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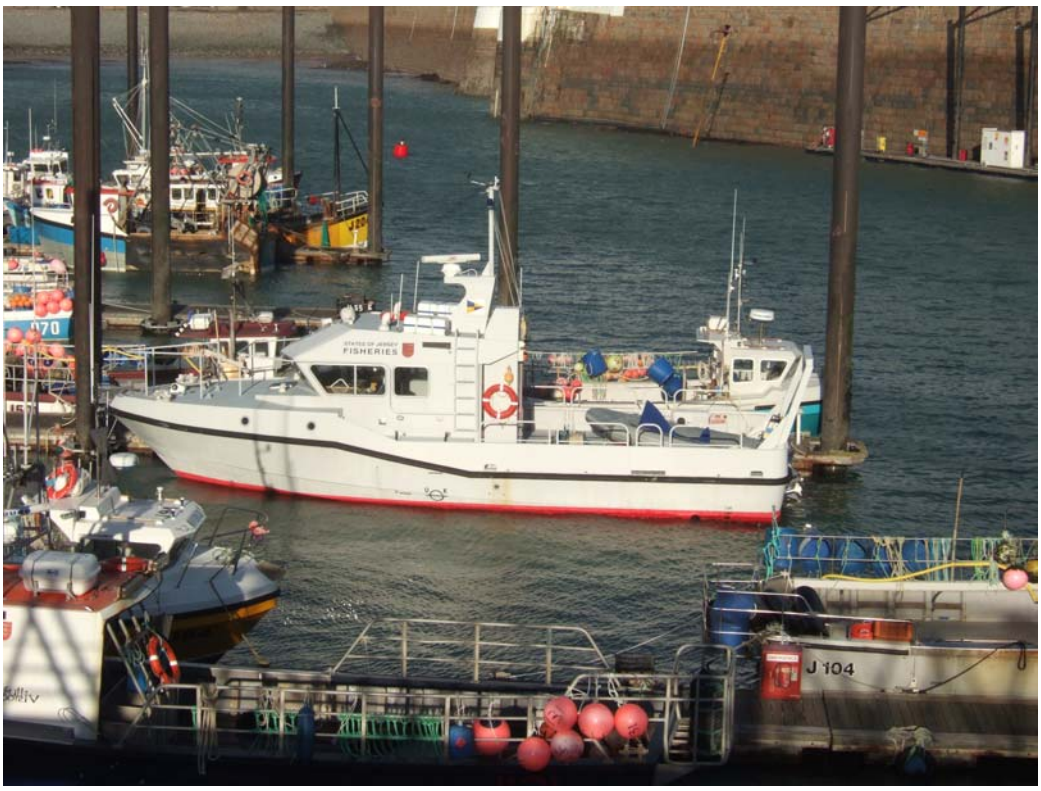
"Norman Le Brocq"

CONSULTANCY SERVICES
REPORT TO JERSEY SEA FISHERIES



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By; pg
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Introduction

Amgram Ltd. has been engaged by Jersey Sea Fisheries (JSF) to review the condition of their boat "Norman le Brocq" (NLB).

NLB is an aluminium 15m Fisheries vessel, designed by Camarc Ltd and built by Souter Marine Ltd (SML). She was delivered to JSF in November 1997. During her life she has had a number of refits alterations and additions (as detailed in Appendix A). Amgram have been asked to look at NLB and comment on the options of refitting, life expectancy and/or requirement for future new build.

Amgram Ltd provides design support and consultancy services to the small boat industry. Recent clients include Avon Inflatables Ltd, BP Exploration, Delta ARRC Ltd, Holyhead Marine Services and work has been carried out for a number of other UK and overseas authorities.

Camarc Ltd are leading small craft designers, specializing in small fast craft design in all materials, GRP, aluminium and steel. Some of the notable designs have been for the French Navy (20m craft, 24 off), UK MoD (15m craft, 1st of 15 craft), United States Coastguard (14m craft, 1st of 180 craft) as well as many Pilotage organizations around the world.

This report reviews the work that has been done for this task and reports the conclusions drawn.

