MEDUSA
MARINE

S1455 – Pre-purchase full condition survey report on:

Sea Lion 36 [redacted]

For

[redacted]

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

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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

Survey Report on Motor Yacht [redacted]

This survey was carried 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 except to the vessels insurers or repairers without permission of the copyright holder.

b) Location

The vessel was laid up ashore at [redacted]

c) Purpose and scope of survey

Survey was carried out under Medusa Marine terms and conditions. These are YDSA standard terms of engagement and are available on our website: www.medusamarine.co.uk/index.php/terms-and-conditions/

This 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

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 without a full sea trial. Surfaces coated with layers of paint cannot be examined for damage which is only 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. All these limitations are subject to an assessment of what is reasonable and practicable due to the condition and location of the vessel under survey.

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 defect of those aspects of the vessel not accessible or evident due to the above limitations.

e) Recommendations

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

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

Category 2 (Cat 2) Recommendations relate to defects which affect the efficient operation of the vessel in normal use. Also safety considerations relating to extended use. They do not affect the present safe operation of the vessel.

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:	10.89 metres
LWL:	10.10 metres
Beam:	3.34 metres
Draft:	0.90 metres
Displacement: (light)	10.900 tonnes
Manufacturer:	CH Hitters, Scheepskerf,Holland / JG Meeks, UK
Model or Type:	Sea Lion 36
Year of Build:	[redacted]
Hull No:	[redacted]
Registration (part one):	[redacted]
MMSI No:	[redacted]
Designer:	CH Hitters
Hull construction:	Carvel steel hull and deck
Superstructure:	Epoxy sheathed hardwoods
Engines:	2 x Perkins Range 4 M90 (4.236)
Gearboxes:	2 x Borg Warner Velvet Drive

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 also built before the 2005 (Directive 2003/44/EC) to include 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 paid status need not be seen. Vessels that were berthed in the UK on 31st December 2020 lose their assumed EU VAT paid status.

This motoryacht hull was built in Holland by CH Hitters to the own design and delivered to be fitted out in the UK by JG Meakes of Marlow in Bucks. This was quite a common arrangement at the time and Hitters 36, and also the larger 41 hulls were imported and fitted out by several different yards in the UK. There was also a later GRP moulded version of the Sea Lion 36.

The hull design above the waterline is conventional for a semi displacement motor yacht hull with broad bluff bows and excessive flare to allow a fine entry. Flared topsides at the bows run to rounded vertical flanks amidships.. The wide transom is slightly rounded and raked.

The hull bottom has a deep rounded forefoot leading to a keel that deepens as it runs aft. The keel is cut away ahead of the propellers and a pair of semi counterbalanced spade rudder. This model was also available as a single screw version so the cut away keel housed the stern tube and supported the single rudder on a strut.

In this twin screw version the keel gives good directional stability and prevents the tendency to wander at displacement speed. A fine entry and steep deadrise forward turns into a flat run aft and radiused bilges. At the turn of the bilges are long bilge runners to reduce rolling.

The superstructure is a traditional three box design with a central raised wheelhouse above the engine space. The wheelhouse has a helm position to port and companionway doors either side. There is a seating area which can convert to a double berth and companionway ladders fore and aft to the accommodation spaces. There is a large opening sunroof in the top.

The forward accommodation comprises a large well equipped galley to port and a heads and shower compartment opposite. Forward leads to a single sleeping cabin with a hull side bunk berth and access forward into the chain locker. The aft accommodation is the master cabin with a pair of single hull side berths with drawers beneath and a hanging locker between. There is an en-suite heads and shower compartment although this is not yet completed.

The twin four cylinder naturally aspirated diesel engines are accessed via the wheelhouse sole and all engineering systems are contained within that space. The water tank is a skin tank constructed beneath the forward accommodation sole and the fuel tanks are skin tanks either side within the engine space topsides.

3) Survey details

a) Hull general

Hull construction is of all welded hot rolled mild steel plate. This is assumed to be standard grade 43A shipbuilding plate. The hull topsides and bilge plating is in 4mm plate. Plating to the hull bottom is in mostly 5mm plate with the transom also in 5mm plate. The box keel fabricated of 5mm side plating and a 6mm thick keel bottom grounding plate. The deck is in 4mm plate.

The hull has rolled radius chine plates with concave bows in rolled plate leading to convex topsides flanks. The box keel does not form part of the floatation hull so is all dead plating which may contain a ballast material to assist stability. The hull bottom has a shallow, approximately 10˚ deadrise over most of its length.

This construction is relatively light for her length and beam. But these compound curvatures and the plates have needed to be wheeled to shape. The lighter gauge is justified by the additional stiffness and strength imparted by the compound curvatures that has been worked into the plating, although the light construction does render it more vulnerable to erosion of plating thickness.

This is a particularly skilled method of plating known as Rondspant in Dutch shipbuilding. It is more labour intensive than the easier and cheaper chine built or Knikspant method. The plating is laid carvel, i.e. joined edge to edge. The plating is all fully welded internally and externally with the outside welds ground flush to the topsides but not to all the bottom plating. The hull and deck plating is laid over transverse frames of 60mm x 60mm x 5mm ‘T’ bar which is ring rolled across the head and stitch welded to the plating.

These are set at 50 cms pitch and there are small triangular webs stiffening the hull to deck frames. The wooden coachroof and wheelhouse joinery is bolted to a short welded steel plate upstand around the inner deck edge Longitudinal hull members are a 60mm x 6mm flat bar central spine to the stemson and keelson up to a bulkhead in way of the forefoot. After is the box keel externally and the skin tank internally.

There are 5mm plate transverse floors at 50cm pitch providing sole bearers to the forward and aft accommodation spaces. These have limber holes and a central radiused bilge for the collection of bilge water in the engine space. Forward the sole is all occupied by the water skin tank. Longitudinals to the engine space are box section engine beds of all welded 5mm plate.

There are full height bulkheads up to the wheelhouse sole at the forward and after end of the engine space. These together form three separate bilge compartments. The plating is joined at bulkheads and frames to minimise weld distortion. All bulkheads are fully welded. The ring rolled frames and flat bar stiffeners are stitch welded to minimise distortion and allow for some drainage.

b) Bottom

The hull had been antifouled with a red painted antifoul coating which was relatively smooth and well adhered. The hull bottom was sounded over its whole surface with a soft headed hammer. It was also measured for thickness and the defects of corrosion with an ultrasonic thickness gauge. Thickness measurement is by definition a spot test and visual inspection is also therefore essential. Where access internally is limited the examination therefore cannot be exhaustive.

There are two main types of surface corrosion. Surface oxidation is a uniform coating of oxide with the corrosion product remaining partially bonded to the surface. This tends to take place internally. Electrochemical and electrolytic erosion in steel tends to occur externally and makes wide shallow pits with the erosion product dissipating into the water. Both kinds of loss of material thickness is visible to close inspection.

The hull bottom was surveyed over its surface externally and internally where possible with a Cygnus 6+ ultrasonic thickness gauge with a 2.25 MHz probe in multiple echo mode. This reads through and disregards the coatings and corrosion and gives accurate measurements of sound steel plating. The device was calibrated before and after testing with 10mm and 15mm test blocks. Readings in areas of heavy internal corrosion are very difficult as the corroded surface tends to dissipate the reflected signal.

