Arrival/departure checklist

Arrival and Departure Checklist

Date

ARRIVAL CHECKLIST	*Tick*	*TIME*
CHECKLIST COMMENCED		
BRIDGE TEAM & CONTINGENCY PLAN BRIEFING		
ENGINES TO STANDBY		
ENGAGE HAND STEERING		
WATERTIGHT DOORS CLOSED		
BRIDGE VISIBILITY - Windows clear / Blinds as req'd		
BOW THRUST VENTS OPEN		
STABILISERS HOUSED		
REDUCE SPEED AS PER PASSAGE PLAN		
BOWTHRUST RUNNING		
TRANSFER CONTROLS TO BRIDGEWING		
TRANSFER OF CONTROLS CONFIRMED		
WATERTIGHT INTEGRITY PANEL TO HARBOUR		
BRIDGE PHONE ON SILENT		
ABORT POSITION 1 PASSED		
ABORT POSITION 2 PASSED *(BAD WEATHER)*		
ISOLATE CAR DECK SMOKE DETECTORS		
CONFIRM PASSENGER LIFT IN OPERATION		

Aft Draught: **Trim:**

Signed ______________ **Time** ________.

Approved By ______________ **Date: 30/09/09**

D.Morrison **Master**

VFS.J5. chk/list

DEPARTURE CHECKLIST	*Tick*
RAMP SECURE	
GANGWAY SECURE	
VISOR SECURE	
WATERTIGHT INTEGRITY PANEL TO SEA	
STABILITY SATISFACTORY	
STABILITY SHEET PASSED ASHORE PRIOR DEP	
UPDATE A.I.S.	
WATERTIGHT DOORS CLOSED	
BRIDGE TEAM DEPARTURE BRIEFING	
BRIDGE VISIBILITY - Windows clear / Blinds as req'd	
SAFETY MESSAGE	
ENGINES TO STANDBY	
BOWTHRUST RUNNING	
ENGAGE HAND STEERING	
TRANSFER CONTROLS TO BRIDGEWING	
TRANSFER OF CONTROLS CONFIRMED	
CHECK OFFSIDE CLEAR OF TRAFFIC	
AFTER DEPARTURE	*Tick*
TRANSFER CONTROLS TO CENTRE	
TRANSFER OF CONTROLS CONFIRMED	
STOP THRUSTER	
BOW THRUST VENTS CLOSED	
ENGAGE AUTOMATIC STEERING	
ENGINES TO FULL AWAY	
CONFIRM PASSENGER LIFT ISOLATED	

Signed ______________ **Time** ________

Annex B

Harris Pye report

M.V. Isle of Arran MI 11546

Attended vessel at Greenock Dry Dock on the 15th of February to investigate a reported malfunction of one of the vessels Berg HC propeller control units. On arrival I had a meeting with the vessels Superintendent and Chief Engineer to discuss the problem that they had experienced with the control unit, I was informed that the link arm from the power transmitter to the servomotor valve had broken in two sending the propeller into full ahead. (With the link arm broken the vessels bridge or engine room would loose total control of the propeller). On examining the control unit it was found that the crew had renewed the link arm, but the servomotor arm showed signs that something had been forced against it.

Photo 1: Shows indent of what we believe are mark made by the link arm adjusting screw which was protruding through the link claw and fouling the servomotor arm, over a period of time this would weaken the linkage and eventually total failure of the linkages

We carried out various test on both port and starboard oil distributor boxes to ascertain any failure or malfunctioning of the units. We carried out a oil seepage test on both units (if the unit drained more than 1lt per minute this would indicate that the clearance between the white metal bearings and the oil distributor shaft being excessive. (Which would lead to the pitch reducing and slowly going astern) Both oil filters were opened up and examined with no metallic particles being found. The control unit was run up and manually operated and tested. (**Please Note:** We could not operate the propeller as it was removed from the vessel prier to my arrival)

Photo No2 Shows replacement link arm with adjusting screw protruding through the link claw but not fouling the servomotor arm.

Summery

Both control units were function tested and found to be working correctly with no oil leaks being found on or around the units. Every thing suggest that the failure of was due to the link arm between the telemotor valve and the power transmitter not being correctly fitted .The over extension of the adjustment fouled the flexibility of the link at the pitch shedding piston and so put an unnatural bending force on the swivel bearing end with the resultant failure of this swivel bearing.

This report was written by the attending Service Engineer [redacted] and forwarded by the Service Department .