Summary

A visit was made to Jersey on 10th December 2007. During the day a visit was made to the boat and discussions held with the Fisheries officers. Following that visit some investigations were made as to likely costs and the report assembled.

Conclusion

NLB, with a mid-life refit, can have a low risk future for the next 10-12 years. The approximate cost of this will be around £250-300,000 compared to a new build cost of £900,000-1,000,000. It is considered that overall there are considerable favourable cost and risk benefits associated to the choice of mid-life refit over new build.

It is recommended that planning should be put in place for a mid-life refit in September 2009. If this timescale is kept to there will be no need for a 2008 refit at all. However it should be noted, if the mid-life refit is delayed until 2010, that there will be a requirement for a partial refit in 2008 together with the associated costs.

Amgram work process;

1. A visit was made on 10th December 2007 to Jersey to view NLB and discuss the project.
2. NLB was inspected afloat in La Collette marina, St Helier. It should be noted that JSF have kept the boat in excellent condition throughout her life and have paid careful attention to service and refit. Whilst not in service but afloat at her mooring the engines are kept heated and void spaces heated, a practice which other users would be well advised to follow! NLB runs about 500 hours per year and has averaged 5000 hours over the last ten years. All in all she is in remarkably good condition for her age of 10 years.
3. Inspection report points; these comments are based upon a brief inspection and reported information, not a full survey which may reveal further issues.

Item	Area	Notes	
1	Hull general plating	Internally and above waterline excellent. No visible defects	
2	Hull cracking forward	See separate paragraph	
	Hull; keel and skegs	Not inspected; no reported problems	
	Hull; tunnels	Not inspected; no reported problems	
3	Deck	No visible defects at this time	
4	Superstructure general	No visible defects at this time	
5	Minor fabrications	No visible defects at this time	
	Minor Mouldings	No visible defects at this time	
6	Fitout; forward	Excellent condition	
6	Fitout; wheelhouse	Excellent condition	Requirement for additional seat and change type of 4th seat
6	Fitout; machinery areas	Good condition; would benefit from thorough degrease, clean and inspection at a refit	
7	Deck fittings	Good condition	Deck winch is rusting and corroding badly. Suggest replacement of unit and, if necessary, system

8	Fender	Excellent condition	No visual evidence of adhesive failing over the ten year life
9	Windows, Hatches & Doors	No visible defects at this time	Seals may be required.
10	Handrails	No visible defects at this time	
11	Lifting equipment	Not sighted	
12	Engines-Scania	See separate paragraph	
12	Gearbox	No visible defects at this time	
13	Stern Gear inc. rudders	No visible defects at this time	Shafts will be due for replacement shortly
13	Cathodic protection	No visible defects at this time	Anodes are reported as degrading correctly and working effectively
14	Steering	No visible defects at this time	
15	Skin fittings	No visible defects at this time	Have all been stripped and inspected at refits
16	Exhaust	No significant visible defects at this time	
17	Fuel Tanks and System	No visible defects at this time	Ongoing fueling/foaming issue
18	Cooling	No visible defects at this time	
19	Bilge Systems	No visible defects at this time	
20	Fire Systems		Suggest CO2 could be replaced with “Pyrogen” or similar
21	ER Ventilation	DC fans being replaced with AC fans to be run thro inverter	
22	ER Insulation	E/R; lower side insulation in poor condition;	Should be replaced at refit
23	Controls and instrumentation	No visible defects at this time	May be upgraded to electronic depending on engine package
24	Domestic tanks and system	No visible defects at this time	Suggest blackwater tank is added in fwd void space

25	Heating & Air Con	No visible defects at this time	Suggest possible further upgrade to heating system; addition of cabin heaters to improve demisting
26	Electrical	No visible defects at this time	
26	Generating sets	None fitted	
27	Navigation / Electronics	No issues at present	Electronic upgraded at last refit. Suggested that further upgrade should be an ongoing process through vessel's life, rather than a particular process at any moment.
28	Painting	Hull paint in average/poor condition. Deck paint average, s/s paint average/poor	Suggest NLB be blasted to remove all paint and antifoul. Repainting should cover the underwater, deck and superstructure only
29	Lifesaving	No visible defects at this time	
30	Loose Equip.	No visible defects at this time	

