

Report on the investigation of the collision between  
two Offshore Circuit Racing powerboats

***Sleepwalker (A2)***

and

***Harwich 2011 (A89)***

in Dover harbour

8 August 2009

resulting in one fatality

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**Report No 7/2010  
July 2010**

**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

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## **GLOSSARY OF ABBREVIATIONS AND ACRONYMS**

AYC	-	Allhallows Yacht Club
COLREGS	-	International Regulations for the Prevention of Collisions at Sea 1972 (as amended)
GPS	-	Global Positioning System
GRP	-	Glass Reinforced Plastic (fibreglass)
HP	-	Horse-Power
IRF	-	Incident Report Form
kg	-	Kilogram
KPI	-	Key Performance Indicator
m	-	Metre
mph	-	Miles-per-hour
OCR	-	Offshore Circuit Racing [class]
OOD	-	Officer of the Day
ORC	-	Offshore Racing Committee
PB1	-	Powerboat Racing Manual
PBRC	-	Powerboat Racing Committee
PRM	-	Powerboat Racing Manager
RYA	-	Royal Yachting Association
SAT	-	Safety and Technical [committee]
SEPA	-	South East Powerboat Association
SHARP	-	Safety Helmet Assessment and Rating Programme
SO	-	Safety Officer
UIM	-	Union Internationale Motonautique
UKFFORC	-	UK Formula Future Offshore Racing Club
VHF DSC	-	Very High Frequency Digital Selective Calling [radio]

**Times:** All times used in this report are local (UTC+1) unless otherwise stated



*Sleepwalker (A2)*



*Harwich 2011 (A89)*

## SYNOPSIS



Two powerboats collided during a race at the Dover Regatta causing fatal injuries to one crew member.

Both crews had limited racing experience, but were taking part in the Royal Yachting Association's (RYA) national championship, on a course that was too short and was congested by the number of boats in the race. The collision occurred when boat A89 unintentionally lost control, turned sharply and reduced speed significantly. Boat A2, following behind, had little opportunity to take avoiding action and struck the side of A89 close to where its co-driver was seated. The co-driver of A89 bore much of the force of the impact, his helmet was torn off and he suffered severe injuries to his head and upper body. Despite prompt and extensive medical attention he could not be saved.

The event took place on a foreshortened and compromised course, under confusing rules and without the risks being properly assessed. However it was approved by the RYA, and a large proportion of untrained novice and inexperienced competitors were permitted to race. Ultimately, it was the ability of the crews of the two boats that collided which caused the collision. However, they were racing under the auspices of an organisation that the investigation concluded had been insufficiently focused on safety, and had not made adequate attempts to control the race, or educate the crews about the risks they faced.

Following its investigation into a junior, K-Class powerboat racing accident at Portland Harbour on 19 June 2005, the MAIB recommended the RYA should:

*Consider the safety issues arising from this accident, and develop a pro-active safety management system which is subject to an independent audit by a professional body, to ensure effective oversight of powerboat racing. Particular attention should be given to developing procedures for the oversight of the K-Class racing classes.*

The RYA accepted the recommendation, however, the investigation found that the safety lessons identified in the K-Class accident had not been applied effectively across the sport, as intended by the RYA Council. This had allowed a number of systemic weaknesses to persist, which set the pre-conditions for the accident at Dover.

Following the MAIB's investigation, the RYA Council has affirmed its ownership of safety including the need to provide clear guidance and oversight of safety issues at all levels of the RYA. Within the RYA this will include: providing subordinate committees and structures with defined responsibilities, authority and accountability; promoting a culture of continuous improvement in safety; and enhancing auditing and monitoring of safety.

In light of the actions agreed by the RYA Council, this report makes no safety recommendations.

