the paint coat. Sails where present, were examined for general condition. The sails were not set, so no assessment of fit, shape or stretch could be made. Spars and rigging, where stepped, could only be examined visually from deck and ashore.

Navigational equipment, electrical installations and domestic appliances were assessed subject to limitations if battery charge or shore power was available. If there was no opportunity for sea trialling the vessel, no assessment of the vessel and her equipment under seaway conditions was possible. No opinion could be made or responsibility undertaken for condition or defects of those aspects of the vessel not accessible, or reasonably evident, due to the above limitations.

e) Recommendations

Recommendations have been subdivided into three categories. All are annotated thus and are summarised at the end of the report

Category 1 (Cat 1) recommendations are safety and seaworthy related defects which should be corrected before the vessel is put into commission.

Category 2 (Cat 2) recommendations relate to defects which affect the operation of the vessel in normal use and should be attended to at the earliest opportunity. They do not however, affect the safe operation of the vessel.

Category 3 (Cat 3) recommendations relate to conditions which are cosmetic or may affect the perceived value of the vessel and could be attended to when convenient and at the owner's discretion.

2) The Vessel specifications and description

Note: Dimensions and measurements given have been derived from manufacturers published data, and have not been verified by survey.

LOA:	11.89 metres
LWL:	8.63 metres
Beam:	3.51 metres
Draft:	1.68 metres
Displacement: (light)	8.165 tonnes
Ballast:	3.175 tonnes
Builders:	Camper & Nicholson / Robert Ives Ltd
Model or Type:	Nicholson 39
Hull No:	[redacted]
Year:	[redacted]
Registration (part one):	[redacted]
Designer:	Raymond Wall
Construction:	Fibreglass (GRP) hull and deck
Engine/gearbox:	1 x Lansing Ford FSD 425
Sail area:	83.3 sq metres
Rig:	Masthead ketch

This vessel was built before the 16th June1998 and therefore is not subject to the requirements of the Recreational Craft Regulations (SI 1996/1353). It was built before the 2005 (Directive 2003/44/EC) which includes environmental emission limits.

Vessels that were built before 1st January 1985 and within the EU prior to 1992 are considered VAT paid. This boat was built in the EU before 1985 so proof of VAT status is not needed. The vessel is showing a UK Register (part one) registration. These need to be renewed every five years and it may not be currently valid. Re-registration would require a measurement survey.

Boatbuilders Camper and Nicholson dates back to 1863 and was at one time the largest private yacht builder in the world. This was in the pre-war period with custom built wooden yachts. With the post war leisure boom C&N needed to diversify into the volume production of GRP yachts but had no skills in that area.

In 1960 C&N developed the first GRP Nicholson, a 36 footer, in partnership with GRP moulders Portchester based Halmatic, There followed by a range of yachts up to 43ft. The fit out was subcontracted to Fields Aircraft Services of Leicester. By 1966 the moulding and fit out was all completed by Halmatic at its new Havant factory.

C&N ended the relationship when Halmatic started to become a competitor with their own range of similar yachts. C&N brought the fit out in house and contracted the moulding of hulls to Marine Construction Ltd. The Nicholson 39 was launched in 1975 built by this partnership until Marcon ceased trading and the last vessels were moulded by Robert Ives Ltd of Christchurch. A total of 63 had been built when production ended in 1979.

[redacted] is one of the last ones, hull number [redacted] of the 63 built, moulded by Robert Ives and fitted out by C&N. The design is of a relatively heavy displacement hull with undistorted lines. A bold sheerline with moderate flare and a steeply raked stem leads to a round bilged hull form with midships tumblehome and an overhanging curved transom stern.

The raked stem leads to an encapsulated semi-long keel with a cut away forefoot. The rudder is hung on a moulded skeg with a stock emerging under the aft cabin bunk. The centre cockpit has a wrap around screen and a full canvas cover. The wheel steered helm is on a walk round pedestal. The cockpit can seat a crew of six with a full depth locker to the port side seating.

The masthead ketch rig is simple and conventional with single inline spreaders, cap shrouds and fore and aft lower shrouds to the main mast. The main mast has a single forestay and single backstay with a split bridle. The mizzen has aft swept single spreaders with twin forestays cap shrouds and aft lower shrouds.

The accommodation provides for up to seven berths, In the fore cabin is a traditional double 'V' berth with an infill and stowage compartments under and an opening hatch to foredeck. Moving aft to port is the heads compartment with a sea toilet with a shower tray to the sole. There are hanging storage compartments opposite.

In the saloon there is a dinette to port and a settee opposite with a trotter box, both usable as single berths. These are either side of a drop leaf table on the centreline. There is a good sized galley to starboard utilising the passageway to the aft cabin as a worktop. The galley has a two burner gimbaled gas cooker with an oven and grill, and a stainless steel sink with a hot and cold water supply. The chart table is to port using the foot of the dinette as a navigators seat. Instrumentation is on the aft facing bulkhead.

The galley passageway leads to the aft cabin. Access is through an en-suite heads and shower compartment. The cabin has twin hull side berths as a V berth but the starboard side is wider and is possible to be used as a double berth. The bunk base and the sole give access to the stern gland and the steering quadrant beneath.

The yacht was of a high build quality and was of a high specification for its era. It was designed as a comfortable passage maker and Blue Water cruiser with a safe deep centre cockpit, a powerful engine and an easily handled ketch rig with a furling genoa. The ease of handling has been enhanced further with the addition of in-mast furling for the mainsail and electric winches for the genoa sheets.

3) Survey details

a) Hull general

Hull construction is of solid skin glass reinforced plastic (GRP) laminates of chopped strand mat (CSM) bonded with polyester resins. The construction is conventional with hand laid up laminations of alternating CSM over a white pigmented gel coat to the topsides. It was common practice for this builder to use clear gelcoats below the waterline.

There are two deep longitudinal stiffening frames of vinyl foam cores in the topsides which integrate with full and partial bulkheads and transverse keel floors. These are all laminated over to form a strong hull. The hull form of firm round bilges and reverse garboards is a naturally stiff shape. There is then an internal tray moulding providing sole board bearers, berth bases and plinths for the heads compartments. This is all fully laminated to the hull.

The hull would have been moulded in a split mould which allows for the moulding of the tumblehome and the hull to deck flange. It also ensures a well consolidated lay up to the keel and rudder skeg before the two halves are joined and the whole heavily laminated over.

This hull would have been built before the problems associated with moisture absorption into permeable resins and laminates were fully understood. The actual resins used in the construction could not be determined by non-destructive testing so no assumptions could be made. They can only be measured and tested for their ability to have delivered their intended purpose.

The hull was built well after the 1973/74 OPEC oil embargo when petroleum derived products quadrupled in price. It was during and after that event that some manufacturers resorted to cheaper orthophthalic resins to maintain profit margins. At the time this vessel was built prices and supplies had stabilised and most reputable builders were using impermeable isophthalic resins for the gel coats and first laminations. Both resins have the same structural properties.

b) Bottom

The bottom is finished with a black antifouling painted coating. This is a poor finish being applied over multiple layers of eroded and flaking previous coats of the same colour. This is a used coating as there is a clear waterline staining evident. There is no record of whether the hull has previously been given a preventative epoxy coating.

Some antifouling coatings with high metallic components and water retention can affect moisture readings. The antifoulings extended about 5 cms above the waterline, so readings were taken for reference on the topsides and through the coating above the waterline.

The above waterline readings were substantially lower than though the coatings. The antifoulings were clearly containing moisture or metallic elements which were skewing the readings. All following reading were taken through the coatings and areas of the coatings would only be removed if there was a possibility of defects beneath the coatings.

The hull surface was examined and was also hammer sounded all over and viewed from all angles. There was no obvious sign of blistering, voids or delamination. There were no visible distortions or evident irregularities in the hull bottom surface. This was given the limitations of assessing the hull surface beneath the poor finish to the antifouling coatings.

Moisture readings were also taken with a Sovereign Quantum Marine Moisture meter. This meter is a capacitance type tester and is equipped with both deep and shallow reading scales. This is useful to trace the depth of penetration of, and correspondingly the drying out of moisture.

All polyester laminates can absorb some osmotic moisture to a degree without it effecting the structure or strength of the construction. The comparative scale is 0 to 100, which is an arbitrary scale, and does not represent actual percentages of moisture in GRP. Figures are thus quoted as scale readings and not as percentages.