3.1. Hull defects

NLB has suffered some hull frame and hull cracking at a particular location forward. Over the years this has been repaired and repairs are outlined in appendix A. The latest repair done at Halmatic has been in operation since January 2006

The following notes provide some further background to this cracking;

Over 20 aluminium Camarc designed patrol and pilot boats have been built in the last ten years. Apart from NLB, other boats are 10 boats for the Dutch Pilot Authority (DPA), 4 boats for Sandy Hook Pilots, 1 boat each for Columbia River bar Pilots (CRBP), Savannah Pilots, Sabine Pilots, Pacific Pilotage Authority (PPA) and Atlantic Pilotage Authority (APA).

Different operators use their boats different amounts. Of the above clients the DPA have the highest use. They have been using the boats for about 4000 hours per year and some boats have clocked up 35,000 hours of usages. CBRP put between 2500-3000 hours per year, so NLB at 500 hours per year has light usage and with 5000 hours on the hull so far, can be considered to have plenty of life left.

About 50% of these designs have had a crack problem, in each case it is in the same proportional area; up forward in the mid chine area. In no case is it a catastrophic failure, in all cases it manifests itself as a small local crack and in all cases it has been locally repaired.

It should be mentioned that of the above designs currently the DPA, CRBP, PPA and APA are clients who have all ordered or are ordering new repeat Camarc designed boats.

It is the general opinion at present, that the problem is caused by the unexpectedly high impact loadings on the mid chine plate, transmitting abnormally high forces into the surrounding local structure. The problem is how to absorb those loads effectively, without putting high point loads on the welded aluminium connections.

The resolution of this local crack mechanism has already had some considerable input from LRS, ABS as well as the designers and a number of other aluminium experts. However for the DPA, who are currently having the next class of boats designed by Camarc, it is intended to carry out some Finite Element analysis (FEA) in conjunction with the Classification society (ABS) to try and eliminate the problem.

The results from this work and other work being done in the USA will be available to Camarc clients as part of ongoing support for the design. In the event of further failure the results for the FEA work would be used as a basis for a further solution.

3.2. Main engines

The existing Scania DS11 main engines have done about 5000 hours. The main engines should be removed in any mid-life refit to allow the engine room to be thoroughly cleaned and some refit work carried out.

There are two choices as to how to deal with the main engines if a refit option is followed.

Main engine refurbishment;
The main engines will need to be sent away for a full overhaul. This may take place in the UK at a major service centre or it may be that they are returned to the main plant in Sweden, It is expected that costs would be between £10-20k by the time the engines were transported and this includes replacing some components such as alternators, starter and other "lifed"items.

Main engine renewal;
As an alternative the main engines could be replaced. The existing engine is the DS11, which is not now built and, as a consequence, will become less supportable as the years pass. The direct Scania replacement would be a Scania DS12. If engine replacement is done, it is recommended that a review of available power plant should be carried out to assess other engine types and review service cost, service support and other issues.

Advantages of engine replacement would be that the new engine was fully supportable for the next ten years, had electronic control leading to better fuel consumption and low speed running control. Additionally a new engine would be "greener" as it would be Tier 2 compliant, ensuring that the engines meet the new and latest emission regulations.

Main engine renewal clearly has a cost associated with it. This is estimated to be around £100k. The old engines and gearboxes would have a residual value; again this is estimated to be between £10-20k, given that they have only 5000 running hours to date

Because of the refurbishment costs and residual value of the old engines, it can be seen the difference between replacement and refurbishment of the main engines might be around £60-70k.