## SECTION 1 - FACTUAL INFORMATION

### 1.1 PARTICULARS OF VESSELS AND ACCIDENT

#### *Sleepwalker*

Race no	:	A2
Built	:	2006
Design	:	Concord
Construction	:	Glass Reinforced Plastic
Measured length	:	5.50m
Maximum beam	:	1.59m
Minimum weight	:	525kg
Engine power and type	:	Yamaha V4,130hp, 2 stroke outboard engine
Maximum speed	:	~ 60mph

#### *Harwich 2011*

Race no	:	A89
Built	:	2005
Design	:	Phantom
Construction	:	Glass Reinforced Plastic
Measured length	:	6.03m
Maximum beam	:	1.78m
Minimum weight	:	525kg
Engine power and type	:	Yamaha V4,130hp, 2 stroke outboard engine
Maximum speed	:	~ 60mph



**Accident details**

- Time and date : About 1157, 8 August 2009
- Location of incident : Recreational craft area, Dover Harbour
- Persons on board : Crew of 2 on each boat
- Injuries/fatalities : Mr Alex Edmonds, the navigator of *Harwich 2011*, died from his injuries.  
Navigator of *Sleepwalker* suffered bruising and whiplash injuries
- Damage : Both boats damaged

## **1.2 BACKGROUND**

Offshore circuit racing is a popular style of racing for powerboats. The course is typically close to land or within harbour limits, and each turning point in the circuit is marked by a buoy. The racers complete a number of laps, and in this case the total length was determined by a 25 minute time limit. Various different classes of boats take part in this style of racing, but both the boats involved in this accident were racing in the Offshore Circuit Racing (OCR) 'A' class. The race was part of the Royal Yachting Association's (RYA) national championships, and the RYA has conducted its own investigation into the accident.

## **1.3 NARRATIVE**

Powerboat racing had been arranged by the UK Formula Future Offshore Racing Club (UKFFORC) as part of the annual Dover Regatta, which took place during the weekend of 8 and 9 August 2009. Two heats were planned for each day of the regatta. The collision took place towards the end of the first powerboat race of the event.

It was reported by racing clubs and the RYA that the numbers of competitors in powerboat racing had been in decline, and different classes were encouraged to race together to share costs and keep events viable. OCR class boats joined in with UKFFORC at Dover to share the organisation and infrastructure of racing officials, safety crews and insurance overheads.

### **1.3.1 Offshore circuit racing classes**

Two classes of UKFFORC and two classes of OCR boat competed in the same race at Dover, for points in their own respective championships. The majority were OCR 'A' class boats, which are between 5.5 and 6.1m (18 and 20 feet) in length and powered by a 1.8 litre, 2 stroke outboard engine. The class has existed for many years, and is regarded as being a relatively accessible way of taking part in the sport. There was a single 'B' class boat racing which was almost the same in appearance, but fitted with a smaller, 1.3 litre engine. 'A' and 'B' classes have traditionally raced together on the same courses.

The UKFFORC runs a number of classes for junior racers, but offers a progression path to adult racing with E900 and the E1500 classes. Both these were outwardly similar to OCR 'A' and 'B' boats, with the major difference being the use of low exhaust emission type 2 stroke engines, of either 90 or 150hp output respectively. The E1500 was in its first year, as an experimental class, and this was the first national event where OCR 'A' and E1500 boats had raced together on the same course.

At the beginning<sup>1</sup> of the race, there were 14 boats from four different classes competing:

- 3 x E1500 class boats
- 2 x E900 class boats
- 8 x OCR 'A' class boats
- 1 x OCR 'B' class boat

### 1.3.2 Racing circuit

The course was designed by UKFFORC and used eight buoys to make an oval shape, modified on two sides with chicanes (**Figure 1**). The first turn consisted of two buoys (no.s 1 and 2), to create a longer arc and encourage separation between the boats at the end of the starting run. This feature was introduced to racing after a collision between two boats in a junior class which occurred at the first corner of a race in 2005<sup>2</sup>. The first chicane on the back straight was relatively gentle, but prevented the boats from straying too close to the beach. Buoy no. 5 was positioned towards the Prince of Wales Pier and was set out from the natural oval shape. It was followed by a chicane which made the turn around buoy no. 5 acute and caused the boats to slow as they approached the pier. The chicane then led the drivers through a more challenging right hand turn past buoys 6 and 7. The accident occurred near the last turn at buoy no. 8, a 90° left hand turn back onto the main starting straight.

