ANNEX 1

Report on the examination of the RIB's steering system by Hypro Marine

Report on the Condition of the Hydraflex Outboard Steering System ex-RIB Installation involved in the Loch Lomond incident

Prepared at the request of Marine Accident Investigation Branch

A) Comments on external conditions of steering system as received.

The overall condition of the steering system is poor, with significant loose movement in the mechanical link between the steering system and the outboard. There appears to be a mixture of questionable fittings used on the installation and a poor selection of hose specification and type of end fitting. There is evidence of the use of an incorrect thread on a critical connection of the steering actuator to the outboard engine. (Photo A)

1. The drag link making the connection between the steering actuator and the "tiller arm" on the outboard is bent at the uniball end. (Photo B)
   The bolt making this connection is incorrect at M10 (should be 3/8" UNF) and should have been retained with a Nyloc locknut.
   The other end of the drag link is loose to the actuator, either as a result of the bolt being too long or a missing spacer.

2. "Bull horn" connection to Outboard tilt tube appears to have missing spacers and adjusting collar to allow excess free movement – this is evident on the video.

3. Hoses have steel end fittings which are subject to corrosion. Hose is wire braided, which can rapidly corrode when exposed to seawater.
   The hose making the connection to the actuator on the starboard side has a split rubber casing and shows evidence of corrosion of the inner braiding.

4. The hose at the helm has steel standpipe ends, made with brass nut/olive compression fittings (not recommended by manufacturers). One fitting is of Parker manufacture, and is bent (photo C). The other is of Wade type and has been made with an Enot universal olive.

5. Fill plug on helm unit does not appear to be standard and would be considered ineffective. Helm date code 12/92.

6. The steering wheel had no means of retention to the helm and was easily removed. Should have had a fixing bolt.

B) Functional Tests

1. <u>Port Side Hose</u> – Pressure tested at 1,000psi and subsequently increased to 1,500psi, i.e. 1.5 x working pressure. Pressure held for 10 minutes. No leaks observed.

2. <u>Starboard Side Hose</u> (having defect in outer casing) – Hose ruptured at a pressure of 500psi in region of split in outer casing.

3. Steering Actuator

i) Unit could be freely operated to full stroke in both directions.
ii) Pressure test carried out holding 1,000psi for 10 minutes on a separate test of both ends. No internal or external leakage detected.

Based on the above it was not considered necessary to carry out further examination, and the unit was retained in the condition as received.

4. Helm Unit - date code 12/92

i) A pressure separately applied to both steering ports to prove internal relief valves operate as expected at 1,000psi – test completed satisfactory.
ii) A pressure of 5psi was applied to helm casing. Test initially indicated bubbling at shaft seal which stopped when the shaft was rotated suggesting possible re-seating of shaft seal.
iii) Helm connected to steering actuator using short test hoses and bled. Appeared to function to give app. 4 turns lock to lock. Evidence of wheel slip occurred at both ends of stroke positions suggesting internal wear. Although we have no figures on this slip condition for the Hydraflex product, it greatly exceeded that of the Teleflex Seastar product of which we have some knowledge.
iv) A strip examination of the helm was carried out with the need to drill the heads of certain fasteners to complete this operation as agreed with Mike Jarvis - MAIB

Comments:

1) Sludge and water evident in casing
2) Remnants of what appears to be a pre-fill check valve spring trapped in pilot piston grooves (photo D & E).
3) Heavy scoring on piston barrel and mating shaft (photo F).
4) Evidence of second pre-fill check valve spring located loose in pilot check cavity.
5) Heavy corrosion in helm casing around shaft seal causing seal distortion (photo G).
6) Large scores evident in pilot check cavity presumed to have been caused by loose spring fragments.

Helm loosely re-assembled to prevent re-use in present condition.

Conclusions

It is considered that the actuator itself would have been working in a reasonable manner, although its performance would have been impaired by the incorrect attachment to the outboard engine. The condition of the starboard hose with the premature failure under the pressure test would undoubtedly have subsequently led to a sudden failure and immediate loss of control.