Representative readings on a Sovereign Quantum comparative scale for moisture content in GRP laminates approximate as follows:

0-15 Regular readings for a ‘dry’ GRP laminate
16-20 Slight absorption typical of permeability of weather exposed GRP
20-30 Medium moisture content, could be osmotic but unlikely to blister
31-45 High moisture, osmotic process but not necessarily physical effects
46-60 Very high, often physical effects, blistering and wicking evident
61-100 Extreme moisture usually with visible structural defects

The atmospheric conditions at the time of survey were as follows:

Weather:	Dry and occasional sunshine
Wind:	Westerly 8 to 10 knots
Air temperature:	21.6°c
Hull surface temperature:	21.8°c (port) 20.2°c (stbd)
Relative Humidity:	65 %
Dew point:	14.7°c
Hull temp above dew point:	7.1˚c to 5.5˚c

It is normal best practise to want a difference of at least 5°C between hull temperature and dew point in order to ensure the evaporation of all surface moisture.

The topsides above the antifouling showed shallow scale readings of 13. The unwetted antifouling above the waterline showed shallow scale readings of 17. It could be seen that the antifoulings themselves were adding about 4 points to the moisture readings. This is not unusual for heavy coatings with evidence of flaking within the paint layers.

The area immediately below the waterline showed average shallow scale readings of 17, readings increased progressively toward the keel resulting in occasional shallow scale readings of 22. Deep scale readings were 12 rising occasionally to 21 in the same area. No areas were considered necessary to scrape back to gel coat.

The general condition of the hull is considered to be structurally sound with a natural level of moisture absorption. It is possible that some absorption could be osmotic but it was a far too low a level to be able to cause structural damage.

A routine of laying up on hard standing for several months every season should prevent any chance of the hull laminates suffering any physical degradation. This preventative routine is good practise for a hull built with the older resin types. The present good condition does not imply any guarantee that osmotic absorption and structural defects could never occur in future.

The laminates to the hull bottom internally were tested with a Barcol Impresser. This tests the hardness of the laminate and so in theory establishes the consolidation of the lay-up and the level of cure of the resins. Readings of 36 to 41 were seen. The impresser was calibrated before and after testing with check samples and found to be accurate.

This averages out only very slightly below the normal range, 38 to 40 is considered satisfactory for modern marine grade isothalic/orthothalic resins. For the older resin types these are actually fairly good results and the tests for the quality of lay-up of the laminate show that the resins and fibres are well consolidated. The use of clear gelcoats assists the laminator in avoiding inclusions and occlusions within the lay-up.

c) Topsides

The topsides are constructed of solid GRP laminates with a blue painted finish over an original white gel coat. The topsides are in a good cosmetic condition, the painted coating being professionally applied by spray application of a two component polyurethane paint. There are some superficial abrasions to the painted coatings at the beam and to the stem.

There are marks to the starboard bow where the vessel appears to have ridden over her mooring chain. The bottom transom edge has a split in the coating which appears to be a lifting section of fairing filler and the port quarter under the bulwark capping shows some flaking and abrasion exposing the primer filler coats.

There is a moulded cove line below the sheer which has a gold vinyl tape inset which is lifting slightly at the edges. The ‘Nicholson 39’ logo moulded into the laminate has been partially obscured by fairing coats. These are all minor defects to the paint and generally, the topsides are in a good cosmetic condition.

d) Hull to deck seam

The hull to deck joint is formed within the bulwark profile. The deck is moulded with a turned upstand around the sheerline. The hull moulding has a flanged shelf just below the top edge. The deck moulding is then inserted into the hull moulding and landed onto the shelf so that the two vertical flanges are mated and bonded with a thickened resin paste.

The joint is not laminated over internally but there is a good squeeze of ahdhesive sealant. The joint internally can be seen in some cupboards and there is no sign of movement or leakage and no break in the flo-coat paint where it is applied over the joint. The vertical flanges then form a low bulwark. This bulwark is capped over with a teak moulding which is fastened down with screws into the bonded seam.

The teak capping has been made as short sections which are butt jointed without bondings or adhesives between so all the joints have moved slightly. The teak is secured by screws which are dowel plugged over although many of the dowel plugs are missing and screw heads exposed. There is some damage to the teak at the bows and the quarters. The bow damage is more siginifcant and could be repaired with a short section scarfed in.

Recommendation

(Cat 3) Repair the damaged section of teak capping at the port bows

e) Deck

The deck is constructed from solid GRP laminates. There is no core such as balsa to the lay-up as is usually seen. This results in the deck appearing to be slightly flexible under foot. The deck is supported by over laminated beam sections in the foredeck, and by bulkheads and web plates forming cupboard dividers to the side decks. The deck was moulded in a light grey coloured gel coat. It has a non-slip texture to the tread areas and gloss gel to the margins and around deck fittings although it is now a dull finish with age.

The deck is drained by four scuppers at the lowest point in the sheerline. There are two each side inside the bulwarks at the beam and they drain water down ducting laminated into the hull sides and out through ports in the topsides just above the waterline. These all appear to be effective without evidence of water pooling on the deck.

The after deck is covered by a teak inlaid decking. This is individual planks bonded down and caulked in a traditional appearance. There do not appear to be any screw fastenings and when tap tested the planks appeared well bonded. The surface shows significant erosion and the caulking is raised ridges. This is the result of aggressive cleaning by scrubbing or pressure washing. This must be avoided *(see explanatory note 3)*

The deck was tested for moisture with a Tramex Skipper Plus moisture meter. Representative readings on a Tramex are different to the Sovereign Quantum and the comparative scale for moisture content in GRPlaminates approximate as follows:

0-15 Regular readings for a ‘dry’ GRP laminate

16-38 Slight absorption typical of permeability of weather exposed GRP

39-65 Medium moisture content, could be osmotic but unlikely to blister

66-100 High moisture with possibility of physical degradation at higher ranges

Readings of 20 to 40 were recorded over the majority of the coachroofs with slight elevation to 60 in small random areas which were considered to be local to the stiffening laminated into the deck head beneath. This is usually a consequence of the natural moisture in the plywood material and not a defect.

The deck moulding was generally considered to be in good condition for the vessels age. Some slight stress crazing was seen around the stanchion mounts and the pushpit feet on the after deck. There is a break out of an air inclusion on the starboard aft coachroof and some old foredeck repairs that have been poorly filled. These were not considered to be significant defects for the age of the vessel.

f) Superstructure and cockpit

The fore and aft coachroof superstructures and cockpit are all integral with the deck moulding. The two coachroof tops feature the same non-slip finish. This is in a fair condition and cleaner than the deck due to the opportunity for water to run off.

The coachroof moulding is also constructed with no stiffening core material but with moulded beam sections. This results in some spring being apparent underfoot. The coachroof was also measured for moisture with a Tramex moisture meter and found to be in a good dry condition over the horizontal surfaces. There is relatively little surface damage seen under the dull painted coating.

The superstructure moulding is a complex shape, profiled to accommodate hatches, handrails, plinths and coamings. There is a moulded box section upstand around the mast partners with gutters at the aft corners. There is a deep crack in the upstand on the port side and a slight crazing to the starboard side.

The purpose of this moulded section is not obvious. The mast is keel stepped so there is no compression load on the coachroof top and all halyards are made off at the mast. The section when measured for moisture is very high and is probably water absorbed into core material within the raised section. As this is not a stress loaded area the absorption is not critical but the cracks could be made good to prevent further absorption and improve appearance.

Recommendation

(Cat 3) Repair the cracks to the raised section around the mast partners

There are three opening hatches in the coachroofs. The hatches themselves are detailed later. All have been replaced and the new hatches, although of the same opening dimensions, have narrower flanges. This means that the original mounting holes all round are exposed. There is no evidence of moisture ingress but these should be made good.

Recommendation

(Cat 3) Fill and fair and re-paint the old mounting holes to the hatches

The cockpit is deep and has tall coamings each side for the mounting of winches. There is integral moulded seating within the cockpit and a hinged section on the port side is access to the cockpit locker. All is in a fair condition with some superficial damage, typical for the vessels age. The after raised section is laid to teak in the same manner as the aft deck. This is in a similar condition with erosion in the grain and raised caulking.

To the port side is also a removeable lid to a deep locker containing a liferaft and grab bag. The port side storage locker is deep and has a foot hold half way down. The lid also has a flap to clear the wheel and widen the access when open. The locker also contains the battery charger, inverter, shaft brake, domestic batteries and deckwash pump.

The forward cockpit has a tall raised profile to act as a breakwater and also provide a mount for the screen. The screen is detailed later. The cockpit is completely enclosed by a grey polyester canvas full cockpit cover with a clear Vybak vinyl panel above the screen which is slightly fogged. The cover has zip out side panels with good clear vinyl windows and a back panel with a central opening roll up vinyl window. This is all in a good condition with functional zips and fasteners. The forward section has clearly seen more use.

g) Hatches and companionways

The main companionway to the accommodation is a sliding hatch and washboard from the cockpit. The hatch is an all teak hardwood fabrication with a frame and laid teak planking. This is all in good order with an intact well varnished coating. This slides on stainless steel runners on upstands that direct any water away from the opening.

