Report on the investigation of

a serious injury sustained when falling overboard from a

Ribeye Open Tender 450

Off Abersoch beach, Wales

7 August 2005

Marine Accident Investigation Branch
Carlton House
Carlton Place
Southampton
United Kingdom
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Report No 12/2006
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Extract from

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2005 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 13(9) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

CONTENTS

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

DTI	-	Department of Trade and Industry
EC	-	European Commission
EEA	-	European Economic Area
ESO	-	European Standards Organisation
GRP	-	Glass reinforced plastic
HIN	-	Hull Identification Number
hp	-	horse power
ISO	-	International Standards Organisation
Kn	-	knot
OT	-	Open Tender
PWC	-	Personal water craft
RCD	-	Recreational Craft Directive
RIB	-	Rigid Inflatable Boat
RNLI	-	Royal National Lifeboat Institution
RYA	-	Royal Yachting Association
UK	-	United Kingdom
UTC	-	Universal co-ordinated time
VHF	-	Very high frequency

SYNOPSIS

At about 1115 on 7 August 2005, a 4.5m RIB with three teenage occupants approached the beach in Abersoch, North Wales. As the RIB passed a line of buoys marking an area in which a 4 knot speed limit had been set by Gwynedd Council, the driver of the RIB reduced to about half throttle, and commenced a slow left-hand turn. During the turn, the console on which the driver was sitting, and to which the steering wheel was mounted, detached from the deck of the RIB. The driver was unable to maintain his balance and fell over the boat's port side and into the sea.

The RIB immediately turned sharply to starboard, and a passenger who had been sitting on the rubber tube to the left of the driver was thrown into the water; he was then struck by the RIB's rotating propeller. A few seconds later, the remaining passenger panicked, and jumped into the water. The unmanned RIB circled in a clockwise direction at a speed of between 10 and 15 knots. Another powerboat in the vicinity saw the accident, and although impeded by the circling RIB, succeeded in passing a line to the people in the water and managed to tow them clear.

The injured passenger sustained deep lacerations to his chest and left side, and was taken to hospital by air ambulance. He remained hospitalised for 3 weeks. The RIB, escorted by a local lifeboat, continued to circle until 1146, when it grounded at the southern end of Abersoch beach.

Several factors contributed to the detachment of the console and subsequent injury to the passenger, including:

- The console fitted to the RIB was designed and shaped for use on another RIB model, and was not the console that had been ordered from the manufacturer by the boat's vendor.
- The console was attached to the RIB using self-tapping screws at an average interval of 30cm. No fixative or bonding agent was used, and the fastenings worked loose over time.
- The dealer did not detect the incorrect supply and fitting of the console before the RIB was passed to its owner.
- The RIB was fitted with a kill-cord, but it was not used by the driver.

Following the accident, the RIB manufacturer has improved the labelling of its products, and has issued written guidance to its dealers regarding the fitting of accessories with self-tapping screws. It has also undertaken to provide an installation manual for all its products. Action has also been taken by the Royal Yachting Association and Gwynedd Council to encourage the use of kill-cords, and by the British Marine Federation to improve the knowledge of its members with regard to the requirements of the Recreational Craft Directive and its harmonised standards.

A recommendation has been made to the British Marine Federation to help ensure that all boat accessories are compatible to the parent hull, and are fitted by methods approved by the manufacturers. A further recommendation has been made to Gwynedd Council with the aim of strengthening its regulation of power driven vessels in its area of interest.

Figure 1

Ribeye Open Tender 450

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *RIB OT450* AND ACCIDENT

Vessel details

Registered owner	:	Private
Type	:	Rigid Inflatable Boat
Built	:	2004 in South Africa
Construction	:	GRP hull with rubber inflatable tubing
Length overall	:	4.5m
Gross tonnage	:	232kg
Engine power and type	:	60hp outboard motor
Service speed	:	30kn

Accident details

Time and date	:	1115 UTC+1 on 7 August 2005
Location of incident	:	Abersoch beach, North Wales
Persons on board	:	3
Injuries	:	1
Damage	:	Console detached from deck. Propeller blades chipped and distorted.

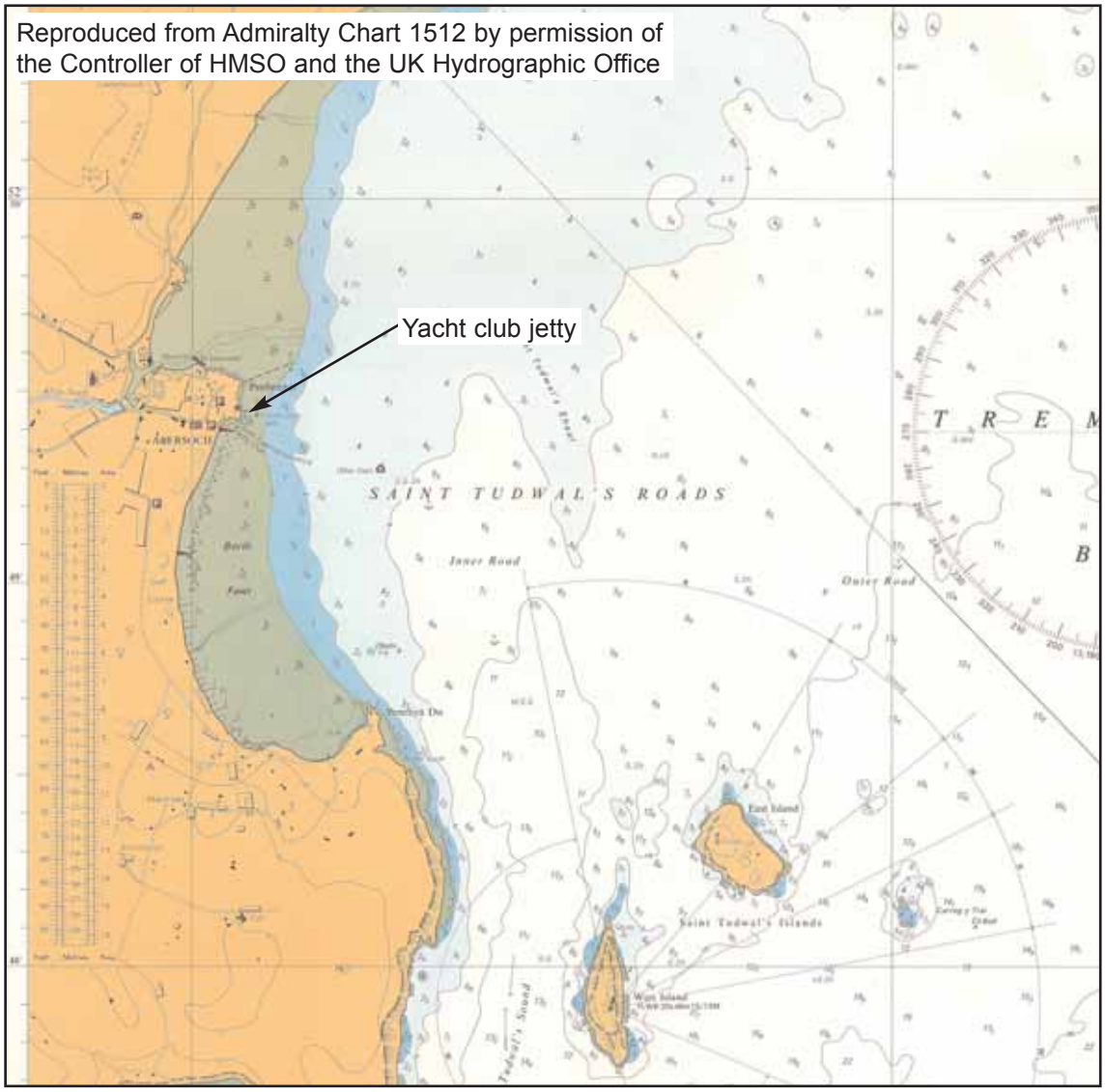
1.2 NARRATIVE

(All times are UTC +1)