Photo A

Photo B

Photo C

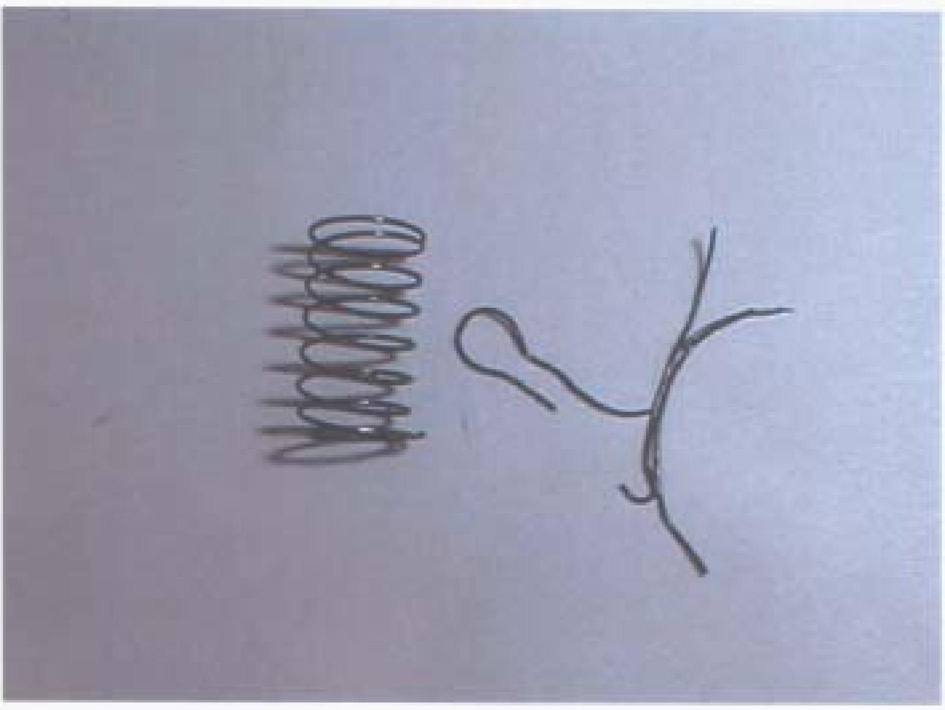

Photo D

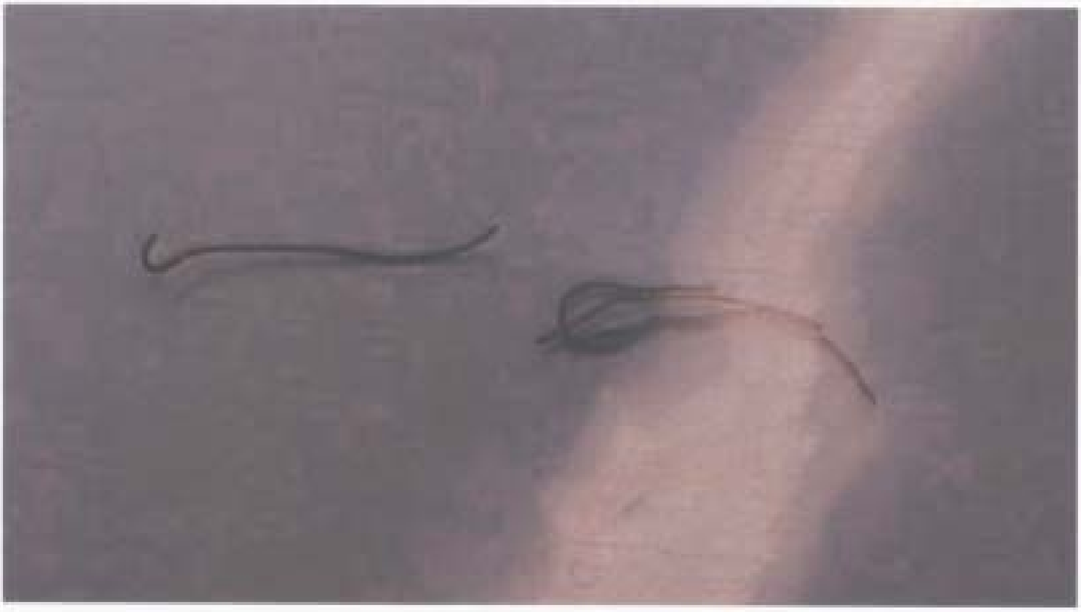

Photo E

Photo F

Photo G

Analytical Data Services Ltd

Unit 12, Brickfield Trading Estate, Brickfield Lane
Chandlers Ford, Hants, SO53 4DR, United Kingdom

Tel: +44 (0) 23 8027 5333 *Fax:* +44 (0) 23 8027 5321

E-mail: enquiries@analytical.co.uk

UKAS TESTING 1880

To:
Marine Accident Investigation Branch
Carlton House
Carlton Place
Southampton
SO15 2DZ