### 1.3.3 Collision

Three separate video recordings of the race, taken from different vantage points on the Prince of Wales Pier, were studied to examine the race. MAIB contracted a world championship winning powerboat racer to advise on racing techniques and assist with interpretation of events and analysis of the collision.

The race was started at about 1132, and the allotted 25 minutes elapsed as the leaders completed their 16<sup>th</sup> lap, and the last lap flag was flown. One of the videos of the race showed the collision and events immediately beforehand, from which it was possible to determine the courses followed by the boats (**Figure 2**). Boat B27 approached buoy no. 8 and took a tight line around the turn. Boat A28 was behind, but catching up and preparing to overtake (**Figure 3**). It followed a similar, but wider line to B27 around the turn keeping clear, but leaving it in position to overtake on the next straight. Timekeepers recorded that boat A89 was 2 seconds behind A28 and, from the video, there appears to be about one boat length between them as they approached buoy no. 8 (**Figure 4**). Boat A89 took an even wider line than A28, but during the turn, the driver attempted to cut inside of A28, in order to gain an advantage on the next straight. During this manoeuvre, A89 turned more sharply than was necessary, the bow trimmed down and the boat slowed significantly (**Figure 5**).

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<sup>1</sup> Two boats had retired from the race due to equipment breakdowns by the time of the accident

<sup>2</sup> Collision between two Sorcerer powerboats at a junior K-Class event at Portland Harbour in June 2005 – [MAIB report 13/2006](#) published March 2006