At about 1100 on 7 August 2005, a Ribeye Open Tender 450 (OT450) **(Figure 1)** weighed anchor from a position close to the yacht club jetty in Abersoch **(Figures 2 and 3)**, for a trip along the beach. In the boat were its driver and two passengers. None of the boat's occupants wore buoyancy aids. The weather was fine and the sea was calm.

After about 15 minutes on the water, during which time the RIB had travelled up to its full speed of about 30 knots, the driver closed the beach in order to collect a wakeboard. The driver was sitting on a jockey seat on the centreline of the RIB. One of the passengers was sitting on the rubber tube to the driver's left, and the other passenger was sitting on top of the forward locker facing the driver **(Figure 4)**. As the boat passed through the line of buoys marking an area in which a 4 knot speed limit was in force **(Figure 3)**, the throttle was eased back to about half way, and a slow left-hand turn was commenced.

Figure 2



Extract of chart BA1512

Reproduced courtesy of the Maritime Department, Gwynedd Council

Figure 3

Abersoch Beach

Figure 4

Position of occupants

A loud crack was then heard as the console on which the driver was seated detached from the deck. The driver was thrown off balance, and fell over the passenger to his left, and into the water. The console fell on its right side, and the RIB immediately turned sharply to starboard. The passenger sitting on the rubber tube was thrown into the water, where he was struck by the RIB's propeller.

Seconds later, the remaining passenger jumped out of the boat. The RIB was now making a continuous turn to starboard at a speed of between 10-15 knots, and was unmanned. As the driver swam towards the injured passenger, who was about 3m away, the circling RIB passed sufficiently close for his fleece top to be ripped by its propeller.

The accident was seen by the driver of a powerboat about 200m away. He immediately recovered the inflatable rings he was towing, and closed to assist. The proximity of the unmanned RIB prevented the powerboat driver from getting close enough to the RIB driver and the injured passenger to recover them into his boat. However, he was able to throw them a line with which he towed them out of the path of the circling RIB. After also collecting the remaining passenger on the towline, the powerboat was stopped, and the RIB driver and both passengers were recovered onboard.

The recovery was witnessed by a senior local authority beach officer. He immediately called Holyhead Coastguard via VHF radio channel 16, and requested the assistance of the local lifeboat and coastguard team. A further call was made 4 minutes later requesting urgent medical assistance. A request for a doctor was also made over the public address system on the beach.

When the casualty arrived at the beach, he was treated by a doctor and a nurse, who had responded to the public announcement. Air and road ambulances arrived at the scene simultaneously at 1135, and the casualty was then taken to hospital by air ambulance.

Meanwhile, the RIB continued to close the beach as it circled in a clockwise direction, and bathers were warned to keep clear of the water. As the RIB circled, a PWC was seen to ride across its wake on several occasions. Escorted by the local lifeboat, the RIB finally grounded on the southern end of Abersoch beach at 1146.

The injured passenger suffered deep abrasions to his chest and left side **(Figures 5 and 6)**, and remained in hospital for 3 weeks.

Figures 5 and 6

Injuries to passenger

1.3 THE OCCUPANTS OF THE RIB

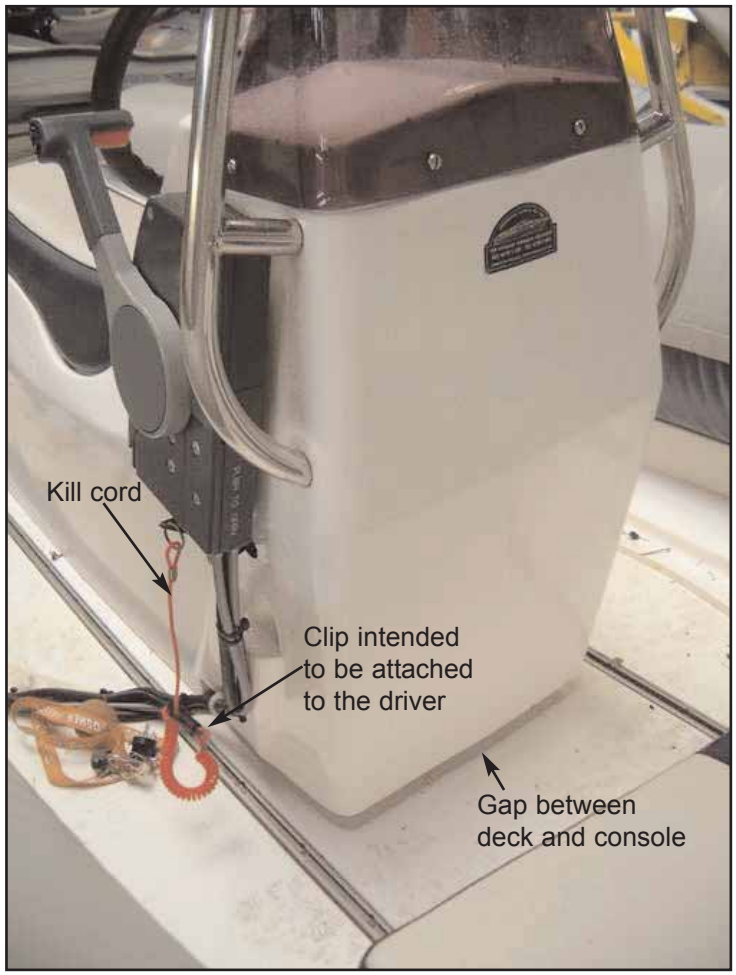
The driver of the RIB was 15 years old and on holiday from school. He was well rested and was a confident swimmer. The driver had about 10 years' experience in powerboats, and had first owned a small RIB fitted with a 4hp outboard engine when he was 8 years old. He had owned the OT450 for almost 1 year, and had accumulated 54 hours experience in the boat before the accident. The driver had successfully completed the RYA powerboat level 2 course at the Abersoch Sailing Club during the summer of 2004.

Both passengers were 16 years old, and had been out in the RIB with the driver on several occasions during the week before the accident. Both had occasionally driven the boat for very brief periods during these trips.

1.4 SAFETY EQUIPMENT

The RIB was fitted with a kill-cord, one end of which had to be attached to a position below the engine throttle mounted on the steering console for the engine to run. The other end was fitted with a clip, designed to be attached to the driver **(Figure 7)**. The purpose of the kill-cord was to ensure that if the driver was disconnected from the driving position, the kill-cord would be pulled from the console, and the engine would stop. The driver usually wore the kill-cord when driving the RIB, but forgot to do so on this occasion.