Date: 14 June, 2005
Test Report No: SRP05241

Determination of Metals and Water in Samples of New and Used Hydraulic Oil

Laboratory sample refs:	ADS 36762, 36763	Invoice no:	AN9963
Date received:	31/05/05	Order refs:	TBA
Date completed:	14/06/05	Worksheet refs:	WS/E993, KF/154
Sampling:	Sampled as received	Analysts:	S Baker, K McKinley

Sample Nomenclature:

ADS Ref	Police Evidence Bag Ref	Sample Description
ADS 36762	ME033716	Sample of liquid within steering system of Northcraft R.I.B. L3834
ADS 36763	ME033702	Marine steering fluid (control sample) from Forth yacht marina Grangemouth

Tabulated Results, Water Content % w/w:

ADS Ref **Sample Ref**	ADS 36762 **ME033716**	ADS 36763 **ME033702**
Water	**6.26**	**0.01**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
* In house non accredited. ♦ Sub-contracted accredited. • Sub-contracted non accredited

Tabulated Results, mg/kg:

ADS Ref **Sample Ref**	Blank -	ADS 36762 **ME033716**	ADS 36763 **ME033702**
Aluminium	< 2	**21**	< 2
Boron	< 5	**102**	< 5
Barium	< 2	**72**	< 2
Calcium	< 2	**124**	**3**
Chromium	< 2	< 2	< 2
Copper	< 2	**183**	< 2
Iron	< 2	**40**	< 2
Lead	< 5	**11**	< 5
Magnesium	< 2	**50**	< 2
Manganese	< 3	< 3	< 3
Molybdenum	< 2	< 2	< 2
Nickel	< 2	< 2	< 2
Phosphorus	< 10	**247**	**23**
Potassium	< 5	**15**	< 5
Silicon	< 2	**11**	**5**
Silver	< 2	< 2	< 2
Sodium	< 10	**323**	< 10
Sulphur	< 20	**3690**	**1370**
Tin	< 5	< 5	< 5
Titanium	< 2	< 2	< 2
Vanadium	< 2	< 2	< 2
Zinc	< 2	**223**	**17**

Uncertainty:

The uncertainty about metals data is ± 5% relative or the LOD, whichever is the greater.

The uncertainty about the water data is ± 5% relative or ± 0.01 % w/w, whichever is the greater.

Background:

The used hydraulic oil was sampled from a Rigid Inflatable Boat (RIB) that had been involved in an accident on Loch Lomond resulting in the death of two of its crew. Problems with the RIB's steering had been reported by both the owners and the recovering authorities.

Chain of Custody:

Both samples were delivered to Stuart Baker (ADS) from Paul Kvavanagh (Marine Accidents) on the 31/05/05. Samples were received in sealed police evidence bags. Three further samples of the used oil were submitted; however these were not required for analysis and remained sealed in their evidence bags.

The video appears to show the system functioning normally. During examination of the steering system components, nothing is apparent which may have led to an immediate failure of operation other than the loose and damaged springs. These are the main items which cause concern. Whilst considered unlikely, it cannot be ruled out that, in operation, these displaced springs may have been able to take positions to adversely affect the operation of the helm. In particular the operation of the pilot check valves, which should correctly secure the outboard in a set position ie. no feedback. Correct operation of the check valves could have been prevented to allow the outboard engine to effectively back-drive the steering. If the steering wheel was released with the vessel at speed, this effect may have taken place suddenly, with dramatic effect, depending on the position of the outboard engine at the time.

We have made an assessment of the total volume of oil which should have been in the steering system @ 1.47 litres. We cannot comment on the point at which the system would malfunction through loss of oil, but know that in the case of an equivalent Teleflex system we would be talking of an amount less than 10 cu.in.before the operating pistons become exposed to air.

The evidence of oil leakage would have been expected in the region of the helm shaft as a result of the corrosion identified in the report. Although possibly small, a significant loss could have occurred over a period of time, creating the effect of a sudden high leakage.

The helm unit was badly corroded, had internal wear which would have reduced its operating efficiency. The only incorrect item appeared to be the fill plug on the helm unit. There is the missing bolt on the steering wheel, and the incorrect attachment of the steering actuator to the outboard engine. The system appeared to have had little or no maintenance, highlighted particularly in the internal condition of the helm unit parts. This is perhaps qualified by the condition of the fluid in the system as shown by the separate analysis.