[redacted]

Best Regards

[redacted]

Marine Service Manager

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Fax : +44 1446 700 801

Mob: [redacted]

E [redacted]@harris-pye.com GE hpuk@harris-pye.com W www.harris-pye.com

Harris Pye Marine Ltd,David Davies Road, No.2 Barry Dock, Barry, South Wales, UK. CF63 4AB

Atlantic Engineering metallurgical report

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Client: Calmac ferries Ltd
Isle of Arran
Gourcock
Ferry Terminal
PA19 1QP

Job reference: J1998

Order No:

Subject: **Spherical Eyebolts 1 + 2**

Prepared by: [redacted]

Authorised by: [redacted]

Date: 26th February 2010

AEL QA 03

Introduction

1.0 We were asked to investigate two failed spherical eyebolts. No 1 recently failed and No 2 failed six months ago. These will be dealt with Separately, Eyebolt No 1 see photograph number 1.

Spherical eyebolt 1

2.0 Material

2.1 1.0570 S355J2G3 structural steel. 0.107% Carbon 1.23% Manganese, for complete analysis see report No 36165-2 (appendix 1).

2.2 We did not have enough material to make tensile or torsional test specimens, however we conducted three hardness tests on the threaded cross-section, these were all recorded in Hv, the results were, 213, 201, 202.

2.3 These hardness values were compatible with the above steel in the normalized condition and were also compatible with the yield and tensile strength of the steel. (See table 1 appendix 1)

3.0 Microanalysis

3.1 To further check the heat treatment condition, a micro specimen of the cross-section of the thread was made, this specimen was polished to 3 micron and etched using Nital 2%, this was examined using a high magnification at 1200x.

3.2 The microstructure consisted of ferrite and pearlite (see photograph 2 appendix 1). The ferrite crystals were equi-axed and covered about 80% of the specimen area. The pearlite Crystals were smaller than the ferrite ones and the iron carbide layers had a fine distribution.

3.3 This structure is typical of a normalized low carbon steel. The manganese is in solution with the iron so this cannot be seen.

4.0 Visual Examination

4.1 The thread fractured area was examined using a stereo-microscope. A crack at the root of the thread could be clearly seen. This crack extended to the fracture surface (see photograph No3). There was also evidence of damage to the flanks and crests of he thread.

4.2 The fracture surfaces were examined using the stereo-microscope which showed the material had fractured around the crystal boundaries giving a coarse fracture face (see photograph No4 appendix 1)

4.3 There was evidence of metal fatigue but also evidence that the steel had been subjected to bending and torsional stresses.

4.4 The corners of the nut were damaged (photograph No5 & 6)

4.5 The thread size was 8 mm metric coarse and the nut was loose on the thread, the male thread measured 7.79mm diameter.

5.0 Conclusion

5.1 The threaded seems to have been over-tightened damaging the flanks and crests and causing a crack in the root.

5.2 This crack eventually extended to the area where the thread fractured.

5.3 The thread failed because of a combination of torsional and bending stresses. The mechanism of failure seems to have had a bending fatigue component.

5.4 The coarse nature of the vee thread could have acted as a stress raiser.

5.5 The thread was subjected to overload, bending and torsional stress.

Spherical eyebolt 2

6.0 **Material**

6.1 The composition is shown on report 3215b (appendix 2). It is classified as a medium carbon steel. 1.0501 C35.

6.2 I did not have enough material to make a tensile or torsional specimens, however hardness values were taken they were, 177,178,179 Hv these are coherent with the steel 1.0501 C35 and the tensile and yield values given in the standard table for a normalized steel. Can be seen on the table (appendix 2)

7.0 **Microanalysis**

7.1 To further check the heat treatment condition a micro specimen was made, etched in 2% nital and examined under high power 1200x on a Olympus metallurgical microscope (see photograph 9 appendix 2)

7.2 The microstructure consisted of ferrite and pearlite in roughly equal proportions. In the pearlite the iron/iron carbide layers were very fine, however the crystals were large. The size of the crystals suggest that the steel may have annealed not normalized.

8.0 **Macro analysis**

8.1 Macro examination of the fractured thread shows a fine crack in the root of the thread extending up the flank into the fracture surface (see photograph No 10)

8.2 Macro examination of the cross-section fracture surface reveals evidence of bending stresses and also bending fatigue.

8.3 The fracture surface was coarse indicating failure had occurred at the grain boundaries. Some of the crystals were burnished where they had rubbed against other crystals before or at fracture.

8.4 I could not detect any evidence of torsional stresses on the fracture surface.

9.0 Conclusion

9.1 It is my opinion that the threaded part of the eye bolt failed because the stress raising (stress concentrations) effect of the 8 mm diameter coarse thread allowed the bending forces to produce a fine crack at the root of the thread. Further bending stresses enabled this crack to extend up the flank and eventually caused failure by bending fatigue and bending overload.

Appendix 1

Disclaimer: The information on this page has not been checked by an independent person. Use this information at your own risk.