Steel expands as it corrodes. This is not entirely uniform and can vary from between 7 times and 11 times the original material thickness. A typical heavy flake of corrosion of 5.0mm thickness could therefore represent a loss of material of just 0.4 and 0.7mm of steel.

It is generally considered acceptable for up to 20% of the original thickness or plating to be lost before the hull structure is considered to be compromised and repair is necessary. This is complicated by the fact that there is a very wide manufacturing tolerance for hot rolled plate of up to 0.2mm, so readings down to 3.8mm could be perfect condition original plating.

Where there is evident corrosion it must be treated to prevent propagation. Continued corrosion can propagate along the grain boundaries of the rolled steel plate in a process known as lamellar corrosion. Where layers of lamellar or ‘pancake’ rusting is seen all the flaked layers must be removed back to sound metal. Rust treatments cannot work through layers of oxide.

The whole hull bottom externally was closely examined and no significant loss of plating thickness through erosion or corrosion externally could be observed. There was seen to be working marks to the hull either side of the forefoot which could be the fairing up of erosion. There is also an unexplained bulge in the plating around the forefoot on both sides. The plating internally is covered by fixed joinery and couldn’t be examined.

At the forefoot is a joint between the 4mm and 5mm plating and readings in the 5mm section were occasionally seen to be in the range 3.6mm to 3.8mm. There is no access within the joinery to view this area internally. Aft of the forefoot in way of the water tank the bottom plating appeared to change from 5mm to a uniform range around 4mm before returning to 5mm in way of the engine space.

This could be either lighter gauge plating where the hull skin tank in built in or else a uniform loss of material. This should be investigated and there are bolted down inspection hatches in the water tank which would give access internally. If this is erosion than it must be arrested before it erodes below a critical thickness. This area and the parts where there are unexplained distortions and working marks by the forefoot should be exposed and investigated.

Recommendation

(Cat 1) Remove joinery and inspection hatches to view hull bottom plating to forefoot and the skin tank.

Measurements over the majority of the whole hull bottom were consistent at 4.7 mm to 5.1 mm to the nominal 5mm plating and 3.8 to 4.1 in the 4mm plating. Internal corrosion was seen in various places and investigated externally. There is very heavy corrosion and lamellar flaking along the join of the side plates of the water tank to the hull. This was worst on the starboard side which is beneath the heads and shower compartment.

Heads compartments are sources of both acid and alkaline water run off. Acids are well known to cause corrosion, but ironically alkaline solutions can also cause corrosion. Initially they form a passivating layer to the metal but where chlorides usually from bodily fluids break down the passivation locally then corrosion can become highly active.

Externally it could be seen that strakes of 5mm plate had been welded along this profile presumably to repair this defect. In this instance overplating or doubling would be acceptable as a repair as the junction to an integral tank would be very complex and the repair plate is relatively narrow. Double plating is usually only considered acceptable as a temporary repair and although often seen on leisure vessels, it would not be allowed on a commercial vessel.

The reason is that the doubling plating is not secured to any primary supporting structure such as the hull side framing and is dependent only on the edge weld for security. It is also only a single sided weld and differential thermal and physical stress and flex, particularly in round bilged vessels can lead to weld fracturing. Also any corrosion which is the need for repair is still existing and could spread. It would not be practical to remove and re-work the double plating but any further repair should be done properly as detailed later.

There was also corrosion seen to the hull bottom between the engine beds in the forward end of the engine space. This is the deepest part of the bilge and where bilge water would collect. Corrosion was also seen around the port side engine seawater intake. This could be electrochemical or galvanic erosion due to the brass valve and elbow fittings above. These were mostly light surface corrosion but it should be cleaned up and treated.

Heavy corrosion was seen to the after hull bottom beneath the en-suite shower compartment. This hull area was also seen to be overplated externally where the loss of material has been repaired. The bulkhead in the same area is also heavily corroded although this has not effectively been repaired. In places it is corroded right through. There is some additional stiffening to the hull bottom in this area due to the deep box keel externally.

It is recommended that any areas which are showing corrosion but of an acceptable thickness should be cleaned back to bare metal. Heavy corrosion should be first removed with a needle gun or chipping hammer before preparing the surface. There is nothing to be benefitted from removing well bonded protective coatings where the paint film is intact and the metal surface beneath free of corrosion. There the surface should be lightly keyed leaving the paint film intact.

Corroded surfaces should be prepared to SA2.5 or better, that is a near uniform clean white metal surface. The surface should then be treated as soon as possible with a zinc rich epoxy primer before application of a bilge paint. This primer can be applied by spray on flat surfaces but must be by brush on profiled surfaces to ensure complete penetration and coverage.

Recommendation

(Cat 1) Clean and treat all areas with visible surface corrosion.

After treatment all cleaned areas of corrosion must be re-measured for thickness, Where thickness is below acceptable thickness, proper repair practice is that the area of plating must be cut out and replated. The eroded sections must be cut out in a regular shape back to full thickness plating. The joint to be welded should not be within 75mm or 15 x plate thickness of a welded join in the plating, a frame or stringer. If it is, then it must be cut back to the join, frame or stringer.

The aperture cut must have significant, i.e. not less than 25mm radiused corners to avoid creating stress risers in the parent metal as it cools. The repair section must be an exact fit and the edges bevelled both sides to ensure good weld penetration. The joint must be fully welded both sides and the weld beads staggered during welding to minimise distortion. Welding should be using MIG or low hydrogen arc welding.

Recommendation

(Cat 1) Re-measure after corrosion treatment and repair properly if necessary

Installed on the hull bottom are 6 anodes. These are fitted to the bilge runners and the A brackets where they can be bolted through. It is usual for anodes to be welded to the hull bottom to give the best electrical continuity with the hull bottom. There are also button anodes to the rudders. These are all 50% eroded and all should be replaced. Anodes lose effectiveness as they erode as surface area reduces and they become covered by oxidation.

These are assumed to be zinc anodes as the vessel has been kept in salt seawater. If the vessel is to be used in fresh or brackish waters then these should be replaced by aluminium or magnesium anodes. Zinc tends to form a passivating layer of oxide when in fresh water and becomes inactive.

Salt water is a better conductor of electrical potential than fresh water, Also magnesium and aluminium are more highly reactive than zinc. If magnesium or aluminium anodes are used in salt water for any extended time they will become fully exhausted very quickly.

Recommendation

(Cat 1) Replace the anodes with a type suitable for the waters in which the vessel is to be kept

c) Topsides

The topsides are constructed of 4 mm flat and rolled steel plating. This has been recently painted with a coating of a polyurethane two component paint. The paint film is in good condition and well adhered. It has been hand applied and there are working marks in the finish that are visible on close examination. There is a painted boot topping in a white polyurethane paint above the waterline and a similar stripe at the deck edge with a blue section to the bulwarks.

This is all in good order and the vessels name and home port is applied in a vinyl applique. Internally the plating where viewed is in a clean red bilge paint. This is except the inner transom where there are numerous welded plates where fittings and mounting holes have been patched and it has been painted white.

The painted coatings to the topsides were tested with an electronic paint thickness gauge. Paint films of between 0.48mm and 1.05 mm were seen indicating that a good thickness of primer fillers had been used in order to fair up weld distortion as well as possible past local impact damage.