Figure 7



Kill cord and RY5030 console

Three buoyancy aids were carried, but these were only worn when wakeboarding, and only by the person on the water. Two distress flares were carried, one with an expiry date of December 2003, and the other with an expiry date of December 2004.

A hand-held VHF radio was on board, along with three personal mobile telephones.

1.5 RIB EXAMINATION

Following the accident, the OT450 was taken to Abersoch Land and Sea Ltd, the dealers from where the boat was purchased, and where it was routinely stored. Examination of the boat showed that its console had become detached from the deck, but was still connected to the boat by the steering cable and the engine control leads **(Figure 8)**. The console had been secured to the deck by 8 x 20mm self-tapping screws **(Figure 9)** into the GRP composite deck, which was constructed using balsa as a core material, and had an average thickness of 18mm. The screws and their associated cup washers were found in the boat. The screws had been fixed through four pre-drilled holes on either side of the console at an average spacing of 30cm **(Figure 10)**, and the console had been sited between the fixed rails on the deck of the boat **(Figure 11)**. Four pre-drilled holes on the front section of the console **(Figure 10)** did not have any corresponding holes on the deck. There was no evidence of any bonding agent or fixative being used. The console was identified as the RY5030, which was designed to be fitted to the Ribeye 330 Tender, not the OT450. All of the propeller blades were also found damaged.

Information shown on the builder's plate affixed to the boat included the number 0609 next to the CE marking, and a maximum power rating of 38kW. The hull identification number, also affixed to the hull, was ZARBI 107 45 E 404.

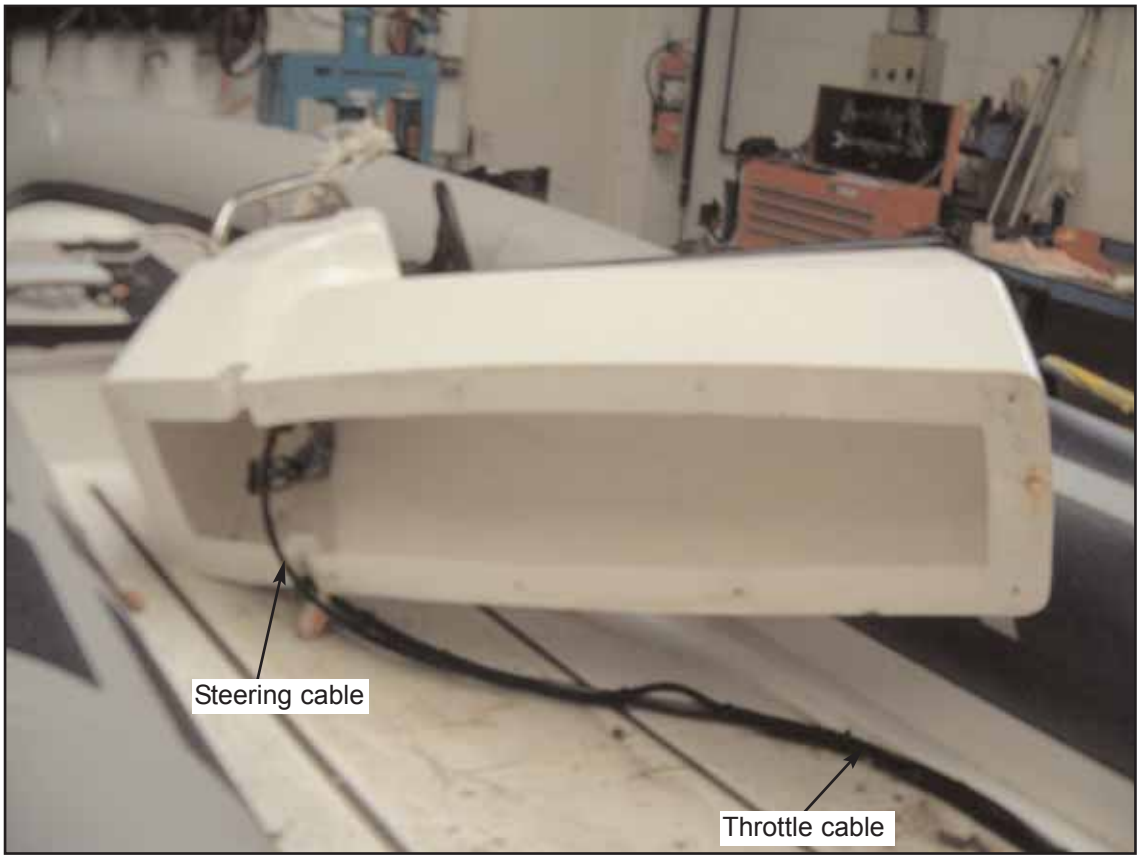
1.6 THE RIBEYE OPEN TENDER 450

The OT450 was manufactured by Ribeye in South Africa using the hull form of the Greyhound 430 RIB, which was manufactured by Prestige Inflatables. The OT450 model is one of two open tenders manufactured by the company, the other being the OT400. General information regarding the OT450, along with its technical specification, and a list of the accessories available, is at **Annex A**. This information was contained in the OT450 owner's manual provided by the manufacturer and given to the purchaser.

The OT450 is fitted with two aluminium rails running fore and aft, which are bolted through the GRP deck. The rails are 190cm in length and are 40.5cm apart. The rails are used to secure specific consoles and seats supplied by Ribeye, which are bolted to them **(Figure 12)**. There are no known instances of the consoles detaching from the deck when secured by this method.