Signed ....

Date ....

ANNEX 2

Report of the examination of the hydraulic oil from the RIB's steering system by Analytical Data Services

Methodology:

Metals

The method employed is based on ASTM D5185-91, ASTM D4951 and IP437 which cover the determination of additive elements, wear metals and contaminant elements in lubricating oils, fuel oils and heavy petroleum fractions using Inductively Coupled Plasma Atomic Emission Spectrometry (ICP).

This test method uses oil soluble metals for calibration and does not purport to determine quantitatively nor detect insoluble particulates. Analytical results are particle size dependent and low results are obtained for particles larger than a few micrometers.

The sample is diluted in the ratio 1 g sample + 20 mL of 50:50 white spirit/xylene containing 10 mg/L cobalt internal standard. Standards are prepared in the same manner. Solutions are introduced to the ICP instrument, then aspirated into the plasma by using a gemcone nebuliser. The intensity of the resultant emitted light is measured at wavelengths characteristic of each element determined. By comparing emission intensities of elements in the specimen with emission intensities measured with the standards, the concentrations of elements in the specimen are calculated.

Water Content

Water was determined by Karl Fischer Coulometric Titration.

Comments:

The control steering fluid sample was found to contain a relatively low concentration of water.

The sample taken from the steering syatem of the (RIB) contained a significant concentration of water.

A small quantity of undissolved material was observed in the sample taken from the steering system of the RIB after dissolution in solvent for ICP analysis. This indicates the sample contains some inorganic material (inorganic salt).

The control steering fluid sample contained a significant concentration of sulphur, a low concentration of phosphorus and zinc and a trace concentration of calcium and silicon.

The sample taken from the steering system of the RIB contained a significant concentration of several elements. The results show the presence of metals typically associated with wear or corrosion (aluminium, copper and iron). Phosphorus and Zinc were found to be at similar levels, this may be indicative of the presence of the additive Zinc Dialkyl Dithiophosphate (ZDDP) where these elements are in equal proportions. ZDDP is a common lubricating oil additive used for its antiwear and antioxidant properties.

If you have any queries please do not hesitate to contact us quoting the reference numbers given above. All samples will be returned to Marine Accidents.

Signed .... Technical Manager, Elemental Analysis

ANNEX 3

Maintenance requirements for SeaStar's hydraulic steering systems

The following considerations from *SeaStar's Introduction to hydraulic steering* and *information and trouble shooting* should be followed when servicing the systems:

Maintenance

When servicing a steering system, thoroughly diagnose the problem(s) first.

Determine which components of the steering system need to be replaced.

Replace components that show signs of excessive physical wear, including slop, chafing, corrosion, leakage etc.

If there is excessive motion, binding or "rough spots", in the steering, determine the cause and replace the problem component.

Oil levels

Check oil level periodically. At this time the steering system must be checked for proper connections of hose, tube and fittings, possible leaks and air removal. To do so, turn the steering wheel and pressurize very hard to port. Apply enough force to the wheel to overcome the pressure relief valve. While pressure is maintained on the steering wheel, check all port (left) fittings and line connections for leaks.

If no leaks are obvious, the system is ready for use. If leaks are found, correct before using. Failure to correct leaks will lower system oil level and could result in the loss of steering.

Repeat procedure by turning wheel to starboard. Watch the oil level in the helm pump when the steering wheel reaches either hard over position. If there is no obvious drop in oil level, you are compressing air – further filling/purging is required.

Purging

Step 1: Screw the threaded end of the filler tube into the helm filler hole. Remove the cap from the oil bottle and holding upright, screw into the filler tube bottle cap. Turn bottle upside down and poke hole in the bottom of the bottle. Fill the helm pump full of oil (oil should always be visible in the filler tube). Use the next bottle at any time throughout the procedure when the oil level drops in the filler tube.

Step 2: Turn the steering wheel clockwise until cylinder rod is fully extended on the right side of the cylinder. Open the right side bleeder.

Step 3: Holding the cylinder rod, turn the steering wheel counterclockwise until a steady stream of air-free oil comes out of the bleeder. While continuing to turn the wheel, close the right side bleeder and let go of the cylinder.

Step 4: Continue turning the steering wheel counterclockwise until the cylinder rod is fully extended to the left. Open the left bleeder.