The thicker readings were on the flat midships topsides beam which is usually the most vulnerable area to berthing damage as well as visible distortion. The topsides were repainted in 2020 having been originally also in a dark blue. Steel vessels are maintained in good condition only by a continual routine of cleaning, treating and painting spots of surface corrosion when they appear.

d) Deck

The deck is constructed of all 4mm welded hot rolled steel plate. The plating is supported under by 60mm x 60mm x 5mm 'T' bar welded steel stiffening beams in the fore deck and after deck and parts of the side decks although the full specification could not be established as most of the deck head is trimmed with headlinings.

The deck was walk tested and felt mostly firm underfoot. There were some slightly springy areas although no significant reduction in material thickness was noted when measured and it may be due to a change in the support structure. The deck is all painted in a light grey two pack polyurethane paint. A non-slip additive has been added to the paint to give some grip underfoot in the walk areas. This works well in use and is well adhered.

In the foredeck is a steel hatch which opens into the forepeak. This is forward hinged over a raised flange which prevents leakage beneath. The hatch is locked shut by a pair of dogs beneath. A similar hatch is located in the aft deck which opens to a lazarette locker and access to the steering flat beneath. This is set flush so that the gutter drains through hoses to ports in the transom. These hatches are good and functional. The lazarette is ventilated by louvres in the transom.

e) Hull to deck joint and bulwarks

The topsides plating has been carried up above the deck and an angle flange has been welded around the top. This flange is visible on the transom and the flange carries the teak capping and provides mountings for the stanchions to the hand rails. The bulwarks have freeing ports cut through the plating at the lowest part of the scuppers to drain surface water.

The bulwark cappings are sound over most of its length but in very poor condition in certain places. This is due to water damage through the fittings and splits leading to patches of blackening and wet rot developing in the worst cases. there is no repair option to the wood other than cutting out the damaged sections back to sound and dry wood and replacing it. This may mean the replacement of whole sections in places.

Recommendation

(Cat 2) Cut out and replace the sections of water damaged bulwark capping

Externally the bulwark and welded flange is covered by a broad hard PVC fendering in a D section. This wraps round the stem and is in sections that are a bit disjointed in places and also at the quarters but it is all well attached. The bulwark provides a mount for the handrails. These are stainless steel stanchions with a half height guardwire and a moulded teak rail to the top.

The teak handrail is also slightly water damaged in places but is in significantly better condition than the bulwark capping. There are gates in the sides adjacent to the wheelhouse doors, and also to the centre of the transom. These are hinging sections with stainless steel hinges and latches. These work well in use and the half height wire is detached by a pelican hook. At the stem the handrails joint into a stainless steel pushpit. All is stable and secure although some stanchions are flexible in the damaged bulwark capping.

f) <u>Superstructure</u>

The superstructure is a regular three box shape with raked forward and aft faces and near vertical sides. The superstructure is a fully joinered construction of what appears to be a mahogany type hardwood and veneered plywoods painted white to the sides externally and varnished finish internally.

The superstructure is near fully glazed throughout. The wheelhouse roof has a large hardwood and sheathed sun roof which slides aft to open and secured by a small barrel bolt. This is in good order and opened and closed when tested but it is heavy.

The coachroof and wheelhouse tops are an epoxy and woven cloth sheathed wooden construction and in very good condition. This is a recent modification and is very different in detail to the laid teak deck that was there before. There is a projecting brow fore and aft to the coachroofs and round the wheelhouse roof. This is to provide some protection and shade to the windows.

The projection also allows the sheathing to be carried round and under the edge to seal completely. To the coachroof sides the sheathing is trapped behind varnished hardwood beading. The tops are all painted with a cream two component paint with a non-slip additive and all in is very good condition.

The tops were all tested for moisture ingress and all read normal except for slightly high readings around where the tops join the wheelhouse structure fore and aft. There was one very high spot in front of the starboard side forward wheelhouse screen extending to near the handrail fitting. This should be investigated and the most likely source would be the corner of the screen frame above.

Internally there was water staining to the joinery beneath all the wheelhouse windows and the bottom corners of the forward and some aft screen frames spiked as soft. These should be stripped back and repaired. It is probable that the frames are still in a sound enough condition to be dried out, treated with a Borate fungicide and then the wood hardened with a saturating epoxy.

The probability of moisture transmission from the screen frames into the new joinery to the coachroof tops should be investigated. This would require the removal of the windows themselves and inspecting the structure for leaks. Replacing the joinery structure to the screen frames would be very intrusive so all attempts to arrest the process of leakage and decay should be made.

Recommendation

(Cat 2) Remove wheelhouse windows expose screen frames and repair softened wood. Investigate for leakage into coachroof tops.

The superstructure sides are all original and painted with a single component white paint. This is a thin coating which has failed in places and most the joints to the structure are showing as splits in the paint coating. The superstructure sides were all tested for moisture ingress and all of the open seams showed at 30% moisture or saturation level.

The surface was also hammer and spike tested for decay and wet rot was found in all four coachroof corners at the bottom where it lands on the deck. The forward port side corner was the worst with extensive decay in the joints. There was also softened wood seen to the joinery in front of the starboard companionway door near the deck.

The corner construction of a wooden superstructure is always vulnerable to moisture ingress because of the different grain direction cause stress and failure in the joints. Wood expands three times as much radially and ten times as much tangentially compared to along the grain. The whole superstructure sides should be stripped back to bare wood and closely examined for condition and repaired.

The rot should be cut out back to sound wood and the wood dried out and then treated with a borate solution to kill any active spores. The wood should then be repaired with a graving piece inserted bonded with a thickened epoxy. Where bonded seams have failed but the wood is sound it should be dried out and treated in the same way.

It would be almost impossible to clean out the failed joints well enough to achieve a new bond. A proper repair would be to rout out the failed seams with a small parallel cutter two thirds of the way through the thickness and then insert a hammered in tapered spline of mahogany type hardwood bonded with a thickened epoxy adhesive. Hammering in the tight fitting spline would drive the epoxy adhesive through the remaining third of the joint. The splines will need to be faired back before the coachroof is repainted.

Recommendation

(Cat 2) Repair the rot and the open seams to the coachroof sides and corners

The internal joinery to the coachroof superstructure in the forward and aft accommodation is difficult to access as it is all fitted out with joinery and headlinings. There was no clear evidence of water ingress or decay in the parts that could be seen and the varnished surface intact, but moisture readings were high opposite where decay has been identified externally.

It is important that whenever the internal fit out is stripped out or removed for alteration any hidden wooden structure must be examined and ensured that it is completely dry and sound before it is covered up again. Removal of joinery and hull linings to access structure hidden behind is outside the scope of survey and all the carlins and deck heads are covered by linings.

g) Hatches & Companionways

The accommodation is accessed by a pair of companionway doors in the wheelhouse opening onto the side decks. These are all hardwood panel doors with glazed upper sections and tongue and groove panelled lower sections. They are sliding doors with wheels in the bottom running on rails and the doors retained by flanges to the top.