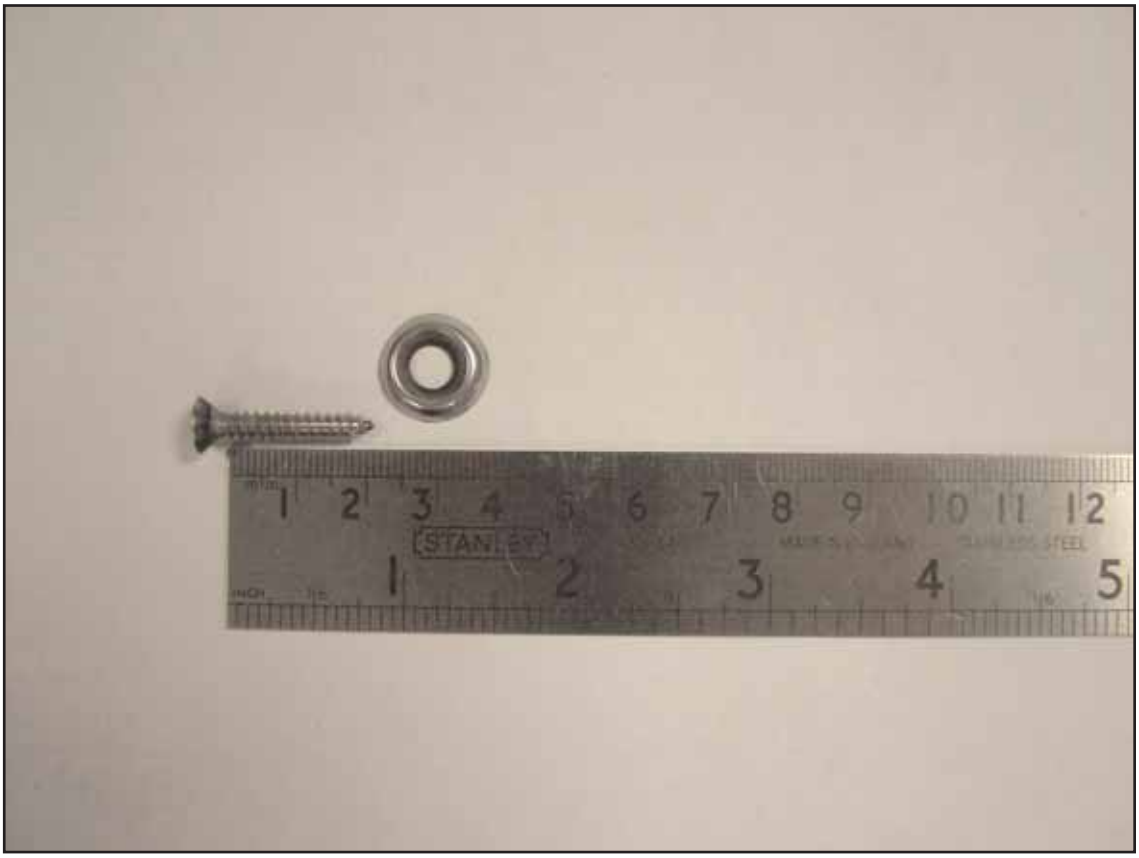
The OT450 model was introduced by Ribeye in 2004. An identical boat had been sold by Ribeye during the previous year as a Wavecross 450. Prior to 2003, Ribeye had also included a Playtime 450 model in its in-house literature available to its dealers, but no boats in this range were manufactured. According to the owner's manual, the maximum engine power rating for the Wavecross 450 was 60hp. The owner's manual for the OT450 **(Annex A)**, stated its maximum engine rating was 50hp.

Figure 8



RY5030 console attached by control cables

Figure 9

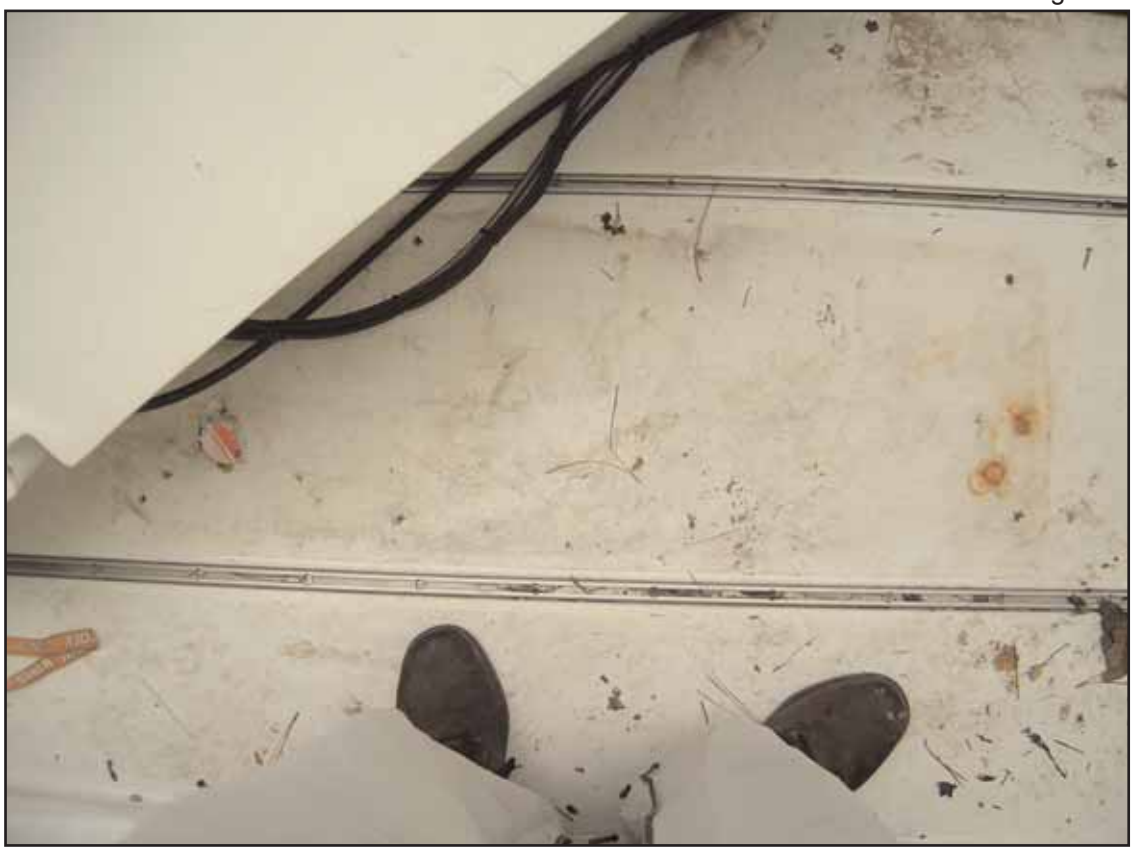


Self-tapping screw and cup washer

Figure 10

OT450 during recovery by RNLI

Figure 11



Deck of the OT450

Figure 12

An RY4000 console secured using rail system

1.7 PURCHASE, DELIVERY AND ASSEMBLY

The OT450, together with an RY4000 console and an outboard engine were ordered from Abersoch Land and Sea Ltd, Abersoch on 14 August 2004. Based on the information provided, the purchaser formed the opinion he was buying a RIB from the Ribeye Playtime range. The salesman had referred to the boat as a Playtime, and the purchaser was shown the technical specifications within a Ribeye brochure when selecting an engine for the boat. Although this brochure gave a maximum rating of 70hp for the Ribeye Playtime 455 model, the purchaser opted for a 60hp engine. The representative of Abersoch Land and Sea who sold the boat cannot recall indicating that the boat was capable of using a 70hp engine.

A boat order form for the boat was sent from Abersoch Land and Sea to Ribeye on 16 August **(Annex B)**. An RY4000 double jockey console and a Yamaha 60hp outboard engine were ordered at the same time.