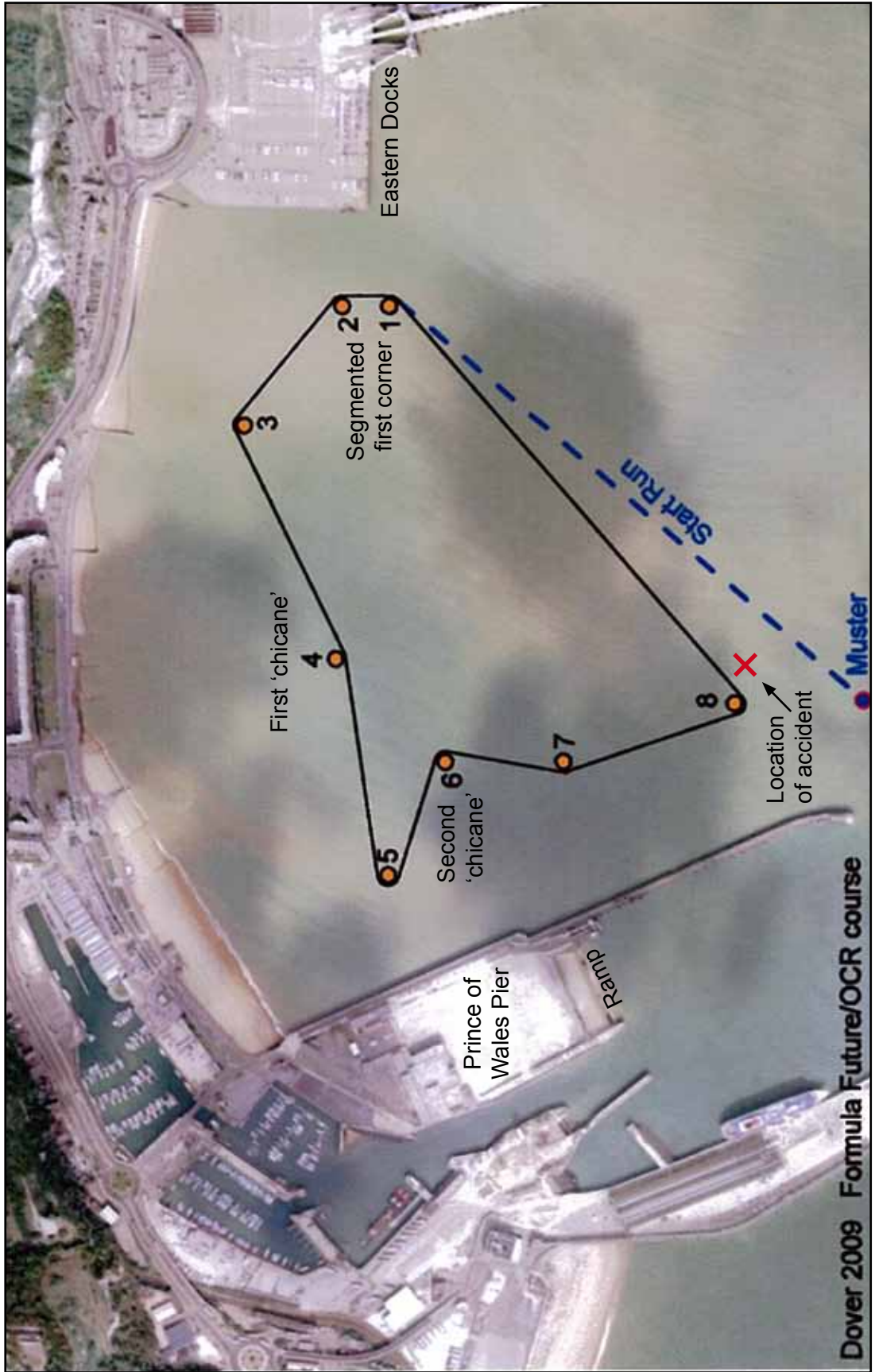
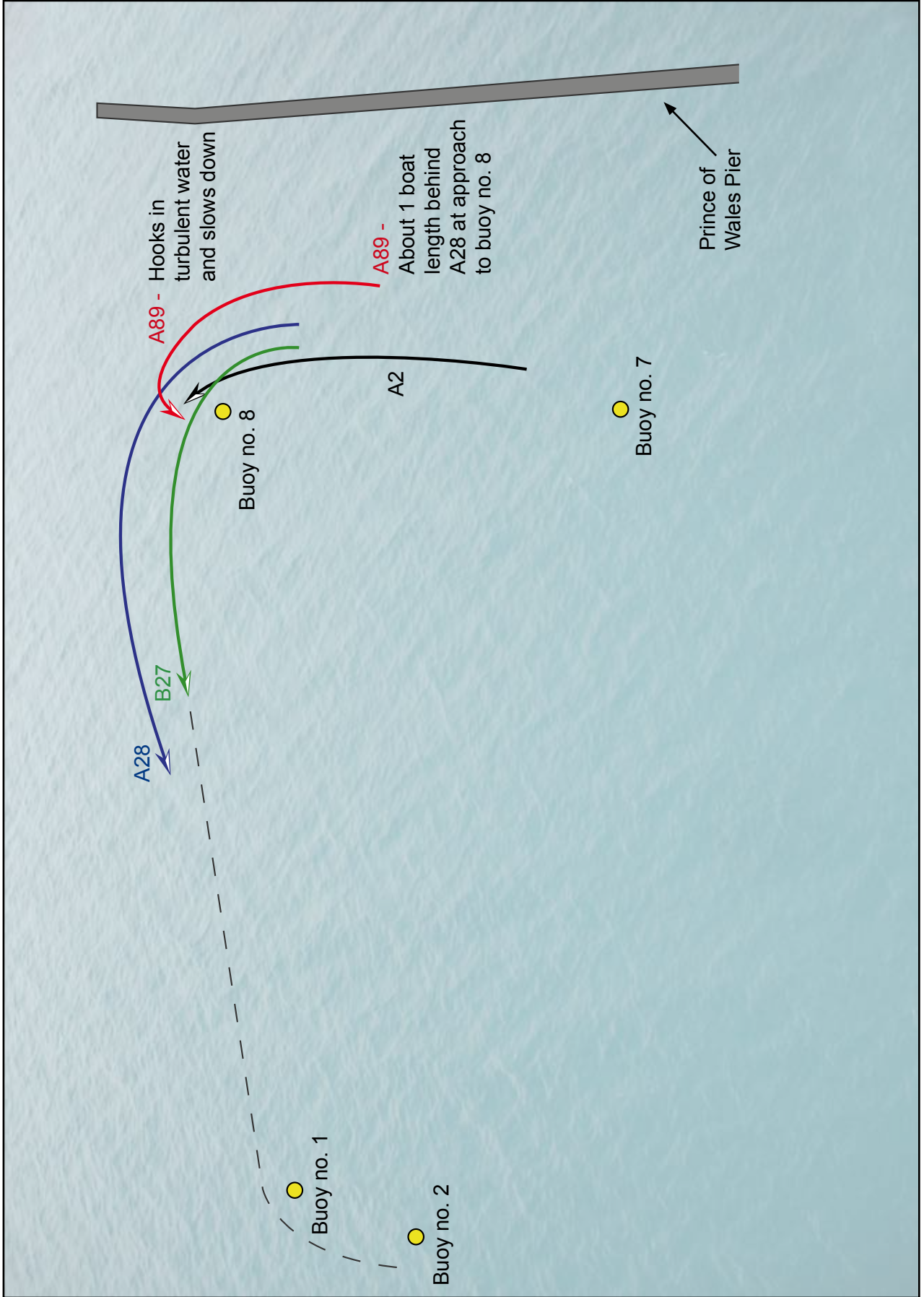