The doors are secured by hook latches and three lever locks. This all works well in use and the doors are in good condition although read slightly high for moisture at the bottom all spike tested as sound. There are no other exits from the accommodation other than the opening hatch to the foredeck. This has a firm foothold in the berth beneath but the hatch cannot be opened from the outside as is usually recommended.

h) Windows and ventilators

There are windows to the front, sides and back of the wheelhouse except where the aft has been partially blanked off for the installation of the gas cylinder locker. The forward and aft windows are fixed and the after side windows are opening. These have a sliding pane that moves over a fixed pane alongside. These both worked when tested. They can be locked with a screw-in stop.

The windows are all glass glazed which appeared to be toughened and are set into silver anodised aluminium frames with rubber gaskets. The windows are then set into apertures in the joinery and screwed in places through the outer flange. The windows would have been bedded on adhesive sealant but this may have failed as all the windows are showing extensive water damage to the joinery beneath.

This could be just the result of condensation but the water damage is starting to soften and decay the wood and also possibly extending into the adjoining coachroof tops. The windows should be removed and the frames dismantled so that the rubber gaskets holding the glass can be replaced before re-assembly. The windows should be reinstated with new adhesive sealant after the repair of the damaged joinery frames as previously detailed.

Recommendation

(Cat 2) Remove and dismantle the wheelhouse windows, replace the rubber gaskets and re-instate with new sealant.

To the front of the wheelhouse are three screens each fitted with a top mounted windscreen wiper. These are operated by a single switch at the helm. Only the port and centre wipers worked when tested. All the wiper blades were split and should be replaced. There are no working screen washers but a washer pump is mounted inside the helm and jets are mounted in the top screen frame. This could be a work in progress.

Recommendation

(Cat 2) Repair the starboard screen wiper and replace all the blades

To the sides and front of the fore and aft coachroofs are long low windows of a similar construction. The single forward and two aft face windows are fixed and shaped to match the camber of the deck and coachroof tops. To the sides are composite windows with fixed end panes and sliding opening panes to the centre. These windows also all worked freely when tested.

There are three Tannoy type dorade ventilators in the forward coachroof top and two similar ventilators in the aft coachroof. This is good provision for the size of the accommodation although it would be recommended that the sliding windows were open whenever the gas cooker is in use. There are two ventilators in the wheelhouse sides to provide combustion air to the engine space. These were judged to be of adequate size for the engine capacity.

i) Deck gear and fittings

To the transom is a pair of buttresses bolted to the bulwarks and steel welded pads to the transom. These are for the mounting of a pair of cast aluminium davits. These are simple frames with an outboard sheave and a cleat for falls although no falls are fitted. The davits are painted in a good uniform coat of white enamel paint and can be swung inward when not in use to reduce the LOA for berthing.

On the forward coachroof is a hinging tabernacle for a mast. This can be lowered for passing under bridges and is stayed by a forestay to the forward coachroof top with a ‘quicklink’ shackle, and side stays to the wheelhouse top. The mast is an all hardwood construction in an I beam profile and lightening holes in the centre web. The mast carries steaming and anchor lights and has spreaders and halyards for flag signals. This all appeared to be in good order although the mast was not lowered to test.

Welded to the transom is a pair of steel loops. This is for hanging a folding boarding ladder and the ladder was seen stowed in the aft lazarette. This is a hardwood construction with six rungs when unfolded. Each rung is covered with a non-slip tape and the ladder should be long enough to reach below the waterline so that a crew member can reboard the vessel unaided and also board the vessel from a dinghy lowered by the davits. There are hand holds in the ladder side frames and handholds in the stanchions to the handrails.

j) Safety equipment

The only item of safety equipment apart from fire extinguishers which are detailed later, is a liferaft. This is a 6 man Zodiac Coaster liferaft in an valise and stowed in the lazarette locker. There is no manufacture or next service date seen. This raft is designed to the old ORC standard which was superceded by ISO 9650 in 2005 so manufacture is prior to that date.

The serial number starts XDC and liferafts with this number were subject to a recall due to faulty overpressure relief valves. If the liferaft is to be used it must be serviced and the completion of the recall checked. This liferafts would have had a three year service interval but once they are over ten years old they are subject to annual servicing which can make them uneconomic.

At least a horseshoe lifebelt should be supplied and installed. This should be equipped with an automatic floating light and mounted on a bracket for immediate deployment. The lifebelt should be permanently marked with the vessels name and port of registry.

Recommendation

(Cat 1) Install a lifebelt and floating light and mark lifebelt with the vessels name and port of registry

k) Skin fittings & 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 or apparent magnetic flux can 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 is a total of 9 through hull skin fittings under the waterline. One fitting is a glass filled nylon transducer fitting with a propeller for the Sumlog speed log This is mounted in the engine space on the port side and just aft is a fairing block with the depth sounder transducer. Both appear to be sound and watertight but neither could be tested as the vessel is out of the water.

The Sumlog is old mechanical technology using a spinning wire in a cable and could not be seen to work. If it is not to be used than the transducer should be removed and the hole sealed. These projecting type transducers have been known to get snapped off leaving a hole in the hull.

The other skin fittings are all valves fitted into short steel tubes welded into the hull bottom. Two in the forepeak were for the forward heads compartment and both have been capped off as the sea toilet has been replaced with a cassette type with an integral holding tank. The valves were sound and free turning but if they are not to be use the valves should be removed and the welded tubes themselves capped off. These brass valves are an unnecessary risk of failure due to galvanic erosion.

Recommendation

(Cat 1) Remove the unused valves and cap off the welded tubes

Two fittings in the engine space are for the engine cooling water intakes. These are both flanged valves bolted to steel stand pipes welded into the hull bottom either side of the shaft logs. It is assumed that the bolted flanges are insulated. These are fitted with a gate valve to port and a ball valve to starboard and both have seawater separators in the top.

These valves are also both in good sound condition although there is some white powder deposits around the port side valve and some light surface corrosion to the hull around the welded flange which appears to be leakage from around the gate valve handle spindle seal. This should be tightened or the gasket replaced.

Recommendation

(Cat 2) Tighten or replace the port engine intake valves spindle gasket

In the forward engine space is another ball valve threaded to a welded pipe in the hull bottom. This is connected to a hose leading to a deck fitting and is assumed to be for use with a deck wash pump. This is a DZR brass ball valve which is also in a fair and sound condition although there is some corrosion to the welded pipe and the hull bottom surrounding. All hoses were tug tested as secure and all handles free turning.

Beneath the port cabin bunk is a new pair of valves for the aft cabin en-suite heads compartment fitted to welded threaded pipes. This compartment is not yet in use and the discharge hose is not connected with a hose. The large discharge valve was also left in the open position and would have flooded the vessel if it had been launched. These are both new valves and in good condition. All except the deck wash pump valves are assumed to be a standard zinc brass although all were seen to be in good clean condition.

The use of brass valves connected to steel standpipes may have contributed to the corrosion seen on the hull bottom around the welded fittings. There is a galvanic potential between steel and bronze or brass which will cause electro-chemical corrosion of the lower anodic metal. The heat affected zone of the steel around the weld is the most vulnerable to any corrosion due to the significant changes in the metal microstructure as a result of rapid heating and cooling during welding.