ROYMECH

Home
Matter Index
Notes on Steel Standards

Information On Selected British Standard Steels

Important Notes:
All information on this page has been interpreted from the relevent Standard, Books, Other Web Sites, and Leaflets. This information is of a general nature for initial guidance. Selection of materials for use must be by communication with the suppliers and by reference to the appropriate codes
The values below are not comprehensive and must be used with extreme care.
The strength values e.g. the proof stress and yield stress, reduce as the section increases. In the tables below the relevant sections are often thin and so the strength values are maximum values. Please refer to the relevant standards for important work..

BS EN 10025 Hot rolled products of non-alloy structural steels

Note:
The yield stress and the tensile stress vary considerably with the section size.
The lowest values are for the lowest value of the thickest section available
The highest values are for the highest value of the thinnest section (< 3mm for R_m, <= 16mm for R_{eH})

Name	Number	C	Mn	Si(max)	P	S	Ni	Yield Stress R_{eH}	Tensile Strength R_m	Equivalent BS	Code
								MPa	MPa		
S185	1.0035	-	-	-	-	-	-	175-185	290-540	-	-
S235JR	1.0037	0,17	1,40	-	0,045	0,045	0,009	225-235	340-510	-	-
S235JRG2	1.0038	0,17	1,40	-	0,045	0,045	0,009	175 - 235	320-510	BS4360	40B
S235J0	1.0114	0.17	1.40	-	0.040	0.040	0.009	175 - 235	320-510	BS4360	40C
S235J2G3	1.0116	0,17	1,40	-	0,035	0,036	-	175 - 235	320 - 510	BS4360	40D
S275JR	1.0044	0,21	1,50	-	0,045	0,045	0,009	205 - 275	380 - 580	BS4360	43B
S275J0	1.0143	0,18	1,50	-	0,040	0,040	0,009	205 - 275	380 - 580	BS4360	43C
S275J2G3	1.0144	0,18	1,50	-	0,035	0,035	-	205 - 275	380 - 580	BS4360	43D
S355JR	1.045	0,24	1,60	0,55	0,045	0,045	0,009	275 - 355	450 - 680	BS4360	50B
S355J0	1.0553	0,2	1,60	0,55	0,04	0,04	0,009	275 - 355	450 - 680	BS4360	50C
S355J2G3	1.0570	0,2	1,6	0,55	0,35	0,35	-	275 - 355	450 - 680	BS4360	50D

BS EN 10028 Flat products made of Steel for Pressure Purposes

Name	Number	C	Mn	Si	P	S	Ni	Yield Stress R_e	Tensile Strength R_m	Equivalent BS	Code
								MPa	MPa		
P235GH	-	0,16	0,4 -1,2	-	-	-	-	235	360-480	BS 1501	164-360
P265GH	-	0,2	0,5 -1,4	-	-	-	-	-	390-	BS 1501	-
P295GH	-	0,08 - 0,2	0,9 -1,5	-	-	-	-	295	460-580	BS 1501	-

BS EN 10083-1 Quenched and Tempered Steels - Special Steels

Note:
The yield stress and the tensile strength are for dia /thickness <= 16mm (Normalised)
Thicker sections have lower strengths
Strength values are for Quench and Tempered conditions.

Name...	Number	C	Si(max)	Mn	P(max)	S(max)	Cr(max)	Mo(max)	Ni(max)	Proof Stress R_e	Tensile Strength R_m (min)	Equivalent BS	Code
										MPa	MPa		
C22E	1.1151	0,17 - 0,24	0,40	0,40 -0,70	0,35	0,35	0,40	0,10	0,40	340	500 -650	-	-
C22R	1.1149	0,17- 0,24	0,40	0,40-0,70	0,35	0,20-0,40	0,40	0,10	0,40	340	500-650	-	-
C35E	1.1181	0,32-0,39	0,40	0,50-0,80	0,35	0,35	0,40	0,10	0,40	430	630 -780	-	-

ATLANTIC engineering

PRECISION MACHINING • WELDING • METALLURGY

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TEST CERTIFICATE

Atlantic Engineering Ltd
Odyssey Centre
Corporation Road
Birkenhead
CH41 1LB

Date of Test: 26.02.10
Date of Report: 26.02.10
AEL Job No. J1998
Report Num: 36165-2

Specification: Customer Specification   Inspectorate: N/A

Item: Spherical Eyebolt part 1
Material: Carbon steel

Chemical Analysis Results

Fe	97.9	Cr	0.108
C	0.107	Mo	0.0254
Si	0.005	Ni	0.0983
Mn	1.23	Cu	0.214

Tested by: [redacted]

Approved by: [redacted]

AEL QA 03

Photograph 1.