The companionway washboard is a plain edged teak faced plywood panel. This is in good sound condition with an intact coat of varnish to all but the very bottom edge which has become slightly water stained. There is a mortice lock in the upper part which engages in the sliding hatch when locked. All is secure when closed.

On the coachroofs fore and aft are aluminium opening hatches by Vetus. These are a replacement to the originals and are in a good sound condition with clear acrylic. The hatches are propped open with friction stays and secured shut with lever clamps. There is one forward of the main mast opening into the forepeak which effectively forms the escape hatch from the forward accommodation.

The hatch has a firm foothold in the bunk base beneath. The hatch is hinged on the forward edge which is the recommended orientation as prevents a breaking wave flooding the forepeak if left unfastened. There is a second hatch the centre of the coachroof giving light and air to the saloon and the third hatch is in the aft coachroof giving light and air to the aft cabin. This can also be designated as an escape hatch with a firm foothold within one metre beneath.

All the hatches are hinged on the forward edge which is unusual as often a pair of hatches are orientated in opposite directions so that wind will force a circulation of air through the vessel. The hatches can also be opened from the outside which is an emergency escape hatch requirement in the event of needing to access the vessel from outside. The levers should always be unlocked when at sea.

h) Windows and ventilators

There are eleven windows to the coachroofs. Seven windows are fixed deadlights and three are inward opening portlights. Each side to the forward accommodation are three rectangular windows to the coachroof which reduce in size going forward. The one window to the heads compartment has been rendered obscured by a vinyl film applied internally. This is discoloured and looks poor but is still effective.

There is also a fixed deadlight to the after end of the aft cabin. All are toughened glass panes held in rubber gaskets to aluminium frames inset into apertures in the GRP coachroof sides. All are in fair condition except the aft facing window which has clearly been leaking and has fillets of silicone applied around the frame. This kind of sealing attempt is rarely successful and leaking windows usually need to be removed, disassembled and the gaskets replaced before being reinstalled on new sealant.

Recommendation

(Cat 2) If leaks persist to the aft window, remove, renovate and re-install properly

The other opening windows are one to the aft cabin on the port side, one to the aft heads compartment on the starboard side and one to the galley. These have cast aluminium framed acrylic glazed panes which are side hinged and secured by handwheel clamps. The cast alloy frames are in good order but the glazing acrylics are all crazed by UV degradation, this is worse on the starboard side windows.

This crazing only serves to reduce clarity and will not lead to leakage. In the inward side to the galley is a fixed aluminium framed deadlight which gets light from the cockpit side. This is also scratched externally from foot falls which reduces clarity, but none of the windows have obvious evidence of current leakage.

The cockpit windscreen is made of six rectangular flat panes of toughened glass held in fabricated aluminium frames with rubber gaskets. This is all by Houdini windows and is in good and sound order. The screens sit on a teak capping to the moulded breakwater. The capping has been abraded clean where there may have been water staining. This is more likely to be due to condensation rather than leakage.

There are no screen wipers so visibility forward in poor conditions may be a problem combined with condensation when the cockpit cover is fully enclosed. The only installed ventilation to the forward accommodation is a mushroom vent fitted into the top of the box forward of the mast. This box acts as a dorade with slots to allow water to drain overboard. The forward heads compartment motorised ventilator vents into this box.

There is another Tannoy motorised ventilator to the aft heads compartment which vents into a moulded box above with a fixed cowl. This is also assumed to take the outlet from the galley motorised ventilator as there are two stack pipes within the cowl. There is another cowl to port which has a single larger stack pipe within which is the outlet for the engine room ventilator which has a fan and motor in the cockpit locker.

The heads compartment ventilator fans are two speed and reversible with controls in each compartment. The galley fan has a toggle switch in the galley and there is a 'Fans' switch at the main switch panel. All were operated but none of the accommodation fans were heard to work when tested. The engine room fan is operated by a switch at the engine panel and did work when tested. The accommodation fans should all be investigated for function.

Recommendation

(Cat 2) Investigate the non-functioning ventilation fans to heads and galley.

i) Deck gear and fittings

Mounted on the foredeck is a Simpson Lawrence Seawolf electric horizontal windlass. This is a lift only windlass and is operated by a deck mounted foot switch and the windlass worked when tested. The windlass has a clutch which can be opened to lower the anchor and the lever for the clutch is stowed in the anchor locker. The windlass is in poor cosmetic condition with flaking power coating, but it is fully functional although not tested in service.

The chain passes through a spurling pipe in the forepeak to a chain locker beneath the forepeak bunk. In the anchor locker is a hose which delivers water from a deck wash pump. This is a diaphragm pressure pump in the cockpit with a filter inline. This is switched at the chart table and delivered seawater from a skin fitting when tested.

The anchor locker has twin lids with raised sections for the anchor shank and matching recesses in the deck. The GRP to the port side is damaged around the anchor housing and deck, probably from chain running out. This could be repaired. Normally, these would be lined with stainless steel plate which could be considered.

Recommendation

(Cat 2) Repair damage around anchor locker and line with stainless steel

There is a pair cast alloy mooring cleats on the foredecks at the bows and a pair of open fairleads mounted on the bulwarks either side at the stem. There is a pair of alloy cleats on the quarters. There are no midships cleats. All these fittings are well seated and secure. A fabricated stem head fitting includes twin bower rollers with one shaped for chain and one for warp. This fitting is rebated into the bulwark angled forward to help self launching and stowing.

This also provides the forestay chainplate on the centre web of the roller fitting and is is supported by a plate which wraps round and fastens through the stem. All the fasteners can be seen in the anchor locker and all are secure and in good condition. Shroud chainplates are elongated U bolts that are fastened through the deck where the deck is stiffened by the hull to deck joint. The cap shrouds cannot be seen but on other vessels from this yard they have been braced by the laminated web frames beneath.

Mizzen chainplates and the main mast backstay bridle chainplates are all fastened through the cockpit and aft coachroof sides. These are also free of evident movement. Not all the chainplate attachments could be inspected internally due to installed joinery and headlinings, but those accessible appeared secure with no movement or leakage evident.

A pair of stainless steel T bar sheet tracks by IYE is mounted on the deck either side. Each carries a block for sheeting the genoa. These blocks slide on cars and are limited in their movement by stops with spring loaded pins locking into holes in the track for adjustment. These slide well and are in good functional condition. The blocks show no signs of grooves starting to wear in the sheaves.

The genoa sheets are led to a pair of Lewmar 44 two speed self tailing primary winches mounted on plinths on the outside of the cockpit coamings. These winches are also electric powered with motor unit beneath and push buttons inside the coamings. These worked when tested. There are only single push buttons so the power drive is single speed only.

The main sheet is a four part purchase pinned forward of the mizzen mast step and led back to a single speed Lewmar 6 winch on the port side of the aft coachroof. The mizzen sheet is similarly a purchase pinned to the after deck and led back via the gooseneck to a block and Lewmar 6 winch on the starboard side opposite the main sheet. There is also a pair of two speed Lewmar 30 winches on the aft coachroof for spinnaker sheets and guys.

None of the sheeting systems were set up or operable to test effectively. The winch ratchets to the minor single speed winches did not all sound positive although the drums could not actually be back wound. It is always recommended that winches should be serviced annually with new pawls and springs as necessary. This should include the three mast mounted winches.

Recommendation

(Cat 2) Service the winches with new springs and pawls as necessary.

j) Safety equipment

The vessel is equipped with a tubular stainless steel pulpit and pushpits. The pulpit is a one piece four legged fabrication and it is secured into the deck by single bolt fixings on each foot with a small disc base. This is slightly flexible at all the fixings, but is quite secure. The disc feet are not at a perfect angle to the deck but any leakage would be into the anchor locker.

The pushpits are two stainless steel fabrications with an upper wire between. They are more stable as they have flanged feet with three bolt fixings and are an inherently more stable shape. Both are made from fully welded 1" diameter stainless steel tube. The pushpits have wire fender baskets built into the outsides of the frames. The guard wires are 4mm 1x19 stainless steel wire and are continuous from the pulpit and terminate at the pushpit.

The wires are terminated with roll swaged eye terminations and tensioned with rigging screws to the lower wires and rope lashings to the upper wires. They are well tensioned and there is good scope for further tensioning when necessary. There are five tubular stainless steel stanchions each side socketed into cast alloy stanchion bases bolted through the deck. These are all stable, upright and unbent.

The wire between the pushpits is attached by a pelican hook to allow access to the stern boarding ladder. This is a two part folding ladder which when deployed provides a bottom rung well below the waterline. This is for a crew member to re-board the vessel unaided. The ladder is well secured to the transom and in good order.