Ideally, valves manufactured from cast or forged carbon steel should be used in steel hulls. Stainless steel valves should not be used as passive stainless steel is actually higher on the galvanic scale than brass. Carbon steel valves are not easy to source in the UK, hence the common use of brass. Marelon glass filled nylon valves are a practical alternative but not acceptable in engine spaces as they are not fire resistant.

When using brass or bronze where there is no practical alternative then the brass should be insulated from the steel such as by using flanged fittings such as on the engine intake valves where a fibre gasket can be fitted. For welded threaded steel pipes the valves can be fitted using a Duralac jointing compound. The welded tubes and welds should be regularly inspected and any signs of corrosion should be treated an painted.

Recommendation

(Cat 2) Clean, treat and paint the hull and stand pipes to the port engine seawater intake and the deck wash pump valves.

There are additional skin fittings in the topsides. These are drains for the basins, sink, bilge pumps and locker lid gutter drains. These are not fitted with valves although above the waterline their security is less critical. All the hoses are in nylon reinforced PVC and are double hose clipped.

There are no tapered bungs attached to any skin fittings. A bung of appropriate size should be located alongside each valve and stand pipe so it is instantly available for sealing the skin fitting in an emergency should the fitting or weld fail suddenly.

Recommendation

(Cat 1) Locate an appropriately sized tapered soft wood bung adjacent to each below waterline fitting.

l) Engine

The engines are a pair of Perkins Range 4 M90's also 4.236M which are marinised, naturally aspirated, direct injection, 3,867cc 4 cylinder diesel engine. The model numbers relate to the number of cylinders (4) the cubic capacity (236 cu ins) and the application (Marine). The engines specification is a pleasure duty rating and rated at 80hp at 2,800 rpm.

The engine hours meters record 299 hours to port and 292 hours to starboard. The starboard engine serial number is U558757W. The U indicates the country of manufacture as the UK and the W gives the year of manufacture. Manufacture of these engines was discontinued in 2002 so the year letter W must refer to 1991. It is understood that these engine were reconditioned when installed in 2008.

The engines are fresh water cooled with seawater drawn from a valve in the after engine space and supplied via a seawater strainer installed on the valves. Raw water is pumped via a gearbox oil cooler by engine driven Jabsco type pump through a water cooled exhaust manifold and intercooler and injected into the exhaust elbow via a swan neck.

The exhaust mixing elbow is good with no signs of corrosion around the water injection port and the exhaust hose connection. This should be regularly inspected as it is a prime point for corrosion. Signs of corrosion externally can be an indication of more extensive corrosion internally. The exhaust is in Vetus exhaust hose and runs via a swan neck in the engine space to welded tubes in the hull side.

These tubes run under the aft cabin bunks to an outlet at the waterline in the transom each side. There is no waterlock in the exhaust and no flaps on the exhaust outlets. The engines are set low in the hull and there is a danger of a sudden deceleration of the vessel with a following sea back flooding the exhaust system and possibly causing a hydraulic lock. It would be advisable to install waterlocks to the exhausts or flaps to the exhaust outlets.

Recommendation

(Cat 2) Install waterlocks to the exhaust hose or flaps to the exhaust outlets

The engines were seen to be in good cosmetic condition. The oils were well filled and clean and lightly carbon laden. The alternator belts were in good condition and set up with sufficient tension. There were negligible signs of black rubber powder from degrading belts. The only signs of corrosion were to the head beneath the forward header tanks on both engines. There is an anti-siphon valve installed between the seawater pump and the heat exchanger which is leaking onto the head on both engines.

These valves will always weep some seawater as they close under pressure so they should not be mounted immediately above an engine. The hose should be extended so that the anti-siphon valves can be located anywhere away from the engines. The valves should always be located above the waterline.

Recommendation

(Cat 2) Move the anti-siphon valves away from engines to prevent damage

The engines are set on flexible mounts fitted to welded box section longitudinal engine beds. The engine mount rubbers were good with no signs of powdery decomposition. The engine space is ventilated by a pair of centrifugal extractor fans mounted beneath the side decks and venting through grilles in the wheelhouse sides. The gearboxes are Borg Warner Velvetdrive 1017 series hydraulic reduction and reversing gearboxes with a 1.88:1 reduction ratio.

The gearboxes have identical forward and reverse ratios to allow the contra rotation of the propellers. A standard Velvet Drive gearbox cannot be run in reverse for an extended period without damage. To enable reverse use on one gearbox the internal hydraulic pump rotation must be reversed so the boxes are not identical. The starboard gearbox is the non-standard one and this must be noted when ordering parts or replacements. Parts must be ordered by the model numbers which are different for each gearbox.

The engine instrument panel is mounted at the helm. This panel includes twin gauges for engine oil pressure, water temperature and alternator output. There is also a pair of tachometers or revolutions counters. These have the engine hours meters.

The engines were started easily and allowed to idle. The gearboxes were also engaged forward and reverse gears and revolutions raised briefly to 1000 rpm to check for good oil pressure. Both engines recorded 55psi and there were no unusual sounds or vibrations and no undue emissions of smoke. The true condition of an engine can only be established when it is trialled under full load conditions and up to full running temperature, which is only possible in a sea trial.

m) <u>Fuel system</u>

The fuel tanks are welded and painted skin tanks each of approximately 170 litres capacity. The tanks are formed between the topsides plating and an internal longitudinal bulkhead outboard of the engine under the side decks. Each tank is filed by a flush filler fitting in the deck each side. There is a large balancing pipe between the tanks with a valve on each tank and a central isolation valve. This arrangement allows both tanks to be filled from one side.

There are no senders in the tanks, but level can be measured by dip sticks through the deck fillers. There is also a sight tube for each tank with a test valve at the bottom but they are almost unreadable. Fuel for each engine is drawn from the balancing pipe either side of the central isolation valve which allows for both engines to be supplied from a single tank in the event of one tank becoming contaminated or damaged.

Fuel is supplied to a pair of CAV 296 type cartridge fuel filters on the after engine space bulkhead. Each filter has a water separator bowl in the bottom. Fuel is supplied is drawn copper to a bulkhead fitting and then in flexible fuel hose ISO 7840 to the engines. There used to be a supply to the warm air heater from the starboard filter, but this has been disconnected so the heater appears to be no longer in commission.

This is not a good arrangement as fuel for other appliances should not be drawn direct from an engines fuel supply. If done so it can cause air locks to be drawn into the engines fuel supply line which will stall the engine when it reaches the injector pump. Fuel for a heater must come direct from a sperate fitting on the fuel tank. The supply to the newer heater could not be seen.

n) <u>Stern gear</u>

The 32mm propeller shafts turns in a shaft logs each side which are welded tubes in the hull bottoms each side. The shafts are rigidly held in the shaft logs with white metal bearings at each end. The shafts are sealed by conventional packing glands which are greased by screw greasers mounted on the aft engine space bulkhead. These needed several turns to come up tight indicating that they have not been operated recently.

There is a squeeze of grease emerging from the glands and bowls have been placed beneath to collect leakage. The appearance is that these glands are leaking and the dog plates need to be tightened. If the glands still leak then the glands need to be re-packed.

<u>Recommendation</u>

(Cat 2) Tighten the gland packing and if leaks persist then repack the glands

The shaft are non-magnetic indicating that they are made of a 300 series Austenitic stainless steel. The engines drive the shafts via Python Drive flexible couplings. These are a short Cardan shaft with a Constant Velocity joint at each end allowing full articulation of the engines on their mounts. This is all in good condition and appears to be a recent upgrade.