Figure 1

Planned course (see Figure 14 for actual track of boats and position of fixed navigational marks)

Figure 2



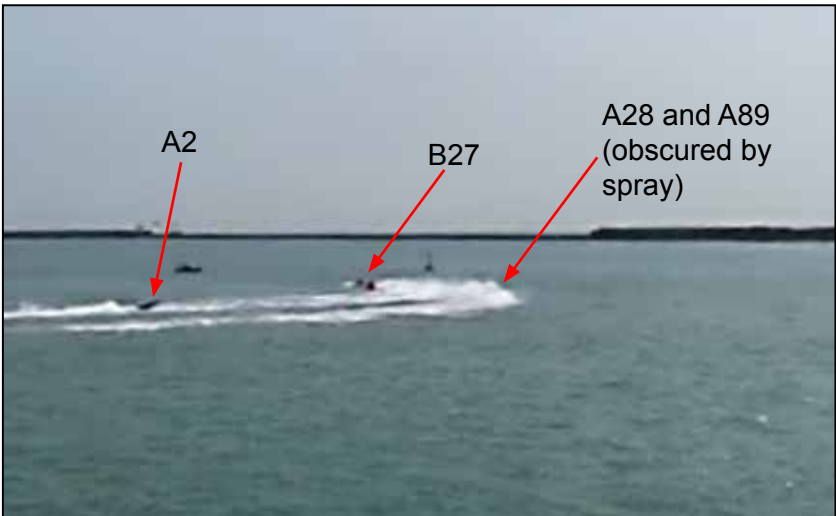
Courses followed by the boats before the collision