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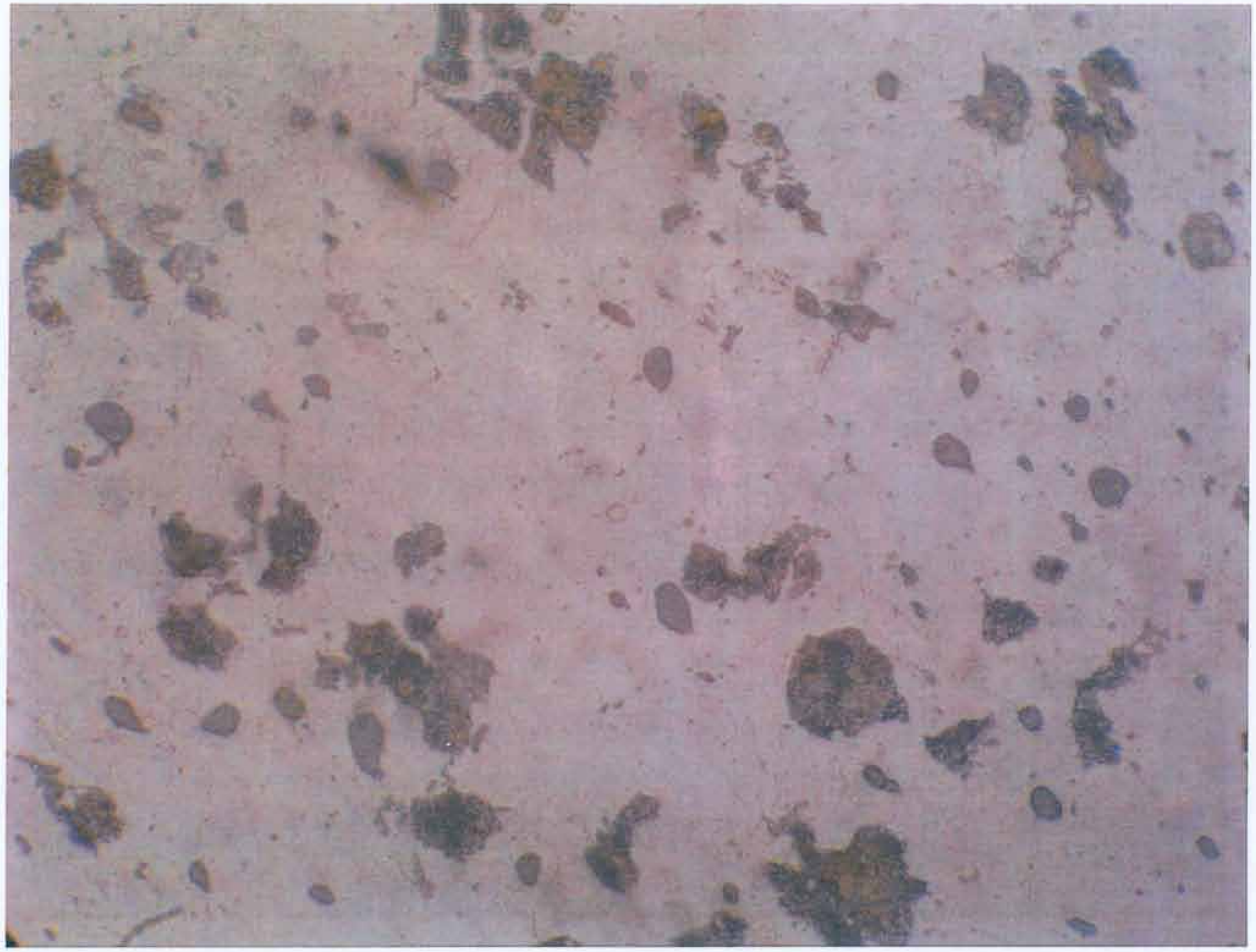

Photograph 2

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Photograph 3

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Photograph 4a

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Photograph 4b
Mating fracture surface to Photograph 4a.