Externally the shafts are held in A brackets with cutless bearings. The propellers are three bladed 20” equipoise propellers. The blades showed slight magnetic flux indicating that they were probably a Manganese Bronze. This is a trademark for a zinc brass with some manganese added for dezincification resistance.

The propellers are mounted on a taper and keyway and secured with a full nut and split pin. They sounded well when hammer tested and showed no significant signs of electrolysis or cavitation damage. Mounted on the shafts are Spurs type rope cutters. The cutters are in good condition although covered by calcareous deposits which can dull the blade edges.

The pitch of the propellers could not be measured but a calculation of engine and gearbox data, vessel dimensions and displacement indicates maximum speed of 11 knots is possible with 20 x 13 three bladed propellers. The engines have ample reserves of power as displacement speed is 7.7 knots which requires the engines to each being delivering just 27 hp.

There was a very poor continuity recorded between the hull anodes and the propellers, but the propellers are better to be electrically isolated from the hull and given their own protection with anodes fitted to the shafts. This is because when connected to shore power the hull can become grounded to the marina electrical supply. Ideally two shaft anodes should be fitted to each shaft as a back up. These anodes can erode around the bolts and become loose and ineffective.

Recommendation

(Cat 2) Install two shaft anodes to each propeller shaft

o) Steering system and handling

The semi-counterbalanced rudders appear to be bronze castings shaped to a hydrodynamic profile. The stocks project at the top and turn in steel rudder tubes welded into the hull bottom braced with struts to the transom and aft bulkhead. This is all accessed within the steering flat beneath the lazarette after deck hatch.

These tubes extend well above the waterline and are sealed by conventional bronze packing glands. It can be assumed that there would be bearing bushes and seals at each end of the tubes as the glands are greased by a pair of screw greasers in the steering flat. These came up tight when turned showing the glands were well packed.

The stocks are turned by a pair of steel tiller arm secured to the top of the stocks by a clamp fitting and keyway. The steering is a Morse Teleflex system with a heavy duty Bowden type push pull cable operated by a mechanical helm. This operates on the starboard tiller arm which is then connected to the port tiller arm by a drag link with ball joints at each end. The steering was extremely stiff and could not turn the rudders effectively. This should be investigated and repaired.

Recommendation

(Cat 1) Repair the stiff steering and replace the Teleflex cable is necessary

At the helm is an Autohelm autopilot control head but no other autopilot components were seen. The Teleflex fitting on the starboard tiller arm has a provision for an electromechanical ram to be installed but none is fitted. The autopilot control did not power up when tested so it assumed to now be redundant.

p) Anchoring and mooring gear

Mounted on a hardwood plate to the foredeck is a Lofrans Royal manual horizontal windlass with a warp drum and a chain gypsy. This is well mounted and appeared to be free moving although the operating lever was not seen on board to test. Alongside is a forward facing spurling pipe which would feed the chain into the chain locker beneath. All the chain has been run out at the time of survey. The stemhead fitting is a simple single roller between a pair of welded steel cheeks to the bulwarks.

In the chain locker beneath is a large builders bucket full of water. It appears that there is a serious leak through the foredeck in way of the windlass mount or the spurling pipe and this bucket it to prevent it reaching the bilges as there are no bilge pumps. This should be investigated by water testing the foredeck and repairing any leaks.

Recommendation

(Cat 2) Repair the apparent leak to the foredeck fittings

Either side on the foredeck at the bows is a pair of galvanised steel mooring bitts, one pair each side. A pair of handed fairleads is mounted on the bulwark cappings either side. These are all well seated and secure. There is a second pair of mooring bitts on the after deck at the quarters and handed fairleads to the bulwarks. Amidships are two pairs of stainless steel cleats bolted through the bulwark capping. All the mooring fittings are well seated and secure.

q) Heating and Air Conditioning systems

There are two heaters installed on the vessel. Under the starboard side deck accessed beneath the companionway door step is an Eberspacher D1L 1.8kW diesel fueled warm air heater. Opposite under the port side deck is a Webasto Thermotop 4.2kW diesel fueled water heater. Neither of the units appear to be fully operational.

The Eberspacher heater has no hoses connected for distributing air round the vessel and the fuel supply appears to have been disconnected. The unit exhaust is still connected to the hull side fitting but it is not insulated. If this unit is to be recommissioned the exhaust which can reach 400°c must be fully insulated. This unit is quite small for the size of the accommodation and appears to have been superseded by the Webasto heater.

The Webasto is clearly newer although this actual model is no longer in production. The unit appears to be fully installed with an insulated exhaust and all pipework connected. The fuel supply appears to be connected although it could not be seen where is draws fuel from the tank. There is completed pipework to the water heater but circulation pipework to cabins for supplying radiators is unfinished and open ended. There is a control panel at the helm that didn't power up. The status of the two heating systems should be established.

Recommendation

(Cat 2) Establish the functionality of the two heating systems.

r) Sea toilet and shower compartments

There are two sea toilets, one in each heads compartment. The forward heads compartment is all fitted out with caravan fittings with a built in Thetford cassette type toilet. There is a basin unit with a pull out shower head and a drainer tray in the sole. The basin drains through the topside but the tray does not appear to be connected to a drain. There is a shower pump out switch at the switch panel but no pump was heard or seen.

The basin plinth moulding has cupboards beneath. All the fittings are very lightweight and flimsy, and could easily break if used when the vessel is in a seaway. The compartment is accessed by a thin plywood sliding door that is not smooth in operation and tends to become detached form its bottom runner.

The after heads compartment is en-suite with the master cabin. This is a large compartment and not yet fully fitted out as it is clearly intended to include a proper shower stall. The compartment is all lined out with white polyester faced plywoods. At present the only fitting is a Jabsco sea toilet with a black Twist ‘N lock’ handle. The handle type and colour is impotant in identifying the correct spares. The toilet valves are installed in the hull but the discharge hose is not connected.

Under the forepeak single berth is a black welded HDPE tank. This is assumed to be intended to be a holding tank although at present no hoses are connected or means of emptying the tank. The true purpose of the tank could not be established and the tank may not be needed.

s) Fresh water system

Fresh water is stored in a pair of close coupled welded steel water tanks located under the galley sole. The tanks are skin tanks partially formed by the hull bottom and are understood to be of about 350 litres capacity. The tanks are filled by a single flush deck filler in the port side deck. There is no level sender in the tops but there is a port that can be opened to view or dip stick the contents.

Pressurised cold water is delivered by a Par-Max diaphragm pressure pump located in the forward engine space. This has an accumulator tank alongside to smooth out the water supply and prevent pump cycling. Cold water is supplied to mixer faucets in the galley and the forward heads compartment. Pressurised cold water is also supplied to a 40 litre hot water calorifier alongside the pump in the engine space.

This calorifier is a copper cylinder with a heating coil supplied by the Webasto Thermotop heater. There is also a 1kw immersion heater in the calorifier which runs off the shore power supply. There is a second heating coil which could be connected in circuit with one of the engines closed cooling systems, but this is not currently fitted. Pressurised hot water is then supplied to the same mixer faucets.

t) Galley

The galley is located on the port side forward of the helm down a short companionway The work tops are in a grey granite effect high pressure laminate which has a rolled edge with no fiddle rail. The joinery is in a red laminate faced plywood with hardwood mouldings and trim around the doors. This is in a fair condition but the joinery is starting to delaminate along the bottoms.