There are good hand holds around the vessel. There is a long stainless steel rail around the top of the forward coachroof and a loop rail to the top of the steering pedestal. Internally, varnished teak hand rails are fitted under the coachroof head and there is a stout hardwood post to the galley. All are well placed for passing through the accommodation when in a seaway.

There are no harness strong points in the cockpit but being a deep centre cockpit they are not as necessary unless taking the vessel offshore or on overnight passages. There are wire jackstays installed along the side decks. These would be advisable as all the sail hoisting and reefing lines are handled at the masts.

The only man overboard recovery devices seen on board is a pair of horseshoe lifebelts stowed on the pushpit which are properly marked with the vessels name. There are two floating lights seen on board which would be tethered to these lifebelts. Neither of the lights worked when tested although one clearly had no batteries installed. Both the lights should be reinstalled to the lifebelts with batteries and working.

Recommendation

(Cat 1) Install floating lights with new batteries and install to the lifebelts

k) Skin fittings and seacocks

Note; Bronze *is conventionally an alloy of copper and tin, but the term is now popularly used to describe a wider range of copper based alloys which have no tin content but zinc and other elements which can provide similar dezincification resistance. There is no non-destructive test for alloy composition which is practical within the scope of this survey. Where visible casting marks indicate a particular alloy, it will be described. Otherwise, where the term 'bronze' or 'brass' is used in this report it denotes a copper based alloy of indeterminate composition. (See explanatory note 7)*

There are nine though hull fittings below the waterline. One is a fitting for the speed log transducer. This is installed in the starboard side under the forepeak sole and is a glass filled nylon through hull with a nylon and aluminium impeller fitting. there is a blanking cap currently fitted and the transducer is lying in the bilge. All appeared sound and watertight although this is possibly redundant as there is no longer speed gauge fitted and the B&G Hornet device is obsolete but the total log odometer may still work.

The engine sea water intake valve is a nickel plated brass ball valve in the starboard side engine space. This has a bronze seawater strainer mounted in the top. The valve was good and clean and hammer sounded well, and the valve handle turned freely. The other seven valves are all Blakes conical plug valves. These are serviceable valves that can be dismantled and the mating surfaces lapped in with grinding paste and re-greased.

There were four I ½" Blakes valves, one for the forward toilet discharge under the heads basin, one for the aft heads discharge under the aft heads basin, and one either side in the forward engine space for the two cockpit drains. There are three 1" Blakes valves, one for the forward toilet behind the plinth, one for the aft toilet beneath the basin, and one for the deckwash pump in the port side engine space.

All the Blakes valves appeared to be well serviced and were free turning, although the forward heads flush water valve was very stiff. All were hammer sounded as good and all the hoses were tug tested and well secured. The Blakes valves are manufactured from a good quality naval bronze.

Nickel plated ball valves such as the engine seawater intake are general purpose valves and not proper marine quality fittings. They will be prone to dezincification but are widely sold and used by the marine industry because they pass the RCD requirements which only defines a minimum of a 5 year service life. These types of valves should be regularly monitored for signs of dezincification

Dezincification is where the brass turns a red carrot colour and the valve sounds dull when hammer tested. There is often also a white crystalline deposit of zinc hydroxide from the zing oxidising out of the brass. When replacing valves or skin fittings always use dezincification resistant alloys marked DZR or CR or with the alloy classification CW602N or CZ132.

All the hoses are properly secured by double hose clips. There are no tapered wood bungs for emergency use. Tapered softwood bungs of the appropriate size should be individually attached locally to each fitting so that they are available for immediate use in the event of failure.

Electrical bonding wires are attached to some, but not all the valve bodies. This is no longer considered best practice. It can be counter productive if the skin fittings are located too far from the hull anode to provide any active protection. *(see explanatory note 8)*

l) Engine

The engine is a Lancing Marine FSD 425 direct injection naturally aspirated, 2,500 cc four cylinder diesel engine. These engines have a peak propeller shaft output of 65 hp (48.5 kW) at 3,500 rpm and are marinised Ford commercial Transit engines. Marinising involves the installation of an oil cooler, Jabsco raw water pump, Bowman heat exchanger and water cooled manifold, vibration damper plate and gearbox bell housing.

The engine is fresh water cooled with seawater drawn from a valve and strainer in the starboard side aft engine bay. Water is delivered to the pump in reinforced EPDM hose. Water is pumped via the engine driven Jabsco type pump through the oil cooler and water cooled exhaust manifold and injected into the exhaust elbow via a swan neck.

The exhaust has water cooler dry riser and then the raw water is mixed into the exhaust on the down path to a Vetus plastic waterlock installed in the after engine space after a short length of hose. The exhaust exits through the port topsides. All the exhaust system appeared to be in good condition including the usually vulnerable mixing elbow.

The engine was seen to be in a good cosmetic condition. The blue paint is uniform and intact over the surface. The engine mounts are cushion mounts on solid beds. The mounts are in good condition with good rubber and relatively corrosion free. The oils were lightly carbon laden but free of particulates and well filled. The alternator belt is well tensioned.

The engine controls are in the port cockpit side. There is a gauge for alternator voltage, oil pressure and water temperature, and there is also a revolutions counter. Inside the engine space is a gauge for engine hours which shows 2335.5 hours run. This is a vibration activated gauge.

The engine was not started as there was no engine key found on board. There is a limited amount that can be gained from running an engine when out of the water as it needs to be up to running temperature and placed under full load. It is understood that the engine has been recently re-built and has run just 50 hours since.

m) Fuel system

Diesel fuel is stored in a 275 litre skin tank located under the engine occupying the keel void aft of the ballast. This is filled from a flush deck filler in the starboard side deck. There is a steel inspection panel in the top which has the tank fittings and a port for a dip stick and a graduated dip stick was seen stowed in the engine space.

Fuel is drawn from a siphon tube in the tank top and delivered to a CAV 296 type primary fuel filter in solid drawn copper pipe. This filter has an aluminium water separator in the bottom. Fuel is then delivered by flexible fuel hose to the engine lift pump and a secondary fine filter on the engine block. Fuel is returned to the tank by flexible hose and solid copper pipe. All the fuel supply system was in good and leak free condition.

All flexible fuel hose is to ISO 7840 A1 except the filler hose to the tank which is in a plain clear neoprene hose. As this is effectively within the engine space this hose should also be in fire rated hose as the fuel could be filled to the top of the filler neck. This should be replaced with hose to ISO 7840 A2 at least.

Recommendation

(Cat 1) Replace fuel tank filler hose with hose to ISO 7840 A2

There is no fuel shut off valve in the siphon fitting. It should always be possible to shut off the fuel supply from outside the engine space. As the tank is beneath the engine the fuel supply line will always be at negative pressure so this is not a safety critical feature. However, a valve would be beneficial and also an assistance in bleeding the fuel system at any time and so would be recommended. This could easily be inserted at the compression fitting.

Recommendation

(Cat 2) Install a fuel shut off valve in the fuel siphon fitting

n) Stern gear

The engine is coupled to a Newage PRM 160 drop shaft reduction and reversing gearbox serial number 31A049905. The gearbox reduction ratio could not be seen but judging by the propeller size is likely to be 3:1. The gearbox oils were checked and seen to be clean and well filled. The output shaft carries a taper and keyways coupling holding 1 3/8” stainless steel propeller shaft. This was seen to be non-magnetic when tested indicating that it is a 300 series austenitic stainless steel *(see explanatory note 12)*

After the coupling is a disc type shaft brake. This is hydraulic and operated by a hand wheel in the cockpit locker. When the shaft is locked the propeller will feather naturally. The brake worked when tested and there is a warning light at the engine control panel to ensure it is off before engaging gear.

The shaft turns in a conventional bronze packing gland. This is a bronze housing on a flexible hose to the shaft log. The shaft is fairly heavily coated with calcerous deposits indicating that it has possibly been leaking. The gland should be examined for leakage when the vessel is afloat and underway. If it leaks then the gland should be tightened. If it still leaks then the gland should be re-packed. There is no greaser fitted so pre-impregnated packing should be used.

Recommendation

(Cat 2) Investigate stern gland and tighten or re-pack as found necessary

The shaft exits the hull in the stern tube which houses a cutless bearing. There are holes in the side of the stern tube to pick up water flow and direct it through the bearing. These holes must be cleaned of antifouling. The shaft was a slack fit in the bearing. A clearance of about 0.15 mm should be maintained for a film of water to develop and lubricate the bearing. This showed a clearance of about 1.0mm This may not be enough to cause vibration but the cutless bearing should be replaced within the next season.

Recommendation

(Cat 2) Clean out the water feed holes and replace the cutless bearing.