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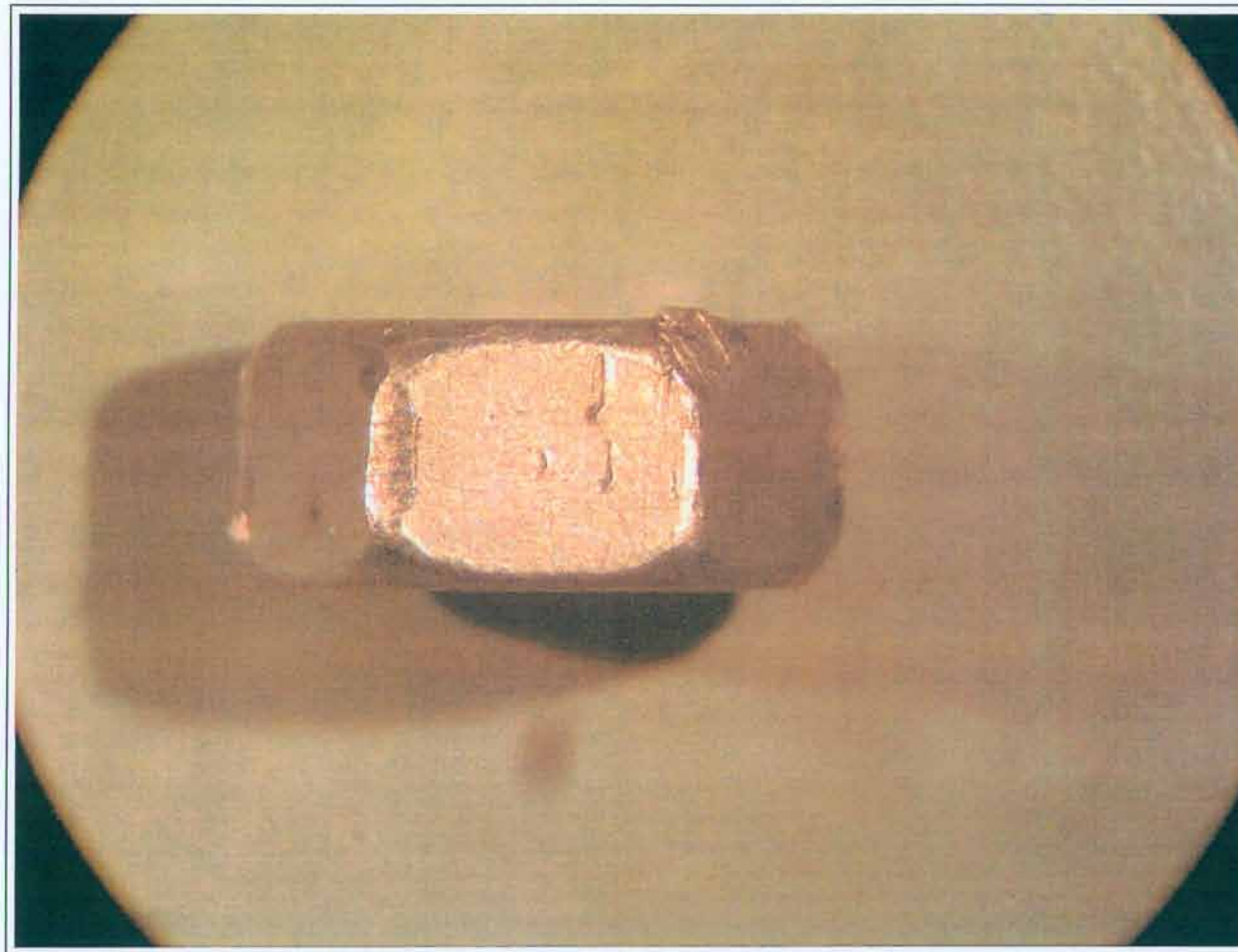
Photograph 5



Photograph 6

Appendix 2

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TEST CERTIFICATE

Atlantic Engineering Ltd
Odyssey Centre
Corporation Road
Birkenhead
CH41 1LB

Date of Test: 26.02.10
Date of Report: 26.02.10
AEL Job No. J1998
Report Num: 32158

Specification:	Customer Specification	Inspectorate:	N/A

Item:	Spherical Eyebolt part 2
Material:	Carbon steel

Chemical Analysis Results

Fe	98.5	Cr	0.01
C	0.351	Mo	0.005
Si	0.283	Ni	0.01
Mn	0.707		

Tested by: [redacted]