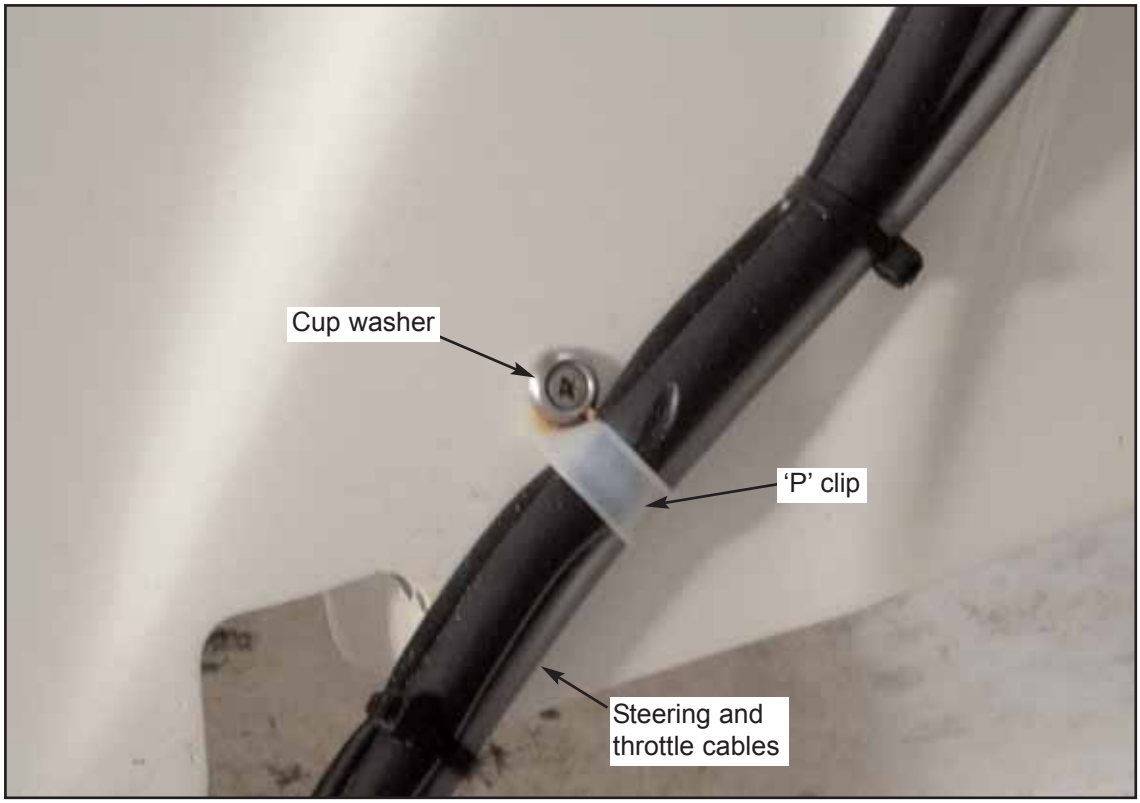
Annex C, which was signed but undated, shows that the OT450, an RY4000, paddles, pump and repair kit, and a steering cable were then delivered to Abersoch Land and Sea. The outboard engine was delivered separately. On 21 August, Abersoch Land and Sea raised a job card allocating 12 hours work to one of its fitters to rig out the OT450. Two hours were allocated to another fitter to clean the boat on completion. This work was completed on 23 August, and the boat was collected and paid for by the purchaser the following day. A boat handover/acceptance procedure **(Annex D)**, which had been accessible to all Ribeye dealers via the company's website since the beginning of 2004, was not used. The sales receipt given to the owner described the boat as a Playtime 450.

The fitter who rigged the OT450 cannot remember securing the console, and considers that it was possibly already fitted when the boat was delivered. The cup washers **(Figure 9)** used with the screws to secure the console to the deck and the 'P' clips securing the control cables **(Figure 13)**, were not routinely used at Abersoch Land and Sea.

Abersoch Land and Sea Ltd. became a Ribeye dealer in 2002. The OT450 was the fifth Ribeye craft the dealer had sold. None of the previous four craft had been fitted with an RY5030 console. Since the sale of the OT450, the dealer has sold two Ribeye craft in which self-tapping screws have been used to secure consoles or seats to the deck. One RIB was fitted with two single jockey seats rather than a bench seat. One side of each of these seats was bolted to the rails in the deck, but the other side of each seat was secured to the deck using self-tapping screws. The second RIB was a Tender 330 fitted with an RY5030 console. No fixative or bonding agent was used in conjunction with the self-tapping screws on either boat.

Ribeye did not issue fitting instructions with its accessories. However, in February and June of 2003, the company sent its technical representative to visit Abersoch Land and Sea Ltd. to discuss its products and the rigging thereof. None of the staff of Abersoch Land and Sea Ltd. recall receiving any instruction regarding the fitting of consoles during these visits.

Figure 13



Control cables secured by 'P' clip

1.8 RIBEYE LTD

1.8.1 Company background

Ribeye is based in Dartmouth in Devon, and started manufacturing RIBs in the UK in 1999. After 2 years of selling its boats directly to the public, the company decided to sell only to trade dealers. Ribeye craft are packaged exclusively with Yamaha engines and sold through the Ribeye/Yamaha dealer network. The company has sold over 600 boats within Europe, mainly in the UK, and a further 100 in the rest of the world.

In 2001, Ribeye relocated all its production to Prestige Inflatable, in Cape Town, South Africa, a company which Ribeye bought in 2004.

1.8.2 Products

In 2004, the Ribeye range comprised ten models:

- Sports 800, 785, 650 – described as fast, high performance RIBs, great for long distances.
- Playtime 600, 550 and 500 – described as the ideal family boat for every occasion. A Playtime 455 and a Playtime 360 also appeared in the company brochure but none were manufactured.
- Open Tender 450, 400 – also described as the perfect fun boat for rivers and beaches.
- Tender Deluxe 330, and 290 – described as the perfect fun boat for rivers and beaches.

In addition to RIB hulls, Ribeye also manufactures a range of accessories for use with its boats, including the RY5030 and RY4000 consoles. The base of RY5030 is shaped to fit across a raised bar sited transversely across the foredeck of the Tender 330, and to fit flush to the boat's rising deck at its bow **(Figure 14)**. The flange around the base of the RY5030 is pre-drilled in South Africa with twelve holes, and screws and washers for securing the console to the deck of a RIB have frequently, but not always, been attached to the console before shipment. The screws and washers supplied are the same type used to secure the console which detached from the OT450 in Abersoch. Ribeye does not fit consoles to its boats as this would hinder the fitting of the steering and control cables. The company also does not pre-drill holes in the decks of its boats. The Ribeye RY4000 console is compatible with all Ribeye boats fitted with the Ribeye rail system, although it would be out of proportion and unsuitable for use on the larger models.