Step 5: Holding the cylinder rod to prevent it from moving back in to the cylinder, turn the wheel clockwise until a steady stream of air-free oil comes out of the bleeder. While continuing to turn the wheel, close the left side bleeder and let go of the cylinder rod. Fill and purge is now complete.

ANNEX 4

Advice from RYA's *Powerboat Handbook*

The following extracts have been taken from the RYA's *Powerboat Handbook:*

Travelling at speed:

If your vessel is fitted with a kill cord it is safest to wear it at all times. At speed ensure your crew, have a good seating position, a firm grip, and you know what you are going to do before you do it.

Avoid situations which involve rapid changes of direction. Keep a good lookout for other craft, keep a watch for and predict the effect of waves or the wash from other vessels

Whenever turning at speed it is important to warn the crew so that they are not thrown out of the boat. Turning too sharply allows the prop to suck air and loose (sic) *grip on the water*

Engine Checks

Outdrive engines may have a reservoir of hydraulic fluid to operate the steering and power trim. Check that the fluid level is between the max and min marks.

Boat equipment

Some items will depend on the area and particular use of the boat. Items to consider include the following:

Anchor with warp and chain, radar reflector, kill cord and a spare tool kit and extra spares, compass, mobile phone, flares, fire extinguisher(s), fire blanket, lifejackets or buoyancy aids, bilge pump or bailer, charts, watch or clock, first-aid kit, GPS, hull repair kit, or tube repair kit, paddles or auxiliary outboard, mooring warps and fenders, throwing line, water, navigation lights, horn, relevant shapes, VHF radio (fixed or hand-held), knife and almanac.

Kill Cord

Most powerboats have an engine cut-out device called a kill cord. One end is attached near the throttle and the other around the helmsman's leg. If the helmsman falls out of the boat, the engine cuts out. Runaway powerboats have caused serious injury and death. Test your kill cord to ensure it works. Spare kill cords should be carried so the boat can be re-started and driven back to the person in the water. Attach the cord around your leg or buoyancy aid and not to your waist.

Lifejackets and buoyancy aids

A lifejacket is designed to turn an unconscious casualty in the water face up, keeping their head above water. A buoyancy aid will keep a person afloat but will not turn them face up.

Most adult lifejackets are gas inflation models and are comfortable to wear and easy to store. Inflation is by a small gas canister and is activated manually or automatically when in contact with the water. Lifejackets are good all round performers and excellent for children and anyone less confident in water.

Flares

Flares are an essential item of safety equipment but there are many different types and makes and a variety of ways they operate. Familiarise yourself with their operation. It is good practice to carry only one make of flare on board to prevent confusion when you need to use them.

Summoning assistance

If a problem arises, you should decide what action to take and how to deal with it. Your first consideration is: are you, the crew or boat in immediate danger? If yes, call for assistance immediately.

The most common methods for raising the alarm where there is grave and imminent danger are:

- *A VHF radio Mayday call.*
- *Flares.*
- *Arm signal, sound horn, mobile phone.*

ANNEX 5

QinetiQ's report on survival times

Loch Lomond Accident modelling

- Wissler model predicts body temperature and an arterial temperature of 34°C is the limit used in predicting survival time.
- It is assumed that the person has survived the initial shock of cold immersion and has not drowned in the first stages of immersion due to exhaustion.
- The body descriptions used for the father and daughter are:

  Weight of 76 kg, mean skin-fold thickness of 11 mm

  Weight of 46 kg, mean skin-fold thickness 8 mm
- The water temperature is inputted as 3°C.
- The clothing description has been modelled as nude. Without immersion protection, the clothing will become saturated with water rapidly and not provide any significant protection against the cold.
- The model bases the distribution of body fat on body fat measurements of male adults and may not be a suitable description of body-fat distribution within the daughter.

  Survival time for father = 60 minutes (32 to 113 minutes) [1]

  Survival time for daughter = 43 minutes (32 to 54 minutes) [2]

---

[1] Range is based on underweight man BMI 18.0 and overweight man BMI 29, assuming average height
of 1.7m. Body fat is estimated from BMI.

[2] Range is based on 25th and 75th percentile height and weight to BMI. Body fat is estimated from BMI.

ANNEX 6

The Loch Lomond and The Trossachs National Park registration forms

Loch Lomond
& The Trossachs
National Park

FOR OFFICIAL USE ONLY
Initial: [illegible] Reg No: L 383
Serial No: 00215. Date: 21/8/04

BOAT REGISTRATION SCHEME APPLICATION FORM

Before filling in this form, please read the notes overleaf. The completed form should be returned to the address also shown overleaf. Please print in BLOCK CAPITALS. Registration is for one year from 1 January to 31 December.