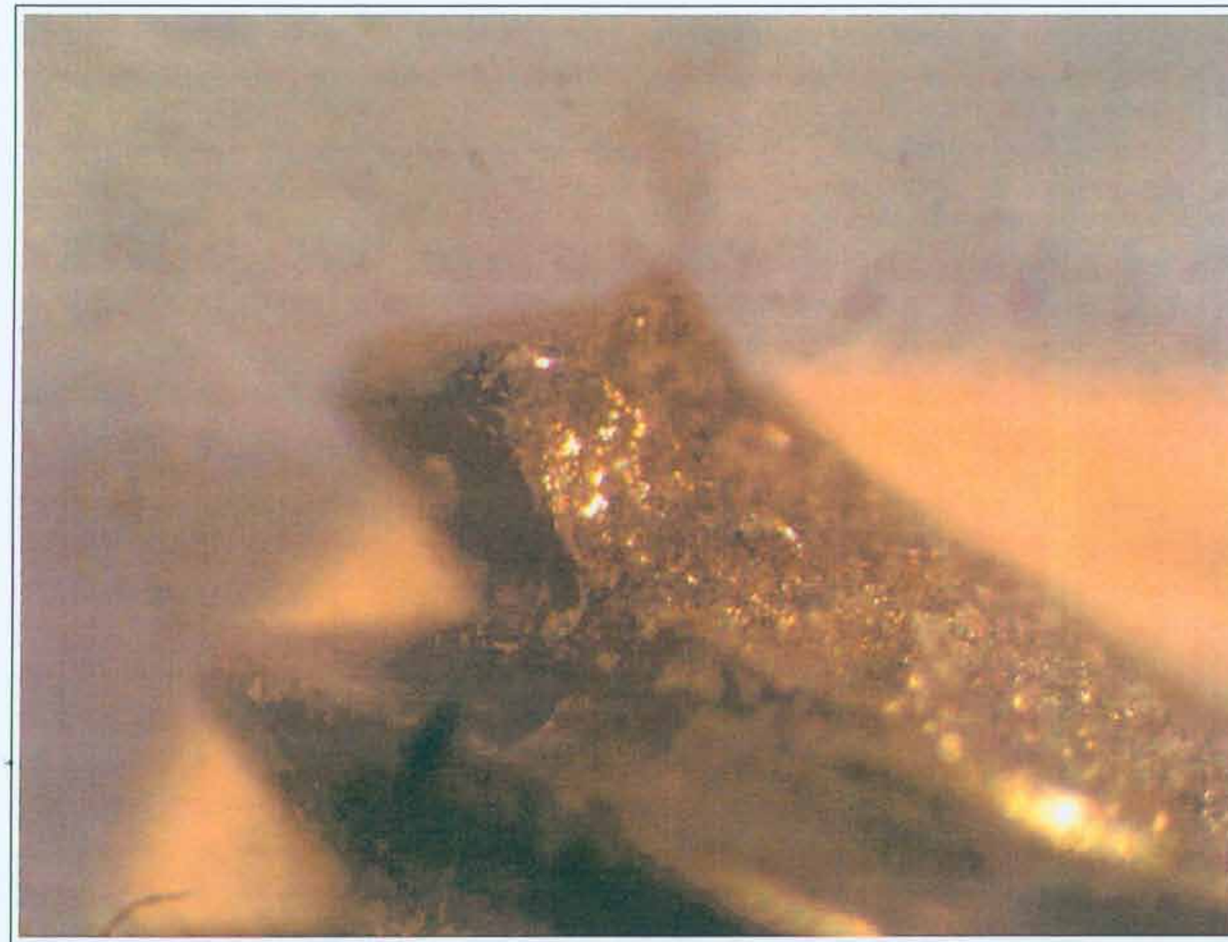
Approved by: [redacted]

AEL QA 03

Photograph 7

Photograph 8

Photograph 9
Striped regions are pearlite. Light regions are ferrite.



Photograph 10
A fine crack can be seen in the thread root extending to the fracture surface.

Arrival/departure procedures

M.V. Isle of Arran
Bridge Management Team

Port Arrival and Departure

Port Arrival:

1. Call Master, off duty Deck Officer and QM at required position.
2. Follow and complete Arrival Checklist – CL/IOA/D13 (Arrival Section)
3. Carpenter to stand by For'd and report anchors clear and thruster vent open.
4. Bosun to radio check and report lift in operation.
5. Reduce pitch depending on port. (60% transiting W. Loch Tarbert between designated points)
6. Bridge Team to be briefed on berthing plan, including any anticipated special or unusual manoeuvres and line of approach to berth.
7. On handing over the con, the OOW is to report the state of all relevant systems, traffic, draft and trim.
8. OOW to start bow thrust and report to Master when thruster running.
9. Master takes control of engines, thruster and steering on bridge wing, confirming that all dials and lights are at normal status.
10. When command lights on centre console go off, OOW must check shaft and engine revs and clutch in lights, then report "control transferred" to Master. He shall then complete and sign the Arrival Checklist.
11. He should then proceed to bridge wing and continue to monitor the Master.
12. Arrival message to be made by the loading officer. He will then monitor from the wheelhouse, until released to go aft for mooring.
13. OOW to continue monitoring Master and observe for anything untoward and deal with communications.