The propeller is a 22” diameter three bladed Maxprop type of feathering propeller. The propeller is coated in multiple layers of antifouling which will compromise efficiency and performance. Some small patches were scraped back and the blades and hub were seen to be in a good condition just some light signs of pinking from electrochemical erosion. The propeller has provision for a nut anode which is heavily eroded. This should be replaced.

Recommendation

(Cat 2) Replace the propeller anode

The propeller showed significant magnetic flux when tested with a magnet indicating that it was probably a nickel aluminium bronze, nickel is magnetic. There is a disc type rope cutter installed on the shaft which is also heavily coating in antifouling and the cutting edge is blunted and unlikely to be effective.

There should be a gap equivalent to at least 50% of shaft diameter to allow a full flow of water through the cutless bearing. This clearance is only about 30% so the cutter should be sharpened and repositioned on the shaft close to the propeller for maximum water flow.

Recommendation

(Cat 2) Sharpen the cutting edge to the cutter and reposition on the shaft

There is a bar anode installed on the hull bottom. This is clearly inactive as it is old but only 5% eroded. There was no recordable electrical continuity with the stern gear. The anode is partially covered by antifouling and also by oxidation and what appears to be filler. This should all be cleaned back to bare zinc. The bonding wires should be checked and an electrical resistance of less than 0.5 ohms recorded with the stern gear for effective cathodic protection.

Recommendation

(Cat 2) Clean the anode back to bare metal and check bonding wires to establish an electrical continuity of less than 0.5 ohms

A calculation using the engine specification, hull dimensions and displacement indicates that a speed of 7.5 knots is possible with a 22 x 12 three blade propeller. This calculation also shows that the engine is well matched to the vessel with the displacement speed being 7.2 knots requiring the engine to be developing 48 hp. This is all based on a lightly loaded vessel with a clean bottom.

o) Steering system

The steering is by a semi counterbalanced spade rudder hung on a long skeg. The rudder is fabricated from two clam shell mouldings which are bonded together and foam filled. This design is vulnerable when a rudder bearing is immersed as on this vessel. This is because the seal between the stainless steel rudder stock and the GRP clam shell is almost impossible to maintain watertight due to the stresses exerted on the rudder in use.

Moisture absorption is not unusual for rudders of this construction. When tested with a moisture meter the rudder was 27 to 34 on the Sovereign deep scale. The highest readings were around a tingle on the starboard side toward the bottom which appeared to be leaking water. The purpose of this tingle could not be identified and another one was seen at a different position on the port side. If covering a defect the GRP to the blade should be properly repaired.

Recommendation

(Cat 2) Investigate the tingles to the rudder and make a proper repair as necessary

This reading is acceptably low for a rudder of this kind of construction as rectification would be very intrusive. The rudder blade was sounded with a small pin hammer for delamination and voids. It was also visually inspected for signs that the clam shell mouldings are separating. All was seen to be good and sound. There was no visible grounding damage.

The skeg carries the lower rudder hanging which is a gudgeon projecting from the bottom of a cast bronze shoe fitted over the end of the moulded GRP skeg. The skeg was also measured for moisture and read at 12 to 22 on the Sovereign scale with the highest readings toward the bottom where the shoe attaches. The skeg is integral with the hull and seen to be laminated over internally.

The shoe is bolted over the bottom of the skeg and these through fasteners have probably allowed some moisture to enter the foam core. These are also acceptable readings as there is little that can be done about minor moisture ingress and repair would be very intrusive. There is a spacer block fitted to the rudder beneath the shoe which can be removed to allow the shoe to be dropped and the gudgeon disengaged from the rudder pintle.

The rudder itself is carried on a 40mm diameter solid stainless steel rudder stock. This stock turns passes out of the rudder at the bottom to form a pintle which engages in the gudgeon. The upper stock turns in a bronze bearing and packing gland mounted in the hull bottom. This is showing calcareous and hydroxide deposits suggesting that this may have been leaking. This should also be observed when afloat and the packing gland tightened if necessary.

The free section of rudder stock above the gland carries a cast alloy steering quadrant. Steering is an Orion cable system with the destroyer type wheel driving a sprocket within the pedestal which carries a short length of roller chain. There are cables to each end which run through sheaves and flexible cable sleeves to the quadrant on the rudder stock.

This is a good tight system with good cable tension seen at the quadrant but there is some degree of slack at the wheel. This is probably play between the sprocket and the wheel pinion. There is a second sprocket with a roller chain running to a gear motor beneath the pedestal which is the autopilot drive. It is not uncommon for autopilots to cause wear in mechanical steering systems. Autopilots make much more frequent and slight steering adjustments compared to a human helm which can cause fretting.

Recommendation

(Cat 2) Investigate play in steering wheel pinion and sprocket

The autopilot is a Normand Electrical Co (NECO) gear motor managed by an electric compass mounted beside the mast step. The control unit is above the companionway. The autopilot was powered up and the rudder immediately applied full starboard helm without any command input. No further appropriate responses were seen when given commands. The system can only be fully appraised when underway afloat, but it is probably defective. The motor drive could probably be adapted to a modern electronic course computer.

Recommendation

(Cat 2) Test autopilot when underway. Consider replacing course computer

The rudder stock terminates in a milled square which can be used with an emergency tiller in the event of a steering failure. No emergency tiller was seen on board. Low speed steering and manoeuvring is assisted by a bow thruster. This is a Vetus 150-55 electric thruster mounted in a tunnel in the forefoot. This has 55kgf (4hp) thrust via a three blade plastic propeller. This was powered up and in good working order.

The lower gear case or tailpiece appears to show some electrochemical erosion which is difficult to examine beneath the paint. There is an anode but it is behind the propeller which needs to be removed for the anode to be inspected and replaced. This anode is frequently overlooked and the condition of the anode and the gear case should be examined and the anode replaced as necessary.

Recommendation

(Cat 2) Investigate condition of gear case and anode, replace as necessary

p) Mast spars and rigging

The main mast is an aluminium spar by Proctor with single inline spreaders. The mast is silver anodised and is sound with only light evident corrosion around some of the riveted fittings. None was at a level what was likely to affect the integrity of the structure. The anodising is intact but dull and slightly powdery. The mast is a thick walled section and well supported being quite short for its section.

The mast was stepped onto the keel with the rigging attached and tensioned. The spreaders are attached to riveted stainless steel fabricated roots. There was no movement in the roots in the mast. The mast is rigged with cap shrouds, forward and aft lower diagonal shrouds, and a single fore stay and single standing back stay with a bridle.

The mast has a heel block which is stepped into a steel channel section with packing fore and aft to adjust rake. The channel is set onto a substantial transverse floor. The side walls of the channel have bowed slightly under the compression load. It could not be established whether this slight settlement has caused the cracking to the mast partner moulding in the coachroof above but all is assumed to have reached a stasis.

The mast has many fittings of stainless steel and aluminium riveted to the mast wall with monel metal rivets. Each side, mounted to plates are halyard winches. There is a two speed Lewmar 30 and a single speed Lewmar 10 to the port side and a single speed Lewmar 10 to the starboard side. All have vague ratchet pawls when tested and all should be serviced as already noted. The boom was originally designed for roller furling but the worm drive gear has been removed and the boom modified for the in-mast roller reefing.

The mast has an EasyReef retrofitted system with an extrusion carrying a rotating aluminium reefing foil internally. This foil is driven by a long cylindrical rope drum and has swivel bearings for the head and the tack. All appeared well set up and the foil and drum could be turned by hand when tested.

This model of EasyReef has a plain drum without a spiral rope seating to ensure a level wind. This type is very prone to a riding turn in the reefing line which will jam the drum. The line is fed via a block beneath the boom. This block could be moved to an eye fitting further back along the boom to improve the lead angle for the reefing line and prevent riding turns.

Recommendation

(Cat 2) Consider moving reefing line block further back to improve lead angle to give level wind

The gooseneck is a cast alloy fabrication riveted to the boom end. This shows little sign of wear and the pivot pin sits parallel. The pivot pin appears to be to be secure and in good order although none could be tested in service. The boom is controlled by the main sheet block, there is currently no vang or kicker. This may have been removed for lay-up but it must be re-instated. This is critical to maintaining the correct angle for furling the mainsail and prevent folds jamming the slot.

Recommendation

(Cat 2) Install a kicker or vang before furling the mainsail

The rigging is conventional with continuous cap and fore and aft lower shrouds attached to separate chainplates which are already detailed. The main mast forestay, back stay and cap shrouds are all in 8mm 1x19 stainless steel wire with roll swaged terminals and open bodied rigging screws. Mizzen riggings shrouds and stays are all in 6mm 1 x 19 wire.