1. DETAILS OF REGISTERED OWNER

BUCHANAN

Do you have any other boat(s) registered on Loch Lomond? (1) ☐ YES ☑ NO
What is its (their) Registration No(s)?

Have YOU previously registered a boat(s) on Loch Lomond? (2) ☑ YES ☐ NO Is it now sold? ☐ YES ☑ NO
What is its (their) Registration No(s)?

Has the CRAFT previously been registered for use on Loch Lomond? ☐ YES ☐ NO
If yes, what was the Registration No?

FIRST NAME: ANGUS SURNAME: (3) BUCHANAN
ADDRESS:

POSTCODE:
TEL NO'S WORK: HOME: MOBILE:

2. DETAILS OF BOAT TO BE REGISTERED

Does your boat have a regular mooring or berth on Loch Lomond? ☐ YES ☑ NO
If yes, where is is based? (4)
Boat Name: Manufacturer: (5) NORTHCRAFT Model: (6) 6-4
Length: 6.4m Beam: 2.2 Main Colour: GREY Other Colours: ORANGE
Boat Type: (7) ☐ Motor Cruiser ☑ Speedboat ☐ Yacht ☐ Tender ☐ Motor Boat
☐ Fishing Boat ☐ Jet Ski ☐ Jet Bike ☐ Other:
How many engines? ONE Engine Manufacturer: (8) MARINER
Total Horsepower: 150 Fuel (e.g. petrol/diesel): PETROL
~~In board~~/Out board: Engine Serial No(s):
If you take your boat to Loch Lomond on a trailer, where do you NORMALLY launch it? (9) BALLOCH
What is the Registration No. of the vehicle you NORMALLY use to trail your boat to Loch Lomond?
Does your boat have a toilet? (10) ☐ YES ☑ NO
If yes, is it a: ☐ Holding tank ☐ Sea Toilet ☐ Chemical Portable

3. OTHER INFORMATION

Does your boat have a VHF radio CB Radio? ☐ YES ☑ NO
If yes, what is your call sign?
Do you have a recognised certificate of competence to drive a motor boat? ☑ YES ☐ NO
If yes, which one?
Is your boat insured for at least third party liability? ☐ YES ☑ NO
Are you a member of a loch Lomond based boating club? ☐ YES ☑ NO
If yes, which one?
Are you a member of a governing body controlling the sport in which you participate? ☐ YES ☑ NO
If yes, which one?

I CERTIFY THAT THE INFORMATION I HAVE GIVEN IS CORRECT TO THE BEST OF MY KNOWLEDGE.
Owner's Signature: [signature] Date: 21/8/2004 Date of Birth: 14/01/61

Owner Title [redacted] Name (First): [redacted] Name (Last): [redacted] Address [redacted] Owner II 1132

Tel No (Work): [redacted] Tel No (Home): [redacted] Reg Date: [redacted] End Date [redacted] Postcode: [redacted]

National Body Control [redacted] Recognised Lomond Club [redacted] Club

Boats

Reg No:	chrishd no:	Name of Boat:	Manufacturer	Model:	Boat Type	Len:	Prime Col:
L3834	y	None	Northcraft	6.4 RIB	SpeedBoat	6.4m	Grey

No Eng	HP	Fuel Type	In/Outboard	Engine Manufacturer:	Beam:	Sec Col:
1	150	Petrol	Outboard	Mariner		Orange

Launch from Trailer ☑ Vehicle Reg No: Engine 1 Serial No

Where are Trailed Boats Launched: Drumkinnon Bay Engine 2 Serial No

Does boat Have a Toilet ☐ Toilet Type Mobile

VHF ☐ Call Sign Cert of Comp ☐ Awarding Body

CB ☐ Handle: Insured ☐

Qty of violations: 1 Last violation 5 Jun 2004

[redacted]

Remarks

Rereg 05/2567 10/02/05

HISTORY OF CHANGE

Reg No: L3834 Name of Boat: None

	Date Changed	Item Changed	Previously
L	23 Aug 2004	BoatName	Fingal
L	23 Aug 2004	Engine	Yamaha 85HP 68800
L	23 Aug 2004	Length	5m
L	23 Aug 2004	Manufr	Humber RIB
L	23 Aug 2004	PriColor	Yellow/Black