Port Departure:

1. Follow and complete Departure Checklist – CL/IOA/D13 (Departure Section)
2. Stability calculated, sheet printed, visor closed – reported to Master.
3. Master starts bow-thrust, rings standby, accepts bridge control and checks all running satisfactory and clutches engaged. Checks steering motors on. This is then checked and confirmed by the OOW. (The start up my be done by the OOW but both Master and OOW must confirm all systems are running)
4. Bridge Team briefed on Departure Plan when loading officer returns to the bridge. This shall include any anticipated special or unusual manoeuvres and planned route of departure. The QM will be briefed by the Officer in the wheelhouse on his arrival on the bridge.
5. Master will make welcome aboard and safety message.
6. Master accepts control on bridge wing and OOW confirms transfer, checking again, all systems are running correctly.
7. OOW reports from opposite bridge wing whether all clear of traffic. He will then move to bridge wing to monitor Master. Loading officer will monitor controls, lights, communications and vessel position from the wheelhouse.

8. When the vessel is clear of the berth the Master orders transfer of controls and steering to centre consol. The OOW will move inside and set controls to the pitch ordered by the Master and QM will accept steering control and course ordered. The Master will centre bridge wing controls. All actions to be positively reported.
9. Master will switch off thruster.
10. OOW will continue to monitor the actions of the Master and the vessels position as per the passage and un-berthing plan.
11. When clear of the berth, build up to desired pitch (60% in West Loch). Carpenter to secure anchors and close bow-thrust vent as required
12. Depending on port, the Master may hand over the con to the oncoming OOW while on hand steering and on standby, or after full away and autopilot has been engaged. OOW is to make sure that the Departure Checklist is completed and signed in either case.
13. On handing over the con, the Master is to report the state of all relevant systems, traffic, draft and trim and any special requirements he may require.

During arrival and departure, communication and positive reporting is essential. When orders are issued they must be repeated by the recipient and again on completion of the order. When passing orders over the VHF, or Talkback, a response must be received. If not, repeat the order until an acknowledgement is received. If still no response then another communication method must be used. When the Master is at the bridge wing consol the OOW is to be positioned beside the Master. This is so that the OOW can monitor the Masters operation of the control of the vessel. The other officer will be positioned in the wheelhouse monitoring the ships head, opposite side of the vessel for traffic or incoming squalls. He shall monitor controls, immediately respond to restarting bow thrust, informing the E/R of problems, responding to internal calls especially from the Engine Room or using the talkback. He is also available for using the public address system to keep passengers informed as required.
The mobile phone is not to be answered on standby. It must be on silent and if not it must be ignored.
When the QM is at the helm the OOW is to ensure that the Masters orders are correctly carried out. The QM must repeat all orders when instructed and when completed, be they helm, compass course or physical point to steer for.
The QM and the OOW should be anticipating what the Master may do, as per the Berthing / Un-berthing Plan. If doubt arises, be it timing, opposite of what is expected or no action at all, it should immediately be brought to the attention of the Master. No Bridge Team member should hesitate to speak out if any doubt whatsoever is thought to exist. At all times the OOW should be ready to confirm with the Master that the vessel is following the agreed plan.

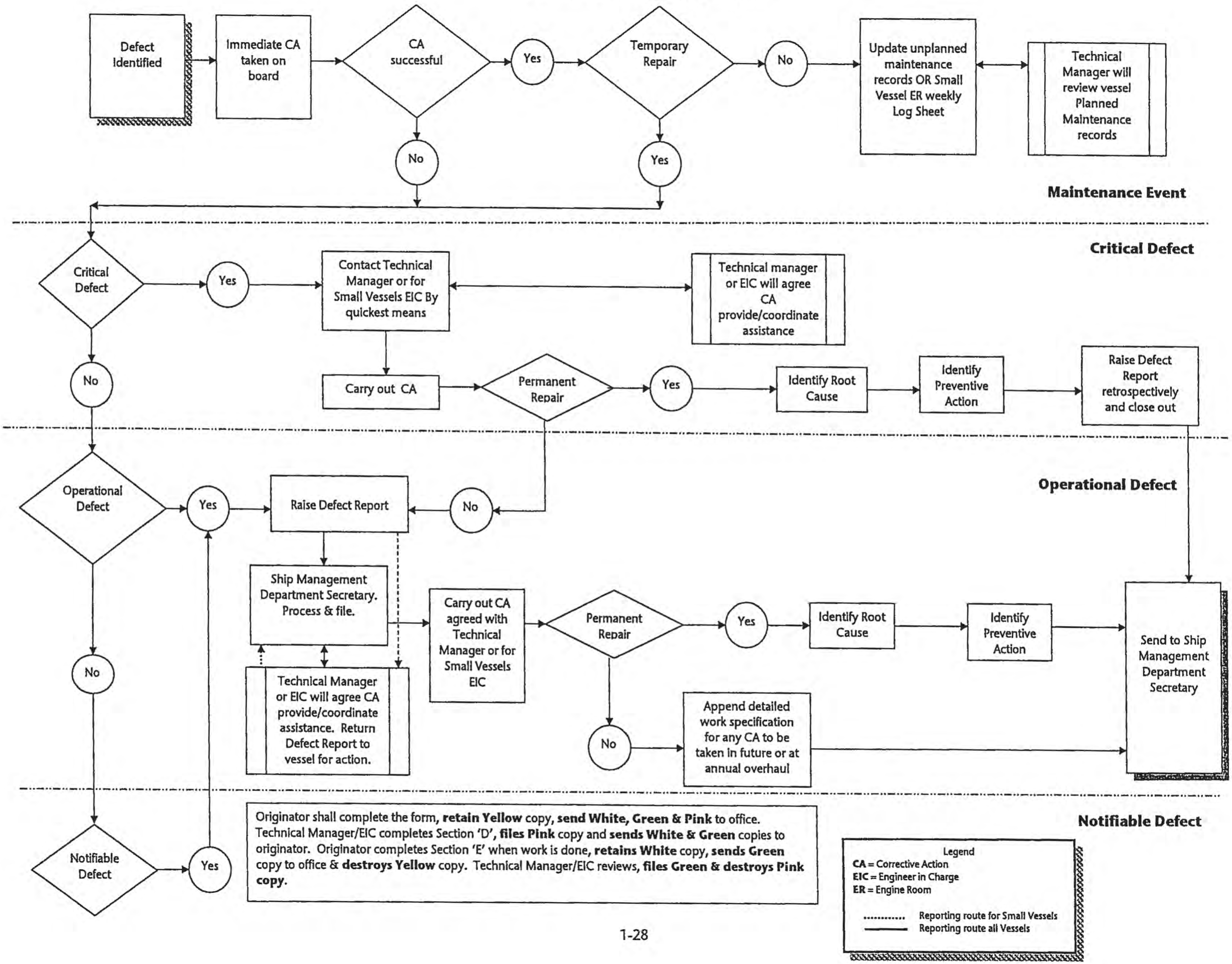
Irrespective of who is on the Bridge, there is to be no conversation other than that required for the safe Arrival and Departure of the vessel.