4. Following the on board visit the meeting then moved to the JSF Office and reviewed the other items on the agenda.

4.1. Discuss shortcomings/ equipment failings

There are few known shortcomings on the NLB. Some issues identified for particular upgrade/improvement are;

- Improvement of the fuelling vents; to prevent build up of pressure and fuel foaming

- If necessary further repair/reinforce hull structure forward

4.2. Discuss future role and future equipment needs and any known upcoming legislation issues.

- Replacement of fourth crew seat with Bostrom seat unit and addition of fifth seat; This change is required to meet current manning recommendations and to improve the safety of the 4/5th crewmen (who is currently in a static seat)

- Investigation and possible addition of a thrust bearing; to reduce noise and vibration and to improve shaft life

- Addition of a blackwater tank; to meet MARPOL regulations and as an environmental issue

- Environmental issues; whether for refit or new build craft, a number of further items were identified as preferred actions; these were; replacement of CO2 by "Pyrogen" fire system, improvement to oil sump area under main engines, reducing main engine oil leaks and improving main engine fuel consumption.

- Bring NLB into line with the MCA workboat code (latest revision) and instigate the recommended inspection and survey periods

4.3. Discuss class (LRS) input if any.

- LRS was used as a build classification society. Generally the MCA workboat code is the industry recognized standard, which, if NLB were brought into line, would be instead of any LRS involvement.

4.4. Discuss engine and equipment choices; collect from any relevant supplier information

- A budget quotation for £70k for provision of new Scania engines and gearboxes was handed across by JSF. This information has been incorporated in the preliminary refit costing.

4.5. Identify mid-life refit key points and requirements

- These are identified in the inspection table at the start of this report.

4.6. Discuss any specification changes for a new build proposal

- NLB performs her role and function very well so apart from issues identified as refit additions or improvements there are no known required specification changes for a new build.

4.7. As necessary discuss and agree a scoring/weighting mechanism, understand from any pertinent financial issues, agree report format.

- These considerations are summarized below. There was agreement that no formal weighting mechanism should be used, but for each option the significant issues should be listed.
- Financial considerations and budget availability have been largely ignored in this report. All indicative prices are as of December 2007.

As a result of the visit and the above agenda items, the following issues have been summarized.

Long term options

JSF wish to consider two options

Proposal 1; Carry out a mid-life refit and consider the potential life of NLB
Proposal 2 Procure a new boat

Proposal 1; mid-life refit

Cost issues

All costs are indicative but it is estimated that at 2007 prices mid-life refit costs would be in the order of £270k to which a 10% contingency budget should be added. Key refit features would be; repair to forward structure, new engines, new shafts, refit in engine room. Blast off paint and repaint wheelhouse only as well as antifouling, renew deck winch and hauler, add wheelhouse seat, replace CO2 system.

Refurbishment programme

The process of carrying out a mid-life refit would take 2-3 months if properly planned. This timescale would mean that the role of NLB could be carried out by chartered RIB, rather than requiring a full time replacement vessel. It should be noted that the planning and tendering time would take a minimum of 3-6 months.

Service life

Given that the current craft is 10 years old, the expected service life of the refurbished boat would be around 10-12 years of further life from refurbishment date. Assuming this occurs as recommended in 2009, NLB would continue to operate through to 2019-2021

Service costs

Major servicing costs after a mid-life refit would be very similar to a new build boat, as all major items of equipment will be renewed or fully serviced. Minor service costs can be expected to be slightly higher, as minor items; pumps, switches etc., would not be renewed at refit unless defective and so would be slightly more likely to fail during the next 10 years of service life.

Residual value

If the NLB was to be refitted at half life, the residual value at that point is irrelevant, it only becomes of interest at the end of her full life; in 10 years time. An estimate of residual value of NLB, with approx 10000 hours and in similar to current condition, would be in the order of £100k at today's prices.

Risks

There are two primary risks; firstly a recurrence of forward structural problems, secondly failure of expensive equipment.

The first risk is mitigated in two ways. Evidence from the DPA shows that despite cracking the life of heavily worked pilot boats can be in the region of 30-40,000 hours, NLB is well within this. Additionally as discussed there will be significant technical input to remove this problem, which will be available to JSF.

As a side issue to this risk, it is proposed to blast and not repaint NLB at the mid-life refit. This will further reduce risk with any repair work, as repainting in weld damaged areas will become unnecessary

The second risk, that of expensive failure, is largely mitigated by equipment replacement or refurbishment. All major items will be refurbished or replaced and therefore it is expected that, barring the unforeseen, the equipment failures will be limited to minor, less costly items.