The forestay is enclosed within furling gear and the luff foil, and so could not be examined. The furling gear is a Rotostay Type E system with a drum and foil. This furling gear is well designed and all rotated freely when tested although none could be tested in service. The aluminium foil is damaged at the bottom where oxidation where it sockets over the stainless steel fitting has swelled and split the extrusion. The extrusion is not load bearing so this will not affect the security of the system.

The mizzen mast is also by Proctor. The mast is stepped on the after deck and supported beneath by the bulkhead that forms the aft cabin joinery. This is supported with aft swept spreaders for cap shrouds and aft lower shrouds and twin forestays. There is a wire between the main and mizzen mast trucks. This is not a triatic stay but an antenna for an SSB radio.

The swages were examined for correct forming, corrosion and signs of splitting and all appeared to be sound. All the swages were measured for forming and all were an acceptable tolerance. The rig upper terminations are eye terminations pinned to fork plates attached to bolts through the mast. At the spreaders this bolt also passes through the spreader roots.

All the rigging screws are properly seized with split pins to prevent unwinding. It is understood that the standing rigging was all replaced in 2016. It is good practice to extend the life of a rig by reducing tension in the wires when the vessel is laid up ashore. This is to prevent harmonic vibration causing work hardening and possible subsequent fatigue fracturing.

q) Sails and running rigging

There were six sails seen on board at the time of survey. All were bagged and stowed below decks in the aft cabin. Examination was limited by the space available. A furling genoa is a white Dacron cross cut sail that has no makers patch visible. The fabric is quite faded in the leach and foot, but the body is in fair condition. There are recent repairs to the head and the leach. There is a grey canvas protective UV strip which is a replacement and matches the grey spray hood fabric made by Advantage Sails. The sail is quite serviceable.

The mainsail is a white cross cut Dacron sail by Max Roach who are the same company as made the in-mast furling system, so this is custom made for the furling gear and has vertical battens. This appeared to be in a fairly good and usable condition although it has suffered when furling with fraying to stitching around batten pockets and black aluminium oxide staining from abrasion at the slot.

The mizzen stay sail is a light weight white Dacron cross cut sail by Butler Varner. This is in a poor condition being very faded and lightly stained by pin mould. The fabric is very soft and de-resinated. A white Dacron Mizzen sail by Butler Verner was also seen. This is in a fairly good and apparently little used condition. This has a new bolt rope installed and is in a fair serviceable condition.

There are two spinnakers seen on board and both appear to be symmetrical all purpose spinnakers. One made by Butler Verner is in very poor condition with softened nylon fabric and rust stains to the cringles. The other is in a much better condition. The makers patch could not be seen but also appeared by the detail to be a Butler Verner sail. Neither could be unpacked as they were both packed for hoisting.

The running rigging is in double braid Terylene with some three strand Terylene. All is in functional condition although some were well used, others appeared to be new. The ends are all heat sealed with some also being taped. None were whipped. Some of the ropes are clearly a few seasons old and in serviceable condition but would benefit from washing. All halyards are managed at the masts, only sheets and reefing lines are led to the cockpit.

r) Sea toilet and heads compartments

There are two heads compartments. Both the toilets are Blakes Lavac manual vacuum operated toilets. These have large diaphragm pumps mounted in the joinery behind which draw waste from the bowl. The lid has a rubber seal which causes a vacuum and draws flush water up from the skin fitting to clean the bowl. These are very simple and reliable systems.

The aft heads toilet flushes waste direct to sea. The forward toilet has a diverter valve after the pump which directs waste either directly overboard or to a holding tank beneath the forepeak bunk. The tank can be emptied by a shore pump out station via a purpose made fitting inside the anchor locker. Alternatively it can be pumped overboard by the same diaphragm pump when operating a diverter valve in the suction hose line from the toilet.

This is a well laid out and proven type of system. All the waste hoses are in good odour free sanitation hose and all in good order. The GRP moulded tank is only of about 15 litres capacity so its use is limited. It is beneficial to frequently need to operate valves and pump out systems as they can become blocked when waste is allowed to sit undisturbed for long periods.

Both heads compartments are very similar in layout and are moulded modules integral with the vessels internal tray moulding. There is a plinth alongside the toilet which has an oval basin moulded into the top and a cupboard beneath. Above the basin is a mirror on the bulkhead and outboard, behind the toilet are cupboards giving access to the plumbing. In the corner are top opening storage bins with lift out GRP liners. These give further access to plumbing and pipe runs.

Both heads basins have pull out faucets which can be hung up as shower heads. There are teak gratings to the sole which cover moulded shower trays beneath and both these trays drain to a small grey water tank beneath the saloon sole aft. This water tank is pumped out by an electric diaphragm pump in the engine space.

This pump can be switched at the main switch panel. It would also possibly be switched by an automatic float switch within the tank, but this could not be established without filling the tank with water. This pump worked when tested. The tank also takes the waste water from the heads basins and the galley sink drain. Both heads compartments are in good and clean condition with the usual toilet fittings and strong hand rails to the plinths for use in a seaway.

s) Fresh water system

There is a single large fresh water tank of about 450 litres capacity located under the saloon sole in the keel bilge. This is a GRP moulded skin tank with a Henderson plastic moulded inspection hatch in the top of a large rectangular aluminium access plate to the top of the tank. The tank is filled by a flush deck filler in the adjacent starboard side deck.

There is no level sender in the tank and level can only be judged by viewing the water level with the inspection hatch open. Inspection showed the tank interior to be relatively clean but showing some patches of algae which is usually harmless. There was also some osmotic blistering as is usually seen. These would not normally be an issue provided they did not burst. It is always advisable to only use stored water for washing and cooking and bottled water for drinking.

Fresh water is delivered to a Whale electric diaphragm pressure pump accessed beneath the aft cabin hanging locker bottom board. There is an accumulator tank alongside which is intended to smooth out the water flow and prevent pump cycling. The pump powered up at the main switch panel and water was delivered when tested.

The accumulator did not appear to be effective as the water flow was pulsing. There is a schraeder valve in the top of the accumulator tank which can be re-pressurised using a bicycle pump. Cold water is delivered to faucets in the fore and aft heads compartment basins and the galley sink. Cold water is also delivered to a hot water calorifier in the engine space.

This is an insulated copper tank of about 20 litres capacity. It has an internal heating coil in circuit with the engines closed cooling system. It can also be heated by an immersion heating element powered from the vessels 240 volt shore power supply. None of the water heating systems could be tested but all appeared to be in good order.

t) Galley and chart table

The galley is located along the passageway to the aft cabin. This has a worktop in a white high pressure laminate faced plywood and a narrow similar worktop is on the opposite side and both have a tall aluminium fiddle rail. The galley is equipped with a single rectangular stainless steel sink inset at the after end. Hot and cold water is supplied to faucets as already detailed. Alongside is a hand pumped faucet that can deliver fresh drinking water from a portable water carrier located in the cupboard beneath.

At the forward end is an aperture with a two burner LPG cooker with an oven and a grill. This is detailed later. Beneath the worktops are drawers and cupboards and further storage is provided by acrylic siding door cupboards under the deck head outboard. All is in good working order and well finished in all varnished teak plywoods and hardwood lippings. The galley plinth itself is part of the GRP internal tray moulding.

Aft of the galley is a fridge/freezer. This is front opening with a teak plywood lined panel door and a latch. This is divided into two separate insulated compartments each with a separate evaporator plate. The fridge is powered from the main engine, which is unusual for a sailing yacht. There does not appear to be any other power source.

Mounted above the engine and belt driven from the crank pulley is an automotive air conditioning type compressor engaged by an electric clutch. This clutch is switched at the chart table panel and powers up the fridge and freezer which both use the same system. Compressed refrigerant is cooled by being passed through a heat exchanger in the engines raw water cooling system. This is the first device after the seawater intake so is at the lowest temperature.

The refrigerant then passes into a condenser on the aft engine space bulkhead and then splits in two to separate dryer and pump units. The refrigerant is then circulated through the separate evaporator plates in the fridge and freezer before being returned to the compressor. None of the system could be tested without the engine running and the vessel in the water, but the refrigerant system appears to be in good order.

The fridge/freezer itself is in very poor condition. This has been partially adapted from a domestic fridge shell and has become badly damaged from condensation. The freezer compartment is very small with awkward access and the fridge has modified wire baskets with acrylic fronts. It is also not very practical to have a fridge and freezer on a sailing yacht that is entirely dependent on running a large diesel engine. It would be advisable to replace the fridge with a self contained electric fridge from Waeco or Isotherm.