Above the worktops the high level cupboards are in a beech effect printed faced joinery with post formed mouldings. The splash backs are in dark blue/grey mosaic ceramic tiling. The galley is in a U shape with a large rectangular sink facing outboard in the centre. This has a drainer and a single mixer faucet supplying hot and cold water. The sink drains through the topsides beneath just above the waterline.

To the forward part is a three burner gas cooker by SMEV. This has a folding glass cover to extend the worktop when it is not in use. The burners must be cold before this lid is closed. To the aft part is a large front loading dual fuel Electrolux refrigerator. This is fuelled by LPG and 12 volts although it was not tested with either source as it did not appear to power up when tested. This maybe a misunderstanding of the operating system.

Opposite the galley is a Vanette eye level double oven also fuelled by LPG All is in good and clean condition although none could be fully tested in service. All the burners of the cookers have flame failure devices. None of the LPG devices could be tested as they are outside the scope of survey. Testing LPG appliances must only be tested by a Gas Safe Registered engineer using certified equipment.

u) Electrical system

There are two batteries installed in battery boxes aft of the engines. These are both Lucas 140 amp/hr flooded cell automotive batteries. Each is charged by the engine driven 70 amp alternators. The batteries are also charged by a Mastervolt 10 amp switch mode battery charger which is located on the after engine space bulkhead. This is a switch mode type and has isolated outputs to charge both batteries without bridging them.

The batteries were all tested for condition with an electronic drop tester to establish the batteries power delivery capacity. This capacity 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. This sulphation process is greatly accelerated if ever the batteries are left at a low state of charge below 11 volts for long periods.

The batteries each have a quoted cranking amperage output of 1000 amps (EN) which means that each battery should be able to deliver at least 1000 amps for 30 seconds whilst maintaining a stable usable voltage. When tested the port engine battery delivered 1015 amps and the starboard battery delivered 1020 amps.

Normally a new battery will deliver about 10% more than its rated capacity as it is intended to be a minimum, so these batteries have lost a small amount of capacity. The output displayed is typical of the batteries being about one year old and still with several years of useful capacity remaining. The batteries are permanently engaged into the engine circuits. They can be Individual engaged into the domestic services supply by a four position isolator switch beneath the wheelhouse saloon seating.

In practice neither engine battery is dedicated to supplying the domestic circuits. It is advisable that the crew always ensure that one battery is maintained fully charged and isolated for engine starting. The domestic circuits are supplied by two panels of rocker switches at the helm with a total of 12 circuits. All of the switches are labelled for function and all circuits were powered up and equipment tested where possible.

Lighting to the cabins, heads compartments and the saloon are by down lighters to the headlinings and lights under the deck head. There are also reading lights to the bunks. All are individually switched within their compartments as well as being switched at the fittings which can be confusing, but all eventually appeared to work when tested.

There are navigation side lights to the wheelhouse sides and a stern light to the transom although this is actually laying on the after deck. There is a steaming and an anchor light mounted on the mast. These all worked except the stern light and the all round white anchor light. These should be repaired which may just be a poor bulb connection due to lack of use.

Recommendation

(Cat 1) Repair the non-functioning stern light and anchor light

The depth sounder powered up and displayed a reading although the vessel was out of the water. The autopilot did not power up as already detailed. The VHF powered up and displayed an MMSI number. Voice was heard and a successful DSC test call was made to a hand held device and auto channel switching was made.

The horn and two of the screen wipers worked when tested. The log is a mechanical device so could not be tested. The FM/CD player powered up and tuned in a channel and speakers worked. The battery monitor showed accurate battery data. There are also voltage meters for each engine but these showed consistently low readings, about two volts below that recorded at the batteries when the engines were running.

Recommendation

(Cat 2) Check the calibration of the engine panel voltage meters.

The 240 volt AC shore power input socket is located in the port side of the wheelhouse and is routed directly to a consumer unit beneath the helm. This houses the vessels own RCD protection device and five MCB breakers which supply the power sockets and devices around the vessel. There is a Sterling ProSave galvanic isolator installed in the ground wire.

There is no reverse polarity warning system. This is necessary when voyaging to the near continent as the live and neutral poles are reversible in Europe which uses double pole switching where UK uses single pole switching. Some vessels carry reversing adaptors to avoid the risk of leaving appliances live when thought to be switched off *(See explanatory notes 17 & 19)*

v) Gas system

The gas cylinder storage box is installed on the after coachroof top where it can drain directly overboard. This contains a single 4.2 kg gas cylinder and space for a spare alongside. The cylinder is fitted with a regulator and flexible hose to a bulkhead fitting and a bubble leak detector. The flexible hose is dated 09/16 and the regulator is probably of the same age. It is usually recommended to replace hoses every five years and regulators every ten. This hose is now due for replacement.

Recommendation

(Cat 2) Replace the flexible fuel hose to the gas storage box.

Gas is supplied through the vessel is drawn copper piping to the galley. There are three gas appliances in the galley, cooker hob, oven and fridge, and there are three individual isolator switches at a manifold in the cupboard beneath the cooker hob. All worked when tested but one of the gas supplies from the manifold had been disconnected and capped off. It could not be identified which appliance had been disconnected.

The appliances were not tested as they are outside the scope of survey. Gas systems should only be tested by Gas Safe Marine registered engineers using certified test equipment. The fridge is termed an ‘unattended appliance’ in that it would be in constant use such as when crew are sleeping in the adjoining cabin.

This device is not isolated and draws combustion air from the accommodation and exhaust also into the communal space. This may be the device which is disconnected, but if not it would be recommended that this device should always be run from the electrical supply where possible and never be left running on gas when crew are sleeping in the vessel.

w) Firefighting equipment

There are two manual fire extinguishers seen on board. In the galley is a 1kg 5A 34B dry powder extinguisher and another 1kg 5A 34B extinguisher is in the wheelhouse. These both have a gauge showing good pressure and a manufacturing date of 2016. There is also a fire blanket in the galley.

There are no service records attached to any of the extinguishers. All fire extinguishers are due an annual service and a discharge test five years after manufacture. For these smaller units, the cost of a test and recharge is likely to be more than the purchase of a new unit. A vessel of this size should have at least three extinguishers to 5A 34B minimum and one should be located outside the accommodation.

Recommendation

(Cat 1) Service or replace all the manual fire extinguishers At least one extinguisher should be accessible outside the accommodation.

There is a pull handle for remote operation of an engine room extinguisher system, but no extinguisher was seen. If an automatic engine space extinguishers is to be installed it should be Halon replacement Clean Agent gas type containing FM200, FE36 or HFC227 heptaflouropropane gas extinguishant. Automatic dry powder extinguishers should not be used in engine spaces as the powder can cause serious damage if it gets sucked into a running engine.

x) Bilge pumping

There are no apparent bilge pumps installed in the vessel. The hull bottom is effectively divided into three compartments but there did not appear to be any bilge pumping arrangements. A Whale manual diaphragm pump was seen in a bucket in the engine space but it was not fitted and may be awaiting installation. At least two bilge pumps must be installed with one of manual pump with at least 30 litres per minute capacity. The pumps should be capable of discharging water from all compartments.