Summary

Setting aside the final detailed specification of the work, the refit proposal is a feasible and practical engineering prospect, capable of delivering a fully functioning refitted fisheries patrol boat, with a life of 10 years plus for between £250-£300,000.

Proposal 2; replacement

Technical selection
There would be a period of specification development and evaluation necessary, despite the current assertion that the NLB suits the job well. A replacement by new build strategy should be based on providing JSF with a craft of a similar nature.

Cost issues;
Amgram Ltd, through associates Camarc Ltd, have recently put a tender package out in the boat building market for an aluminum 16m pilot boat

On the basis of this information and including some extra cost for specialist equipment and assuming that the current RIB was re-used, it should be possible to procure replacement craft for around £800k and allowing some further margin and inflation before order, a budget of £900k-1,000,000 should be comfortable.

As well as the costs involved in direct replacement, there would be a need to carry out some refit work on NLB to keep her fully operational until the new boat is specified, procured, built and accepted into service. Although this would not reach the level of a mid-life refit it is recommended that a budget of around £100k is allowed for this aspect.

New build programme
From the point at which funding is available, a craft of this type would take 6 months to design (allowing time to properly review the design and specification to meet operational needs). Assuming the tender process was set under way at, say, month 3, then the build period would take a further 12 months, making an 18 month programme. Allowing some margin on this, together with some time to bring a new boat into service and train crews, the new boat could be fully operational in 20-24 months from decision.

Service life
Based on experience of NLB, the service life of a new build craft would be between 20-25 years assuming the craft had a mid-life refit.

Service costs
Appendix A indicates the overall through life service costs for the first 10 years of NLB's life. It is considered that these costs are fairly typical and at today's prices an annual budget of around £20k per annum should be expected.

Residual value
The residual value of NLB today at current prices would be around £200,000. It must be noted that a small market exists for this type of boat and the sale process may take some time. A new boat, performing correctly, after a service life of 20 years might be expected to have a residual value of around £100k at today's prices.

Risks
The risks associated with developing and building and bringing into service a brand new boat, should not be underestimated. Each and every system must be tried and tested to check it is performing properly and is compliant with the specification.

The risks could be lessened by simply rebuilding a sister ship to NLB, but that would seem to have little purpose over a half life refit.

It should also be noted that considerable time and work will be required by JSF officers to see a new build to the water.

Additionally some elements of risk associated with keeping NLB in service also remain. If a new build is carried out NLB would have not had the benefit of a full mid-life refit and therefore the chance of a significant equipment failure between now and the acceptance of a new boat would increase.

Summary
Proposal 2 represents a way to deliver a fully functional, properly performing platform to JSF at a cost of between £ 900-1,000,000. Such a boat would have a future service life of 20-25 years if given a half life refit. There would the positive benefits of incorporating all the few lessons learnt from the NLB but the negative aspects of keeping NLB in service until the replacement boat was effective.

Appendix 1

NLB; through life major issues, alterations and amendments

Item	Issue/event	Date	Action/Notes	Approx cost
1.	Delivered from SML	November 1997		
2.	Warranty inspection SML	November 1998	Added stiffener forward (had been omitted in error,	
3.	Refit at SML	February 2001	Take out fwd accommodation to repair cracks. Other sundry items	£5-10k
4.	Refit MGE Guernsey	July 2002	New shafts, repaint, fans in wheelhouse added, engine heaters added	£30k
5.	Refit at VTH	Jan 2006	Fwd accom out and frames reinforced, repaint, engines out and overhauled, shafts end for end, hull valves serviced, major electronics upgrade	£100k

Notes;

1. The above table is not exhaustive and is a broad summary of costs incurred over the last ten years.

2. Estimated approx total cost through NLB life so far is £150,000, which over 10 years is approx £15k per year.

3. There is local and minor service work which has been done over the last ten years and this is considered to average £5k per year.

4. It is considered that NLB total refit/repair/upgrade cost is approx £20k per annum.