Recommendation

(Cat 2) Consider replacing the fridge and freezer with a front opening self contained fridge

The chart table opposite has a large top, large enough for a half sized admiralty chart. The main bulkhead aft carries all the navigation and communications equipment. Outboard, under the deck head is the main switch panel and the battery isolators are under the chart table on the engine bulkhead. The navigator uses the head of the dinette as a seat which is awkward as the cushion is not secured and is easily displaced due to limited leg clearance. All is however in good clean order.

u) Electrical system

There are two battery banks, one for engine starting and one for the domestic services. The engine battery is in the port side engine space and is a Platinum 75 amp/hr deep cycle leisure battery. The domestic services are three 643 automotive 96 amp/hr batteries located beneath a cover in the aft end of the cockpit locker. All are in boxes and well secured.

All the battery banks were tested for condition. The batteries were tested with an electronic drop tester to establish the batteries power capacity. This will gradually diminish as the batteries age due to sulphation. This is where the sulphur in the acid will gradually solidify on the plates increasing the batteries internal resistance and reducing its ability to accept and deliver a charge.

Sulphation is accelerated whenever the batteries are left partially discharged below 11 volts for long periods. Some batteries are Gel type or AGM type in which the sulphuric acid is retained in a gel form or an absorbent mat. This enables the sulphur to resist migration and therefore sulphation of the plates. These batteries are more expensive than simple flooded cell batteries but will give a longer service life.

The domestic batteries are each rated at a cold cranking amp output of 640 amps (SAE) This indicates that each battery should deliver 640 amps for 30 seconds whilst maintaining a stable usable voltage. The domestic batteries were individually tested and reading from port to starboard showed 350 amps, 225 amps and 255 amps. All showed between 12.50 and 12.55 volts. These readings show that the batteries have lost between 60% and 75% capacity.

The engine start battery has a cranking amp rating of 550 (MCA) and delivered 506 amps. This battery is in a fair condition but has lost about 15% as the rating is considered to be a minimum so should normally be exceeded in a good battery. The batteries will continue to give good voltage but that voltage will drop when subject to heavy load. This is less important in domestic batteries than engine start batteries, but the domestic batteries should be replaced within the next season.

Recommendation

(Cat 2) Replace the domestic services batteries within the next season

Batteries are charged by the engines 90 amp alternator. A voltage sensing relay prioritises charge to the engine battery before switching charge to the domestic battery when the engine battery is full. There is also a NewMar 8 amp switch mode battery charger in the cockpit locker powered by the 240 volt shore power system. Domestic battery voltage is displayed at a gauge at the chart table

The batteries are engaged by individual isolator switches below the chart table. There is a separate isolator for each of the domestic batteries which engages them all in parallel. There is also a bridging switch which joins the batteries for emergency use and isolators for the electric winches, windlass and bow thruster. The domestic circuits are supplied from a 19 switch panel by the chart table. These are all push button breaker switches.

All the circuits were powered up and appliances tested where possible. There are individually switched incandescent and fluorescent lights to the coachroof head in the cabins and heads compartments and galley and reading lights to each sleeping berth. All worked when tested. There is a light to the engine space but that didn’t work and the lens was missing.

Recommendation

(Cat 2) Repair the non-functioning and broken light to the engine space

There are pulpit and pushpit mounted navigation lights, a steaming light, deck flood light and a combination tricolour and anchor light on the mast truck. All the navigation lights were tested and working except all round white anchor light. This was difficult to see in daylight and should be checked when dark. If it isn't working it must be repaired.

Recommendation

(Cat 1) Repair non-functioning anchor light if it is seen not working when dark

The navigation instruments, were all powered up. The VHF powered up and voice was heard although reception was poor. It is also obsolete and not a DSC enabled set. This is important now that monitoring of channel 16 is no longer mandatory. A DSC enabled VHF should be installed, interfaced to GPS and an MMSI number installed. This number will be issued when a VHF licence is applied for.

Recommendation

(Cat 1) Install a DSC enabled VHF and interface to GPS and install an MMSI number

The B&G Hornet is also obsolete and no longer has a speed display gauge fitted, so it is assumed that it does not work. The B&G Homer RDF set also did not power up and is an obsolete system. The NASA SSB radio did not power up and neither did the NASA Navtex receiver. This Navtex uses an internal battery and if off for a long period this will discharge. Both these NASA devices are current and could be useful. They should be made to work.

Recommendation

(Cat 2) Investigate the non-function of the NASA SSB radio and Navtex

The Eagle GPS navigator powered up and obtained a fix. The Standard Horizon chartplotter powered up and obtained a fix and displayed a position. The TackTick wind display showed wind speed and direction. The JRC radar powered up and showed a good radar image. These cockpit devices all worked but when the radar was scanning the breaker tripped out twice. There may be a fault or just too many devices for the rating of the breaker switch

Recommendation

(Cat 2) Investigate supply fault or breaker switch rating to instruments

There is a 240 volt shore power system installed. There is plugged in at the cockpit locker and supplies a Powerbreaker RCD device and double socket in the cockpit locker. This then supplies sockets around the vessel. There is a small 200 Watt inverter in the cockpit locker and a cross over at the chart table enables the inverter to supply mains voltage audio and TV devices on board. None of this was tested but all appeared to be functional.

There is no galvanic isolation device in the mains voltage supply. This can protect the vessel from electrolytic erosion due to ground wire faults in the marina pontoon electrical supply. There is also no reverse polarity indication. This is useful if voyaging to continental marinas where the polarity is often reversed. *(see explanatory notes 17 & 19)*

v) Gas system

The gas system is supplied from a moulded GRP compartment in the starboard side deck. This contains a single 2.7kg cylinder and a second one of the same size. Both the cylinders are connected to the supply with a T piece after the regulators with flexible hose. All are aged fittings and neither regulators nor hoses could show a readable date.

The gas compartment drains naturally overboard. Gas is fed from a bulkhead fitting in the compartment in drawn copper piping. This is secured at intervals to a bulkhead fitting in the cooker aperture. There does not appear to be a shut off valve. Gas is then supplied in flexible hose to the cooker which is dated Oct ’95. It is usually recommended that hose is replaced every 5 years and regulators every ten. Both regulators and all hoses should be replaced.

Recommendation

(Cat 1) Replace both regulators and all flexible gas hoses and install a shut off valve beside the cooker

The cooker is an all stainless steel Spinflo Nelson cooker with two burners, a grill and an oven. The cooker has flame failure devices to all the burners. The cooker is in a fair cosmetic condition but is well used and there is some corrosion to the hob burners. It is well gimballed and has pan clamps installed. There is also a good strong crash bar in front.

There are no other gas appliances and no gas alarm system on board. The gas system and cooker was not tested as it is outside the scope of survey. Gas systems should be inspected and serviced by Gas Safe Marine engineers using certified equipment.

w) Fire fighting equipment

There are three fire extinguishers seen on board. By the companionway is a 1kg 5A 34B dry powder extinguisher. In the fore peak cabin is a 2.5 kg Halon 1211 gas extinguisher and in the aft cabin is a 1.5kg Halon 1211 gas extinguisher. There is also a fire blanket in the galley. Halon gas has been banned from use except for military and aviation use since 2003. These units should be disposed of at a licensed recycling site. Most civic amenity sites will accept them.

Recommendation

(Cat 1) Dispose of the Halon gas extinguishers at a licensed recycling site

Fire extinguishers should be subject to annual inspection and a discharge test every five years. The small powder unit would be cheaper to replace than have it discharge tested and re-charged. A vessel of this size should have three extinguishers to 5A 34B C. One should be mounted where it is accessible from outside the accommodation. This can be just inside the companionway.

Recommendation

(Cat 1) Supply and install three fire extinguishers At least one extinguisher should be located where is can be accessed from outside the accommodation

If an automatic extinguisher is to be installed in the engine space it must be a gas extinguisher with HFC22, FM36 or FE200 Halon replacement clean agent extinguishant. Automatic Powder type extinguishant must not be used in engine spaces. The dry powder can cause serious damage if the powder is sucked into a running engine. *(See explanatory note 11)*

x) Bilge pumping

There are two bilge pumps seen on board. A Rule 1100 GPH electric impeller pump is installed in the keel sump under the aft cabin sole. The pump is switched at the chart table switch panel and the pump could be heard running when tested. It is also operated automatically by a Jabsco HydroAir air pressure switch. Alongside is a Henderson manual diaphragm bilge pump which draws from the same space. This appeared to draw when tested but there was no water to discharge.

The electric pump discharges one of the side deck drains. The manual pump discharges into the same outlet in the topsides as the grey water pump via a Y fitting in the hose. The electric diaphragm grey water pump could also be deployed as a bilge pump in an emergency. None of the pumps delivered water when tested although all could be heard working. It is advisable to ensure that all pumps are working by introducing water into the bilge occasionally.

y) Fit out

The fit out is all executed in teak faced plywoods and teak hardwood mouldings. There is an extensive internal GRP moulding up to the settee backs which also creates plinths for the sleeping cabin bunk bases, heads compartments and galley but this is well disguised to give the appearance of a fully joinered fit out.