Figure 3



Boats B27, A28 and A89 approaching buoy no. 8

Figure 4



Boats A28 and A89 entering the turn at buoy no. 8

Figure 5

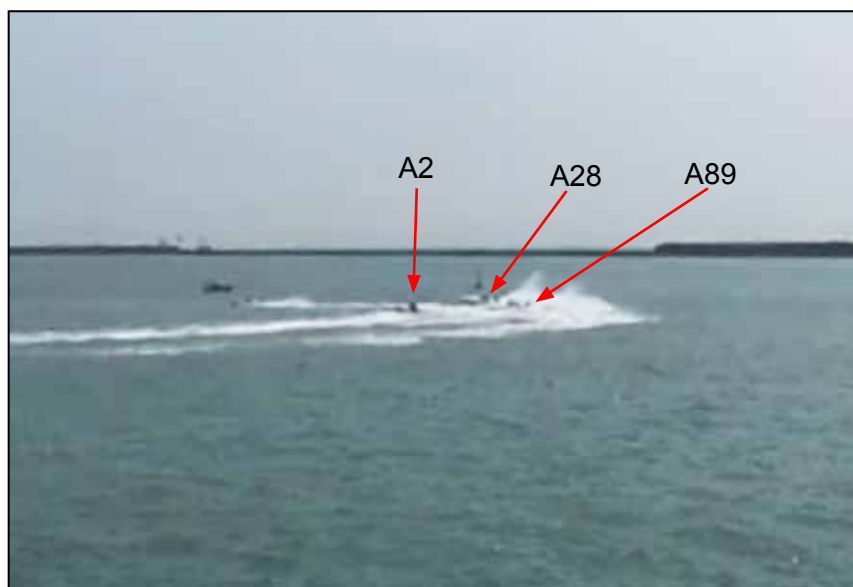


Boat A89 hooking

Boat A2 was several boat lengths behind A89, but closed the distance quickly as it took a tight line into the turn at buoy no. 8 (**Figure 6**). Boat A2 began to turn and its crew saw A89 directly ahead, lying across their path. A2 struck A89 on the port side, in the part of the boat where the crew were seated. A2 was launched upwards and out of the water (**Figure 7**). As it crossed over A89, it struck A89's starboard side coming immediately behind the driver's seat, and rolled to starboard. The driver of A2 was thrown clear, but the co-driver remained in the boat as it landed upside down in the water. After some initial difficulty, the co-driver swam clear.

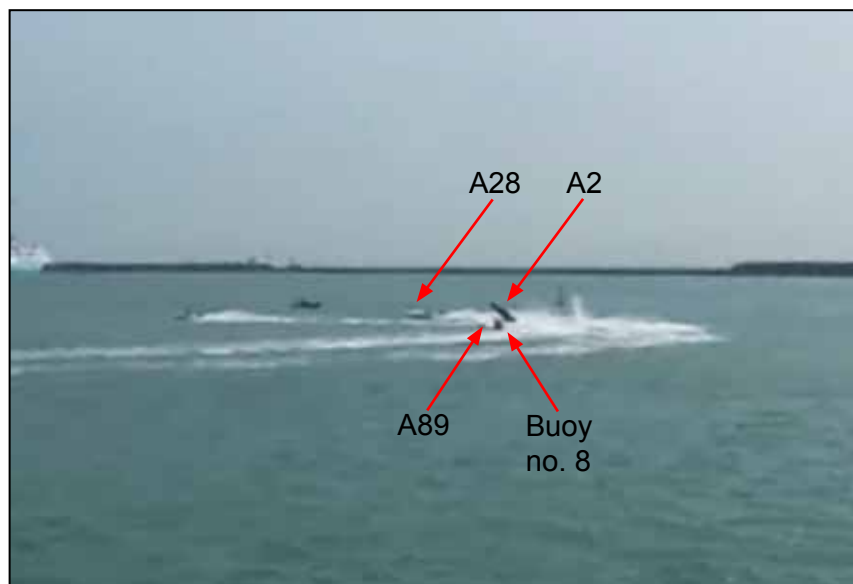
Examination of a GPS navigation unit taken from boat A89 showed that the collision happened at approximately 1157. On previous laps A89 had achieved speeds of about 45mph around buoy no. 8.

Figure 6



Boat A2 approaching the turn at buoy no. 8

Figure 7



Collision between boats A2 and A89

### 1.3.4 Emergency response

The driver of A89 leant forward over the steering wheel just before the impact, and was not injured. He became immediately aware that the co-driver, Mr Edmonds, was seriously injured, and he stood up in the boat to wave for assistance. A safety boat stationed nearby had seen the collision and arrived at A89 within 30 seconds of the accident. Another safety boat arrived shortly afterwards to recover the crew of A2 from the water. Both safety boats flew yellow flags, and the lead racing boat, E10, slowed and stopped nearby to offer help if needed. The second racing boat, A9 caught up and overtook, which prompted E10 to accelerate away in pursuit.

The crew of the safety boat attending A89 included a nurse with qualifications in pre-hospital trauma life support and advanced life support, who was normally employed by an ambulance service as a student paramedic. He assessed that the injuries to Mr Edmonds were extremely serious, and called for the second race medic to assist him. The second medic was a qualified paramedic, and he arrived at A89 in less than a minute. Mr Edmonds had remained in his seat, but his helmet had been pulled off during the impact and he had suffered extensive facial and chest injuries. Both medics worked to stabilise his airway and assess his condition.