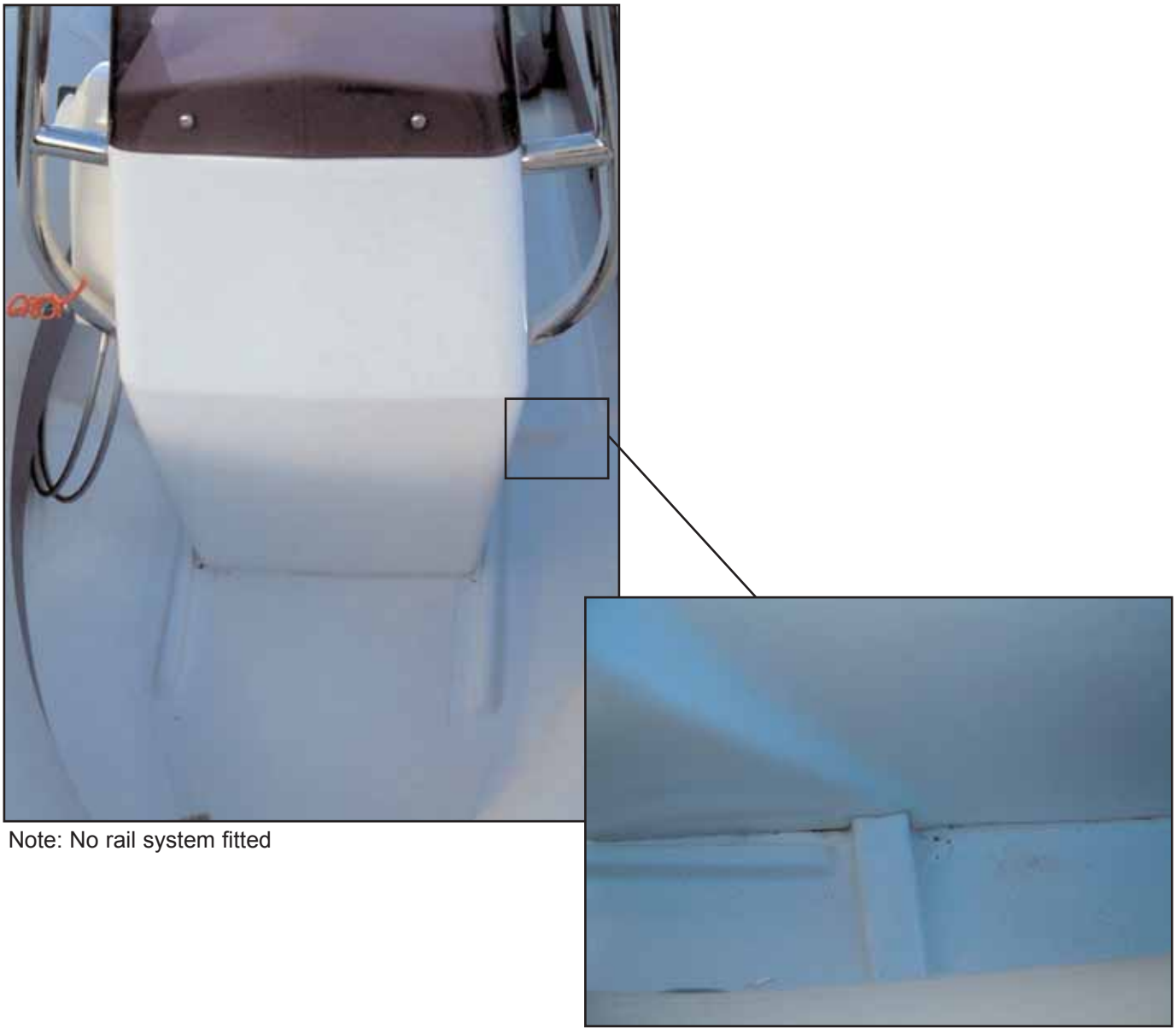
1.8.3 Shipment

All Ribeye boats and accessories are shipped from South Africa to the UK in containers. The OT450 (HIN 107 45 E 404) was shipped to the UK in container RO32/04. The container was delivered to and unloaded in a warehouse in

Cheshire on 26 July 2004. The container checklist **(Annex E)** shows that several RY4000 and RY5030 double jockey consoles were in the same container. Hull 107 45 E 404 remained in the warehouse in Cheshire until delivered to Abersoch Land and Sea in August. The distributor did not attach the consoles to any of the RIBs it stored and delivered.

On the advice of its distributor, which had experienced difficulty in identifying a number of the products shipped from South Africa, Ribeye sent its sales manager to the distributor's warehouse in January 2004 to check the labelling on its boats and accessories. During the visit, all Ribeye stock was identified and re-labelled where necessary. The sales manager made a further visit on 29 July 2004 to do a stock take and to check that all stock was correctly labelled.

Figure 14



Note: No rail system fitted

RY5030 console fitted in a Ribeye Tender 330

1.9 RECREATIONAL CRAFT DIRECTIVE

1.9.1 General

In 1998 Directive 94/25/EC (Recreational Craft Directive) was introduced by the European Commission to ensure a uniform level of safety in the design and manufacture of recreational craft throughout the European Economic Area. The RCD applies to all craft (with some exemptions) placed on the market or put into service and intended to be used for sporting and recreational purposes, with a hull length of between 2.5 and 24 metres.

At national level, within the UK, the Department of Trade and Industry (DTI) has responsibility for the Recreational Craft Regulations, with enforcement being the responsibility of local authority trading standards departments.

1.9.2 Essential requirements

Annex I of the Directive lays out essential safety, health, environmental protection, and consumer protection requirements that must be met by recreational craft. These include requirements regarding a boat's integrity and structure, and the display of a builder's plate.

1.9.3 Conformity with the essential requirements

The essential requirements of the RCD must be met before a manufacturer can place its boat on the market in the EEA. This can be achieved through the application of harmonised standards, which gives a presumption of conformity with the Directive's essential requirements. In broad terms, harmonised standards are European standards, which are adopted by European Standards Organisations (ESOs), prepared in accordance with the general guidelines agreed between the European Commission and ESOs, and follow a mandate issued by the commission. Appendix 3 of the RCD lists the standards harmonised under the Directive. With regard to the security of the console and the maximum power rating, the applicable harmonised standard is EN ISO 6185-3:2001: Inflatable boats-Part 3: Boats with a maximum motor power rating of 15kW and greater.

However, the application of harmonised standards is voluntary, and is not the only method available to demonstrate conformity. If a harmonised standard is not followed, a manufacturer is obliged to prove that his product conforms to the essential requirements of the Directive by alternative means.

1.9.4 Methods of conformity assessment

The method of assessment of a boat's conformity with the essential requirements of the RCD is dependent on its design category and length. In the case of the OT450, assessment was possible in either Module A (internal production control) or Aa (internal production control plus tests), depending on

whether the harmonised standards for stability and buoyancy were complied with. In the case of the OT450, conformity was assessed by the manufacturer in accordance with module A (internal production control). The manufacturer's assessment of conformity with its stability and buoyancy requirements was based on certification initially issued by the International Marine Certification Institute, a notified body within the EU, for the Greyhound 430 RIB in July 2001.

When module A is used, it is the responsibility of a manufacturer to provide a 'Declaration of Conformity' for each separate craft, which should include references to the relevant harmonised standards used, or references to the specifications in relation to which conformity is declared.

A copy of the declaration of conformity for the OT450, which was contained in its owner's manual, is at **Annex A**. The declaration was unsigned.

1.10 EN ISO 6185 –3-2001

EN ISO 6185-3-2001 requires that seating systems, where offered as standard or optional equipment, should remain undamaged and functioning on completion of a performance test. The performance test includes both a drop test and an in-water test. The drop test requires a boat to be dropped from 2m at varying attitudes, and the in-water test requires a boat to be driven in the light and fully loaded conditions for a total of 1.5 hours in specified sea conditions.

The standard also contains a formula for determining a RIB's maximum motor power. This is shown at **Annex F**.

1.11 WATERSPACE MANAGEMENT

Abersoch Beach, like other beaches in this area, is very popular with many different types of users, including: sail boats, powerboats, personal watercraft, water skiers, swimmers and paddlers. In order to manage the many different types of user, Gwynedd Council, the local authority for the area, has introduced several measures.

All craft launched from the public slipways in Gwynedd must be registered. The registration form requires applicants to provide details of their craft insurance, and also to agree to abide by the rules and regulations laid down by Gwynedd Council. Once registered, proof of registration is displayed on each craft via an affixed sticker. In 2005, 943 powerboats and 1111 PWCs were registered in Gwynedd. The council's regulations for Abersoch Beach are at **Annex G**, and its general regulations for power vessels and personal watercraft are at **Annexes H and I**.