VIOLATIONS

	Owner ID ATOV	Date	Time	Violation codes	Rangers Present				Area	Verbal Warnin	Owner Letter code	Mag Letter code
L	11321	5 Jun 04	20.55	3701/	IS1	JA1			6S	Y	V0	

y

2567

10 FEB 2005

Annual Registration Scheme

13-Dec-04

Owner ID: 11321 **Reg No:** L3834

Forenames: Angus **Surname:** Buchanan

Address

Postcode:

Tel No (Work): **Tel No (Home):**

Name of Boat: None **Manufacturer:** Northcraft

Model: 6.4 RIB **Boat Type:** SpeedBoat

Primary Colour: Grey **Secondary Colour:** Orange

No. of Engines: 1 **Engine Manufact'r:** Mariner

Total Horse Power: +02

Engine 1 Serial No **Engine 2 Serial**

I confirm the above to be the correct details of my craft and wish it to be registered on Loch Lomond for 2005.

SIGNATURE........Angus B........

DATE.......8th FEB 2005

If you do not wish to be informed about other National Park services or initiatives please tick this box. ☐

Loch Lomond
& The Trossachs
National Park

FOR OFFICIAL USE ONLY
Initial: H. WT   Reg No: L 3834
Serial No: 210   Date: 13/12/04

BOAT REGISTRATION SCHEME APPLICATION FORM

Before filling in this form, please read the notes overleaf. The completed form should be returned to the address also shown overleaf. Please print in BLOCK CAPITALS. Registration is for one year from 1 January to 31 December.

BUCHANAN A

1. DETAILS OF REGISTERED OWNER

Do you have any other boat(s) registered on Loch Lomond? (1) ☐ YES ☑ NO
What is its (their) Registration No(s)?

Have YOU previously registered a boat(s) on Loch Lomond? (2) ☐ YES ☑ NO   Is it now sold? ☐ YES ☐ NO
What is its (their) Registration No(s)?

Has the CRAFT previously been registered for use on Loch Lomond? ☐ YES ☑ NO
If yes, what was the Registration No?

FIRST NAME: ANGUS   SURNAME: (3) BUCHANAN
ADDRESS:

POSTCODE:
TEL NO'S WORK: HOME: MOBILE:

2. DETAILS OF BOAT TO BE REGISTERED

Does your boat have a regular mooring or berth on Loch Lomond? ☐ YES ☑ NO
If yes, where is is based? (4)

Boat Name: FINGAL   Manufacturer: (5) HUMBER   Model: (6) RIB
Length: 5M   Beam: Main Colour: YELLOW   Other Colours: BLACK.

Boat Type: (7) ☐ Motor Cruiser ☑ Speedboat ☐ Yacht ☐ Tender ☐ Motor Boat
☐ Fishing Boat ☐ Jet Ski ☐ Jet Bike ☐ Other:

How many engines? ONE   Engine Manufacturer: (8) YAMAHA
Total Horsepower: 85   Fuel (e.g. petrol/diesel): PETROL
~~In board~~/Out board: Engine Serial No(s): 68800

If you take your boat to Loch Lomond on a trailer, where do you NORMALLY launch it? (9) BALMAHA
What is the Registration No. of the vehicle you NORMALLY use to trail your boat to Loch Lomond?

Does your boat have a toilet? (10) ☐ YES ☑ NO
If yes, is it a: ☐ Holding tank ☐ Sea Toilet ☐ Chemical Portable

3. OTHER INFORMATION

Does your boat have a VHF radio CB Radio? ☐ YES ☑ NO
If yes, what is your call sign?

Do you have a recognised certificate of competence to drive a motor boat? ☐ YES ☑ NO
If yes, which one?

Is your boat insured for at least third party liability? ☐ YES ☑ NO

Are you a member of a loch Lomond based boating club? ☐ YES ☑ NO
If yes, which one?

Are you a member of a governing body controlling the sport in which you participate? ☐ YES ☑ NO
If yes, which one?

I CERTIFY THAT THE INFORMATION I HAVE GIVEN IS CORRECT TO THE BEST OF MY KNOWLEDGE.