Authorised by:
[redacted], Master ....[redacted].......... Date 15/04/09

Annex E

Defect reporting flowchart

DEFECT REPORTING FLOWCHART



Originator shall complete the form, **retain Yellow** copy, **send White, Green & Pink** to office. Technical Manager/EIC completes Section 'D', **files Pink** copy and **sends White & Green** copies to originator. Originator completes Section 'E' when work is done, **retains White** copy, **sends Green** copy to office & **destroys Yellow** copy. Technical Manager/EIC reviews, **files Green & destroys Pink copy**.

Caledonian MacBrayne Safety Alert No. 05/09

SAFETY ALERT – No. 05/09

<u>Interim Recommendations following Grounding of Company Vessel in Oban Bay:</u>

Applicability: All CalMac and Northlink Vessels

One of our vessels struck a reef shortly after leaving the port on a route not normally operated by that particular vessel. Thankfully, no one was harmed and no pollution was caused, but the vessel was extensively damaged as a result. The potential consequences of this incident were very serious indeed.

The circumstances of the incident are being investigated by the authorities, but the Preliminary Report of Investigation has highlighted a number of issues concerning:

- Passage planning;
- Preparedness for sailing;
- Bridge Team Briefings;
- Situational awareness;
- Distraction.

Masters of vessels are requested to take the implement the following:

- Passage plans shall be reviewed onboard at least annually and the results of the review recorded. They shall also be reviewed when:-
    - There is any reason to suspect that the passage plan is no longer valid;
    - There are corrections to charts or nautical publications referenced in the plan.

  Any changes or corrections shall be sent to the Marine Manager for the passage plan to be revised and promulgated accordingly.
  Note: The primary means of navigation on our vessels is by use of paper charts and pilotage. ECDIS is a secondary aid to navigation.

- Full and proper preparations for voyages shall be made prior to departure;

- Prior to departure/arrival, Masters shall hold an effective briefing with the Bridge Team to inform them that the departure/arrival will either be as per passage plan, or, will deviate from it. Details of any deviation from the relevant passage plan shall be clearly communicated to all members of the Bridge Team by the Master;

- The Bridge Team shall be wary of any potential distractions during arrival or departure of the vessel at a port, and should take action to prevent such distractions occurring at all, or at least limit their effect. Although not all necessarily factors in this incident, potential distractions may include:-
    - Small talk;
    - Visitors to the Bridge;

- Carrying out unexpected work activities additional to normal arrival/departure duties;
- Mobile phone ring tones;
- VHF radio traffic;
- Unanswered alarms;
- Other vessel traffic.

Arrival and departure checklists should be reviewed and amended to reflect the above.

Following completion of the external investigations into the incident, further recommendations may follow.

Issued by
Safety, Environmental & Security Department
David MacBrayne Limited
27 April 2009