Recommendation

(Cat 1) Install at least two bilge pumps in the vessel capable of discharging bilge water from all compartments

y) Interior fit-out

The accommodation fit out is the result of several different alterations over the years. The aft cabin and the wheelhouse are the only compartments that are essentially original and in these areas the fit out is of a good standard for its time. The construction is fully joinered in good quality hardwoods and veneered marine plywoods.

To the aft cabin this in in good condition for its age although the layout is not ideal for a master suite with two single hull side berths. The prime location to extend one of the singles to a double berth is taken up by the en-suite heads and shower compartment.

The wheelhouse joinery has seen more wear and tear and changes of equipment so is not in as good a condition but it is still well constructed. There is water damage to the frames beneath the fore and aft window which needs to be addressed. All the headlinings to the cabins is in vinyl covered plywood panels inset between hardwood battens and all in good order. These will probably have been renewed when the fore and aft coachroofs were replaced.

The soles to the cabins and the galley are in a Linoleum type of flooring and bonded to individual panels. These can be lifted with flush lift rings to give access to the hull bottom. The wheelhouse has a single access panel in the centre and the rest covered by a single flooring sheet. There are individual panels beneath and full access could be gained by removal of the flooring.

The galley and the forward heads compartment are not in the same quality of fit out. There appears to be extensive use of caravan quality fittings which often are not robust enough for marine use. The forward cabin is still quite original but is only a single berth. This could be converted to a traditional V berth to increase the number of sleeping berths. All the berths have ventilating wooden slatted subframes fitted so they are clearly well used.

The hull side linings are all in a white polyester faced plywood with hardwood lippings and mouldings and are all in good order. The bulkheads are similar but in a textured laminate. There are woven striped fabric curtains to all the wheelhouse windows and blue satinised cotton curtains to the aft cabin. These are all on curtain tracks and the aft cabin curtains are retained at the foot by curtain wire. These are all in good order. The glazing to the forward heads compartment is obscured for privacy.

z) Additional equipment

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

Sestrel main steering compass, good condition, no bubble

Incastec depth display at helm, working

Incastec depth repeater, not working

NASA BM1 battery monitor, working

Autohelm 6000 autopilot control at hem, not working

Standard Horizon Matrix DSC VHF transceiver, working, DSC test call made

Pioneer FM/CD/Bluetooth player, working

Pair of stereo speakers to wheelhouse, working

Sumlog mechanical speed log, not tested

Plastimo hand bearing compass, good condition

Kelvin clinometer to helm, broken

Built in steel safe

Brass cased clock to wheelhouse, not working

Chrome cased clock to galley, not working

Absaar portable battery charger

Glomex TV signal booster

Quantity of warps and fenders

Pair of chrome horns to wheelhouse roof, working

Ropework bow fender

Boat hook and deck scrubber

Quantity of engine service spares, oils and lubricants

Red ensign and ensign staff

Signal flag cabinet with flags

Hose and hose reel

Outboard bracket on aft handrail

Handbooks and equipment manuals

Galvanised Delta plough anchor, good condition

4) Summary of Recommendations

This is intended as a check list. Full details must be read and can be found in the body of the report. Page references are given (p#)

Category 1 Recommendations are safety related defects which should be corrected before the vessel is put into commission.

(p7) Remove joinery and hatches to view hull bottom plating to forefoot
(p8) Clean and treat all areas with visible surface corrosion
(p8) Re-measure after corrosion treatment and repair properly if necessary
(p9) Replace the anodes with a type suitable for the waters
(p15) Install lifebelt and floating light and mark lifebelt with name and port
(p16) Remove the unused valves and cap off the welded tubes
(p17) Locate a tapered soft wood bung to each below waterline fitting
(p21) Repair the stiff steering and replace the Teleflex cable if necessary
(p25) Repair the non-functioning stern light and anchor light
(p27) Service or replace all fire extinguishers with at least three
(p27) Install at least two bilge pumps capable of discharging all compartments

Category 2 Recommendations relate to defects which affect the efficient operation of the vessel in normal use. Also safety considerations relating to extended use. They do not affect the present safe operation of the vessel.

(p10) Cut out and replace the sections of water damaged bulwark capping
(p12) Remove wheelhouse windows and repair softened wood
(p12) Repair the rot and the open seams to the coachroof sides and corners
(p13) Dismantle wheelhouse windows, replace rubber gaskets and re-instate
(p14) Repair the starboard screen wiper and replace all the blades
(p16) Tighten or replace the port engine intake valve spindle gasket
(p17) Treat and paint hull and pipes to seawater intake and deck wash pump
(p18) Install waterlocks to the exhaust hose or flaps to the exhaust outlets
(p18) Move the anti-siphon valves away from engines to prevent damage
(p20) Tighten the gland packing and if leaks persist then repack the glands
(p21) Install two shaft anodes to each propeller shaft
(p22) Repair the apparent leak to the foredeck fittings
(p22) Establish the functionality of the two heating systems
(p26) Check the calibration of the engine panel voltage meters.
(p26) Replace the flexible fuel hose to the gas storage box

5) Conclusions

[redacted] is an example of a well regarded class of displacement motor yacht. The design concept favours the good seakeeping abilities of a radius chine displacement hull with a deep keel for good directional stability. This is combined with a large deck saloon with good all round visibility and a secure full walk round working deck. Dutch steel shipbuilders have an enviable quality reputation which has maintained demand for traditional design and has led them to eschew the trend toward light displacement deep V planing hulls.

Provided with timely maintenance, this kind of vessel will endure longer and in better condition than the current genre of lightly built performance motor yachts. But steel is demanding when it ages and every sign of corrosion should be immediately attended to while the repair is still a quick and simple task. The longer any repair is delayed the bigger the task becomes. This vessel has been fairly well maintained with this understanding and the current condition is good for her age but there are areas that need attention now.

The hull superstructure is another potential problem area being constructed traditionally in wood. The tops have been recently rebuilt professionally and have been done to a high standard, but the sides were overlooked or have deteriorated rapidly since. There is also a need to address these issues before they worsen but at least they do not threaten the security of the vessel.

The accommodation is a strange mixture of good quality original fit out and very mediocre recent replacement. There appears to be much use made of caravan quality fittings which are never intended for the rigours of an offshore vessel in commission. The re-fit is incomplete in places so combined with the unsuitable quality of some fittings, there is plenty of scope for improvements.

Good investment has been made upgrading the engines and drive train. Oil samples were taken and have been sent for laboratory analysis. There have been improvements made to the plumbing systems and the 240 volt electrical installations. The gas, water and fuel systems are basically original but still good and functional. The recommendations list is very long but includes some duty of care issues to bring the vessel up to current safety standards. The list also includes some time expired fittings and minor problems that are easily rectified

There are no significant structural or mechanical defects reported but some issues must be attended to. The urgency is more about early intervention and minimising the work needed to repair, rather than any immediate threat. The vessel is in an essentially sound condition combined with high original build quality There are issues to be addressed but when completed [redacted] will be a safe, reliable and efficient vessel, potentially capable of many more years of service.

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