The soles are moulded white within the tray and have individual plywood access panels with stainless steel lift buttons. These are all in a teak and holly veneered plywood which is in fair condition for the vessels age and havew been re-finished previously. The heads compartments are finished with white laminate faced bulkheads and panelling.

This white faced plywood is also used on the galley bulkhead and together with the white tray moulding helps to create good reflected light to the smaller compartments. The main saloon bulkheads are all in teak veneered plywood. This is also in good order for the vessels age and have been re-finished with a gloss varnish.

All the cupboard doors are a good fit and secured by internal brass catches with finger holes These can be awkward to use at first. Some of the doors have swelled slightly over the years and require a gentle slam to shut, which will become worse in winter months with higher humidity. Doors to the heads compartments are in a high pressure laminate and are in a better condition.

The headlinings are all in off white embossed vinyl faced plywood panels. These are in fairly good and clean condition for the vessels age. There is no debonding or sagging of vinyl trim which is very common with vessels of this era. This vinyl is also carried down the coachroof sides retained behind the window frames.

fit-out mouldings to the bunks have hardwood fiddle fronts and plywood lids to storage beneath. All the bunks have lee cloths fitted although it could not be seen where the lanyards for some could be made fast. These may have been removed as lee cloths are rarely used. There is different upholstery to each compartment and appear to have been replaced at different times.

The forepeak upholstery is in a blue Bouclé type of fabric. This is applied to the cushions and also to the infills where it is stapled to backing boards secured by barrel bolts These are difficult to engage properly. The cushions and fabric are in fair condition but it is damaged by abrasion where the fabric is used to line the hull sides.

The aft cabin is in a grey Tweed fabric which is possibly the oldest of the upholsteries. It is slightly worn but sound and still a good fit. This is also used to the hull sides but this has fared better than the forepeak. The saloon upholstery is the most recent addition by Jeckells and is a maroon velour. This is over sculptured and buttoned cushions and is in good condition

There are curtains to all the windows in a woven fabric. The colours match the colours for the upholstery but not in the same fabric. There are blinds with press studs to the smaller windows and similar blinds to the coachroof hatches. The fit out is dated in style but in good general condition having been regularly re-finished and upgraded. All is in a fair and clean and tidy condition for her age.

z) Additional equipment

The following equipment was seen on board the vessel. Inclusion in this list does not necessarily imply that it is included in the sale inventory.

Sestrel main steering compass in binnacle, good condition
Eagle Cuda 240 GPS navigator, working fix obtained
JRC 1000 radar display and 15” scanner, working
TackTick MN30 wind speed and direction display, working
Standard Horizon CP180 chartplotter, working, fix obtained
Sailor RT144B VHF transceiver, working, reception poor
NASA Target Navtex Pro, did not power up
NASA HF3 SSB radio receiver, did not power up
B&G Hornet speed log and wind speed/direction, no displays, not working
B&G Homer radio direction finder, not working, no antenna/receiver
Studer AJ200 sinewave inverter
Sony CMT EP50 micro HiFi tower mains voltage not tested
Panasonic MCD350RDS FM receiver, not tested,
Stereo speakers to saloon and cockpit
Goodmans digital TV receiver mains voltage not tested
Okishi plasma TV, mains voltage not tested
Neco automatic helmsman, not working properly
Brass cased barometer
Blue canvas sail covers, fair condition
Firdell Blipper radar reflector
Windex wind indicator and VHF antenna, working
Glomex unidirectional TV antenna, not tested
CQR 15kg anchor, 10mm chain and warp
Quantity of fenders and warps and fender step
Folding ball and cone day signal shapes
Reel of hose
KIM MOB throwing strop
Grab bag with essential supplies and Fast Find GPS locator beacon
Boat hook and deck scrubber
Shore power extension cables
Suzuki DT5Y two stroke 5hp outboard, serial no. 00504-152095
Outboard tiller extension
Avon R280 inflatable, oars, seat and pump. HIN No. GB-AVB35828C101
Seago Offshore 4 man liferaft in valise, no service record
Flare pack, expiry 1995, 2008, 2012

4) **Summary of recommendations** This summary is a check list. Full details can be found in the body of the report. Page ref numbers are given (p#)

Category 1 (Cat 1) recommendations are safety and seaworthy related defects which should be corrected before the vessel is put into commission.

(p15) Install floating lights with new batteries and install to the lifebelts
(p18) Replace fuel tank filler hose with hose to ISO 7840 A2
(p29) Repair non-functioning anchor light if it is seen not working when dark
(p29) Install a DSC enabled VHF and interface to GPS and install an MMSI
(p30) Replace both regulators and gas hoses and install a shut off valve
(p31) Dispose of the Halon gas extinguishers at a licensed recycling site
(p31) Supply and install three fire extinguishers

Category 2 (Cat 2) recommendations relate to defects which affect the operation of the vessel in normal use and should be attended to at the earliest opportunity. They do not however, affect the safe operation of the vessel.

(p12) If leaks persist to aft window, remove, renovate and re-install properly
(p13) Investigate the non-functioning ventilation fans to heads and galley.
(p13) Repair damage around anchor locker and line with stainless steel
(p14) Service the winches with new springs and pawls as necessary
(p18) Install a fuel shut off valve in the fuel siphon fitting
(p19) Investigate stern gland and tighten or re-pack as found necessary
(p19) Clean out the water feed holes and replace the cutless bearing.
(p10) Replace the propeller anode
(p19) Sharpen the cutting edge to the cutter and reposition on the shaft
(p20) Clean anode back to bare metal and check bonding wires to 0.5 ohms
(p20) Investigate tingles to the rudder and make a proper repair as necessary
(p21) Investigate play in steering wheel pinion and sprocket
(p21) Test autopilot when underway. Consider replacing course computer
(p22) Investigate condition of gear case and anode, replace as necessary
(p23) Consider moving reefing line block further back to improve lead angle
(p23) Install a kicker or vang before furling the mainsail
(p27) Consider replacing fridge and freezer with a self contained fridge
(p28) Replace the domestic services batteries within the next season
(p28) Repair the non-functioning and broken light to the engine space
(p29) Investigate the non-function of the NASA SSB radio and Navtex
(p29) Investigate supply fault or breaker switch rating to instruments

Category 3 (Cat 3) recommendations relate to conditions which are cosmetic or may affect the perceived value of the vessel and could be attended to when convenient and at the owner's discretion.

(p9) Repair the damaged section of teak capping at the port bows
(p10) Repair the cracks to the raised section around the mast partners
(p10) Fill and fair and re-paint the old mounting holes to the hatches

5) Conclusions

Nicholson 39's were much admired boats when new and considered by many to be the ideal blue water cruiser. The design provided comfortable accommodation for their era combined with good ocean going performance sailing at an affordable price. They still have a strong following of enthusiastic and committed owners evidenced by the fact that, despite the brand being long out of production, there is an active owner's association.

[redacted] is now over 40 years old and has a few typical 40 year old boat issues. There will always be a gradual deterioration in the fabric of a vessel considering the hostile environment in which it has to live and the stresses and strains to which it is subjected. This boat has been well used and that shows up in many of the fittings and equipment.

However, these yachts were well designed and strongly built and most of the deterioration and repairs necessary are of a cosmetic nature. There is a fundamental and enduring strength to the structure as a result of traditional build practices, that avoid the built-in obsolescence seen in current volume yacht manufacture.

The hull and deck are well bonded as a monocoque without the glued and screwed assembly seen in modern construction. The keel is encapsulated within the hull moulding avoiding fasteners and bonded seams. There are no absorbent core materials in the hull or deck mouldings making them almost immune to moisture damage.

The recommendations list is very long but mainly reflects the need for a thorough overdue service of machinery and equipment, and the updating of some time expired components. There are some suggestions for improving the efficiency of the vessel and bringing it up to current standards of safety. There is also the issue of repairing many minor non-functioning devices.

She has had good recent investment made in her equipment and fittings. A recent engine rebuild, new upholstery, cooker and standing rigging. There is considerable scope for upgrading of communications and siling electronics and replacement of an archaic fridge system. The batteries will need replacement and the fuel system needs some improvement.

Overall [redacted] is in a very fair and basically sound mechanical and structural condition for her age, but in need of some essential maintenance and repair. After the critical items have been addressed she will be a comfortable, safe and efficient vessel capable of delivering another 40 years of service. She would also be considered to be a normal risk for insurance purposes.

Richard Thomas BA(hons) AMYDSA MRINA

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