With respect to Abersoch, the Council has divided the beach into different zones marked by floats, in which the speed limit is 4 knots, and only certain types of craft may enter **(Figure 3)**. To collect launching fees and to monitor compliance

with its regulations, the Council employs beach officers. A Council operated powerboat and a personal watercraft are also available to patrol the area. However, some of the regulations imposed by the Council cannot be enforced by penalty. The only regulations able to be enforced in this manner are the regulations prescribed in local bye-laws, which are:

No person, being the navigator of a pleasure boat shall, during the months of May to October inclusive cause or suffer to cause such vessel to exceed a speed of eight knots through the water in the areas described…..

No person being the navigator of a pleasure boat shall cause or suffer to cause such vessel to be driven or sailed in a dangerous manner or without due care and attention or without reasonable consideration for other persons.

No person being a navigator of a pleasure boat propelled by an internal combustion engine shall use the engine unless the engine is fitted with a silencer…….

SECTION 2 - ANALYSIS

2.1 AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

2.2 FATIGUE

Due to the period of time between the supply and fitting of the RY5030 console to the OT450 and the accident, it has not been possible to determine whether the actions and decisions of the individuals concerned in this process were influenced by fatigue. The driver of the OT450 was well rested at the time of the accident, and there is no evidence to indicate that fatigue influenced his actions or decision making.

2.3 THE DETACHMENT OF THE CONSOLE

As the securing screws were still intact, and there was no damage to the flange on the base of the console, it is evident that the console detached from the deck of the OT450 because the screws were pulled through the holes in the deck. This was probably caused by a combination of a number of factors.

First, the console was intended to be used with the Ribeye 330, and was shaped accordingly **(Figure 14)**. Therefore, it was not possible to secure the raised front section of the console to the deck. Second, as the console was secured by eight screws with an average spacing between the screws of 30cm, this was insufficient considering the area of the console in contact with the deck. Third, no fixative or bonding agent was used. Finally, it is possible that the holes in the deck were drilled oversize in relation to the size of the screws used. This is evident from the lack of damage to the deck area surrounding the holes, through which the self-tapping screws were pulled. The drilling of oversized holes would have caused the screw to act more like a bung than a fastener.

These factors would have allowed the console and deck to move independently when subjected to the vibration and forces experienced in the RIB when underway. The resultant ‘fretting’ would have caused the screw fastenings to work loose. Therefore, given the amount of leverage applied to the console via the steering wheel and seat, it was not surprising the screw fastenings eventually failed.

However, the RY5030 console was still sufficiently secure to last for 54 hours of use. Because the console’s fixing arrangement failed over time, it is possible that its inherent weakness might not have been detected by the performance tests required by EN ISO 6185. Such tests are probably adequate for determining base-line strength of structures, but the detection of long-term degradation of the security of fittings through vibration and wear and tear can only be achieved via periodic inspection, either by the user or by the dealer when servicing.

2.4 SUPPLY OF THE RY5030 CONSOLE

The console fitted to the OT450 was an RY5030, not an RY4000, which had been ordered. As Abersoch Land and Sea had not previously taken delivery of an RY5030, the console fitted to the OT450 must have been delivered with the boat, contrary to the information at **Annex C**.

The labelling of the Ribeye products stored in Cheshire was checked on 29 July 2004, and this check would have included the OT450 and the RY4000 and RY5030 consoles delivered on 26 July. However, it is not possible to determine whether the delivery of the wrong console was the result of the incorrect labelling, or to the oversights by the persons making or taking delivery of the boat and its accessories.

In view of the good safety record of the consoles secured to Ribeye craft by the rail system fitted, had an RY4000 console been delivered, and secured to the OT450 by this method, as intended, the risk of console detachment would have been virtually eliminated.

2.5 FITTING OF THE RY5030 CONSOLE

Although the person responsible for fitting out the boat cannot recall installing the console, and the cup washers used with the self-tapping screws were not normally used by Abersoch Land and Sea Ltd., it remains probable that the console was fitted by the dealer for several reasons: no consoles manufactured by Ribeye in South Africa are secured to its RIBs during shipment; there is no record of the OT450 being sent to another dealer after being delivered to the distributor's warehouse in Cheshire; the distributor did not secure the consoles to the RIBs prior to their delivery; the screws and washers with which the console was secured were probably supplied with the console; the rigging of the steering cable would have been much easier with the console not secured to the deck; and, after the sale of the OT450, Abersoch Land and Sea Ltd. secured two further consoles to RIBs using self-tapping screws without using a fixative.

Numerous methods are employed to secure consoles and seats to the decks of RIBs, and it is a feature of the RIB industry that many RIB owners prefer to customise their boats to suit their individual needs and preferences. Consequently, while some RIBs are fitted with accessories such as consoles and seats by the manufacturer, others are sold as bare boats into which owners can opt for accessories of their own choosing. Although there is no industry standard regarding the method by which these accessories are secured, the detachment of such accessories does not appear to be a common occurrence. The MAIB is aware of only two similar occurrences in recent years.

Nevertheless, the detachment of an accessory can have serious consequences, and it is therefore extremely important that they are fitted securely. In this respect, given the variety of accessories and securing methods available, it is essential that an accessory is: compatible with the parent hull, easily identified, and fixed using appropriate methods. This requires the manufacturer to provide clear and accurate labelling and detailed fixing instructions.

2.6 QUALITY ASSURANCE

The inappropriate installation of the RY5030 console to the OT450 was not recognised by Abersoch Land and Sea Ltd. Notwithstanding the dealer's unfamiliarity with the RY5030 console, such an oversight was surprising considering the front end of the console, which had four empty pre-drilled screw holes and was not in contact with the deck. The boat's rail system was also not used as intended.

In industries such as car manufacture, in which new vehicles are sold via appointed dealers, it is common practice for the dealers to inspect all cars before they are handed to customers. Such pre-delivery inspections are usually conducted using checklists, and are made after all additional accessories have been fitted. Although Ribeye provided a handover/acceptance procedure for its dealers via its website **(Annex D)**, this was limited in its scope for the inspection of fixtures and fittings and, moreover, was not used when the OT450 was collected by its owner. Had a detailed examination of the boat, similar to the pre-delivery inspections conducted in the car industry, been undertaken, the probability of the erroneous supply and fitting of the RY5030 console being detected would have been substantially increased. The lack of a signature on the manufacturer's declaration of conformity with the RCD, and the discrepancy between the power of the engine provided, and that stated on the builder's plate and in the owner's manual, might also have been detected.

2.7 USE OF SAFETY EQUIPMENT

Many small high-speed craft are fitted with a 'kill-cord' or 'dead man's handle', which cause the engine to shut down when a driver is disconnected from the control position, through unforeseen circumstances. This not only prevents injury to people in the water, caused by a moving boat and its rotating propeller, but also limits the distance a driver can be separated from the boat should he/she fall out.

In this case, a kill-cord was fitted but was not attached to the driver. Consequently, when the driver fell overboard from the RIB, the engine continued to run at about half throttle. Without a person controlling the steering wheel, the transverse forces generated by the rotating propeller caused the boat to turn sharply to starboard. As a result, the passenger sitting on the port tube was thrown into the water and was then struck by the propeller. Had the kill-cord been attached to the driver, the engine would have stopped as soon as the driver fell overboard, and the injuries inflicted by the propeller to the passenger prevented.