Owner's Signature: [signature]   **Date:**   **Date of Birth:**

Owner Title [redacted]

Name (First): [redacted]

Name (Last): [redacted]

Address [redacted]

Owner II 1132

Tel No (Work): [redacted]

Tel No (Home): [redacted]

Reg Date: [redacted]

End Date [redacted]

Postcode: [redacted]

National Body Control [redacted]

Recognised Lomond Club [redacted]

Club [redacted]

Boats

Reg No:	chrishd no:	Name of Boat:	Manufacturer	Model:	Boat Type	Len:	Prime Col:
L3834	y	Fingal	Humber	RIB	SpeedBoat	5m	Yellow

No Eng	HP	Fuel Type	In/Outboard	Engine Manufacturer:	Beam:	Sec Col:
1	85	Petrol	Outboard	Yamaha		Black

Launch from Trailer ☑

Vehicle Reg No:

Engine 1 Serial No 68800

Where are Trailed Boats Launched Drumkinnon Bay

Engine 2 Serial No

Does boat Have a Toilet ☐

Toilet Type

Mobile

VHF ☐

Call Sign

Awarding Body

Cert of Comp ☐

CB ☐

Handle:

Insured ☐

Qty of violations: 1

Last violation 5 Jun 2004

Remarks

NewReg 04/215

HISTORY OF CHANGE

Reg No: L3834

Name of Boat: Fingal

VIOLATIONS

11321	5 Jun 04	20.55	3701/	IS1	JA1			6S	Y	V0

y

ANNEX 7

MAIB Safety Bulletin

MAIB SAFETY BULLETIN 1/2005

Two fatalities from a high-speed

Rigid Inflatable Boat accident

March 2005

MAIB SAFETY BULLETIN 1/2005

This document, containing safety lessons, has been produced for marine safety purposes only, on the basis of information available to date.

The Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 provide for the Chief Inspector of Marine Accidents to make recommendations at any time during the course of an investigation if, in his opinion, it is necessary or desirable to do so.

A man and his teenage daughter died during a day trip on inland waters, in their rigid inflatable boat. The MAIB investigation of the tragedy revealed the hydraulic steering system of the RIB was in poor condition and the boat carried no basic safety provisions. With the onset of the summer boating season, it was considered essential to promulgate the lessons to emerge from the investigation so far, so the MAIB has issued this Safety Bulletin. A full report will be published in due course.

Stephen Meyer
Chief Inspector of Marine Accidents

This bulletin is also available on our website: http://www.maib.gov.uk

Press Enquiries: 020 7944 3232/3387; out of hours: 020 7944 4292
Public Enquiries: 020 7944 3000
INTERNET ADDRESS FOR DFT PRESS NOTICES:
http://www.dft.gov.uk

THE ACCIDENT

The owner of a 6m RIB took his two teenage daughters for a day trip in sheltered waters. It was the first of the season, the boat having been laid-up for the winter. The RIB was powered by a 150hp outboard and was capable of speeds in excess of 50 knots. The water temperature was 3^{o} C, the air temperature about 5^{o} C and the wind strength was Force 4. All were wearing warm clothing, but were not dressed for entering the water and **were not wearing lifejackets.**

During the day out, the RIB's steering was described as difficult, the wheel needing many turns to achieve any movement of the engine. On their way back to the launch point at the end of their day, the owner was steering, the younger teenager was sitting behind him, and the elder girl was standing behind the seat holding the backrest. The RIB was travelling at full speed when it suddenly lurched, throwing the owner and his younger daughter out of the boat. The elder teenager was thrown to the deck but remained in the boat which, because **the kill-cord was not in use**, continued away from the two people in the water. Although the elder girl managed to control the RIB and return, with difficulty, to the casualties, there was insufficient time to rescue them before they disappeared below the surface. **There were no flares or radio onboard** the RIB so the survivor was unable to raise the alarm immediately.

After the accident, investigations discovered the oil level in the hydraulic steering system in the RIB to be very low, and there were indications that the system had been leaking for some time. It is probable that air in the system caused the engine to lurch unexpectedly to one side, causing the accident.

SAFETY LESSONS

Any unintended movement of the outboard engine on a planing craft can be highly dangerous. It is therefore **<u>essential</u>** that owners and users of powerboats ensure that steering systems are fully operational before using the boat. It is especially important to ensure hydraulic systems are topped up as required and are checked for leakage. If the owner or user is in any doubt about the condition of the steering system, they should **seek professional advice**.

All powerboat users are further strongly urged to ensure that:

- Kill-cords, where fitted, are used correctly.
- All crew and passengers are wearing suitable clothing and lifejackets.
- They have the means to summon assistance: ideally a VHF radio, or in the very least distress flares.