The importance of the use of kill-cords is included in the syllabi of RYA powerboat courses, one of which had been successfully completed by the driver. However, as a powerboat engine can still be started without a kill-cord being attached to a driver, their use is dependent on the action of individuals. Until advances in design and technology are forthcoming, the use of kill-cords, along with other safety measures such as the use of lifejackets, buoyancy aids,

and the carriage of in-date pyrotechnics, can only be encouraged via further education, and possibly regulation. On this occasion it was extremely fortunate that the injured passenger remained conscious after being struck by the propeller. Had he not done so, his chances of survival without the assistance of a buoyancy aid would have been considerably reduced.

2.8 REGULATION OF LEISURE CRAFT

Although the driver of the RIB had slowed on passing into the 4kn zone indicated by marker buoys, the RIB was still travelling at a speed of between 10kn and 15kn when the console detached. As a result, the RIB circled out of control for over 30 minutes until finally beaching itself. It was fortunate that the accident occurred sufficiently distant from the many young children and bathers close to the shore, and allowed the area to be cleared. Otherwise many more injuries might have resulted.

The number of people involved in water-based leisure activities appears to have increased considerably in recent years, and the management of the ever-growing numbers and types of such activities around the UK's coastline is difficult **(Figures 15 and 16)**. There is no national regulation of the operation of leisure craft; there are no requirements for qualifications or training, and there are no age restrictions. There is also no compulsory requirement for third party insurance. Therefore, the control and order of the conduct of leisure craft in the UK is largely reliant on the training, experience, and common-sense of those participating, along with the actions taken by local authorities. However, the irresponsible action of the PWC driver in the wake of the unmanned RIB indicates that common-sense is sometimes lacking, and the failure of the driver of the OT450 to adhere to the prescribed speed limit, and to attach the kill-cord, shows that both regulation and training are not always successful.

The measures adopted by Gwynedd Council to manage the potentially conflicting activities off Abersoch Beach, along with its general requirements for the registration and use of powerboats and PWCs **(Annexes H and I)** appear to be sensible, and relevant to the safety of all beach and water users. However, the policing of these measures is inevitably difficult, particularly considering the large numbers of leisure craft in the area and the resources available. Additionally, as the violation of many of the regulations cannot be penalised without the support of local legislation, the effectiveness of this well-intended regulation might be diminished over time.

2.9 INFORMATION PROVIDED

The information provided to the owner of the OT450 contained several anomalies. The boat was sold by the dealer as a Playtime 450, even though a Playtime 450 model was never manufactured, and the engine supplied was above the recommended maximum engine rating indicated in the OT450 owner's manual and the builder's plate affixed to its hull. The builder's plate also contained a numerical reference to IMCI, which had ceased to participate in the RIB's conformity with the RCD since 2002 and, the manufacturer's declaration of conformity supplied to the purchaser was not signed.

These anomalies were not contributory to the accident, and the fitting of a 60hp outboard engine was appropriate to the size of the RIB in accordance with the formula shown at **Annex F**. Nevertheless, they indicate a lack of attention to detail during the re-branding process, and in the information and documentation required by the RCD, and the dealer's lack of familiarity with the Ribeye range of boats.

Figure 15 and 16

Activities on Abersoch beach

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES

The following safety issues have been determined from the foregoing analysis. They are not listed in any particular order of priority.

1. The driver of the OT450 was well rested at the time of the accident, and there is no evidence to indicate that fatigue influenced his actions or decision making. [2.2]

2. The fitting of the console to the OT450 with self-tapping screws alone allowed the console and deck to move independently when subjected to the vibration and forces experienced in the RIB when underway. This would have caused the screw fastenings to work loose, and it was not surprising the screw fastenings eventually failed. [2.3]

3. The detection of long-term degradation of the security of fittings through vibration and wear and tear might have been achieved via periodic inspection. [2.3]

4. The console fitted to the RIB was an RY5030, and not an RY4000 as intended. Had an RY4000 console been fitted using the rail system, the risk of console detachment would have been virtually eliminated. [2.4]

5. It is essential that all accessories such as consoles and seats are easily identified via clear and accurate labelling, and detailed fixing instructions are provided. [2.5]

6. A pre-delivery inspection of the OT450 by the dealer would have increased the probability of the erroneous supply and fitting of the RY5030 console being detected. [2.6]

7. Had the kill-cord been attached to the driver, the engine would have stopped as soon as he fell overboard, and the injuries inflicted by the propeller to the passenger prevented. [2.7]

8. It was extremely fortunate that the injured passenger did not lose consciousness. Had he done so, his chances of survival without the assistance of a buoyancy aid would have been considerably reduced. [2.7]

9. The policing of local authority regulations regarding water-based activities are inevitably difficult, and where the violation of many of the regulations cannot be penalised, the effectiveness of the regulation might be diminished over time. [2.8]

10. Anomalies in the information provided by the manufacturer and dealer indicate a lack of attention to detail during product re-branding, and in the information required by the RCD and the dealer’s lack of familiarity of the Ribeye range of boats. [2.9]

SECTION 4 - ACTION TAKEN

Following the fatality of a RIB driver who fell from his RIB in March 2005, the MAIB issued a Safety Bulletin (1/2005). The Bulletin strongly urged all powerboat users to ensure that:

- Kill-cords, where fitted, are used correctly.
- All crew and passengers are wearing suitable clothing and lifejackets.

Other actions taken include:

Ribeye Ltd has:

- Removed the IMCI number from its builder's plates on boats manufactured since January 2005.
- Altered its product labelling to reduce the possibility of detachment during transportation.
- Advised its dealers to use a fixative as well as screws when securing a moulding to a deck.
- Introduced procedures to ensure that each copy of a boat's document of conformity is signed and is retained with each boat.
- Stated its intention to provide guidance to its dealers on the installation of all its products via an installation manual.
- Undertaken to emphasise the importance of the use of kill-cords in its owner's manuals at their next amendment.
- Stated its intention to review the technical standards used as a means of demonstrating conformity with the essential requirements of the RCD.

The British Marine Federation has:

- Undertaken to issue guidance to its members highlighting the importance of conducting periodic checks on the security of accessories.
- Introduced a CD-ROM and a series of workshops aimed at improving the knowledge of its members with regard to the requirements of the RCD and its harmonised standards.

The Royal Yachting Association has:

- Undertaken to emphasise the use of kill-cords in its training courses and publications.

Gwynedd Council has:

- Introduced a requirement for kill-cords to be used on powercraft where fitted.

SECTION 5 - RECOMMENDATIONS

The British Marine Federation is recommended to:

2006/156 Highlight to its members the importance of:

- boat accessories being clearly labelled and supplied with fitting instructions;
- checks by dealers to ensure compatibility between accessories and hulls;
- fitting accessories in accordance with the manufacturer's instructions.

Gwynedd Council is recommended to:

2006/157 Review, and if necessary revise, its bye-laws to ensure that appropriate legislation is in place to support regulation of marine pleasure craft operating within its area of interest.

Marine Accident Investigation Branch
March 2006