The plan for evacuating a casualty was to use the old hovercraft ramp at the western catamaran terminal. However, the medics were concerned that it would be difficult to transfer the casualty to an ambulance from this position and requested that A89 be towed onto the beach, where the boat could be made into a more stable platform. The medics asked the Officer of the Day (OOD), who was one of the race officials, to call 999 and request an ambulance to meet them at the beach. Shortly afterwards, the medics asked the OOD to update the 999 call with a report that the casualty had suffered a cardiac arrest and had been moved to the beach. This was to make sure that ambulance controllers gave the highest priority to the emergency and so that it was clear that the casualty was ashore.

The remaining boats continued to race, albeit with yellow flags being flown in the area of the accident, for approximately 1 minute while race officials were told how serious the co-driver's injuries were. Safety boats were then instructed to fly red flags to stop the race. In this time, boat E10 overtook boat A9 and both continued to race back to the Prince of Wales Pier.

The driver of A89 was in a severe state of shock and he was moved onto another safety boat and taken back to the launch area. A89 was towed across the harbour and manhandled up the beach. Police officers attending the Regatta as part of their normal duties saw that the situation was serious, and moved to the beach to clear an area for the ambulance. Their incident report recorded that the first of two ambulances arrived at the boat at 1209.



The medics reported that Mr Edmonds was semi-conscious, but had suffered severe open fractures to his face, required assistance to keep his airway open, his ribs had been crushed and his left arm had a deep laceration in a position corresponding with damage to the boat's coaming on the port side.

At 1235 the air ambulance arrived with a doctor who was able to sedate Mr Edmonds so that he could be taken out of the boat. He was transferred to the ambulance, where medical teams continued to treat him but, tragically, were unable to save him. The Police incident report recorded that Mr Edmonds died at 1334.

### 1.3.5 Other incidents during the race

The race was started with all the boats in line abreast following behind the starter's boat. Speed was increased, with all the boats maintaining their positions, and when the start flag was raised they accelerated to full race speed. Although the bulk of the field was to the south of the special navigation mark, several boats passed extremely close to it on both sides, in their attempts to take the shortest route to the first turn (**Figure 8**).

Figure 8



Starting run passing the special navigation mark

It was common practice in both UKFFORC and OCR classes to leave out chicanes on the first lap to give more of an opportunity for the field to separate as the fastest boats pulled away. However, there was a requirement from the regatta organisers to keep races clear of areas near the beach and Prince

of Wales Pier to allow other activities to continue during racing. Using the chicanes helped to meet this requirement and also reduced the potential effects of confused seas from wave reflection off the pier. The use of chicanes for the first lap was not included in pre-race instructions, and so racing crews were only informed of this requirement at the pre-race brief.

After passing buoy no. 5 on the first lap, boat A19 continued ahead, entering the exclusion zone next to the Prince of Wales Pier and taking a course that would have left out the chicane. Boat A11 was very close on boat A19's outboard side and could not follow the proper course. Boat A19 then changed course abruptly to take the chicane, followed closely by boat A11. Both boats rejoined the course just before buoy no. 6, at right angles to the normal flow of traffic and immediately ahead of A10 causing it to take avoiding action.

The racing was close, and several competitors reported that the course was more congested than in races at other venues. Boat A19 struck buoy no. 5 on lap 6 and again on lap 11. On both occasions a safety boat took the place of the buoy and flew a yellow flag, indicating that competitors should slow down and proceed with caution<sup>3</sup>. In the three videos, none of the boats that were seen passing the safety boat showed any discernible reduction in speed compared with their performance on other laps. After the buoy was replaced for the second time, the yellow flag was taken down while two safety boats were still in position. Several boats, including A28, A89 and A2 passed close to the safety boats while travelling at racing speed.

#### **1.4 CONTROL AND TRIM OF RACING POWERBOATS**

Racing powerboats are known to suffer from 'hooking', a term used to describe when a planing powerboat makes an un-demanded excessively sharp turn, similar to a car skidding while turning. Hooking can occur either by: the bow digging deeper into the water and giving more lateral resistance for the turning moments to react against; the stern lifting and skidding across the water (often aided by the rotation of the propeller); or a combination of both effects. Hooking may also result in the boat decelerating rapidly as hull resistance increases and propulsion becomes less effective.

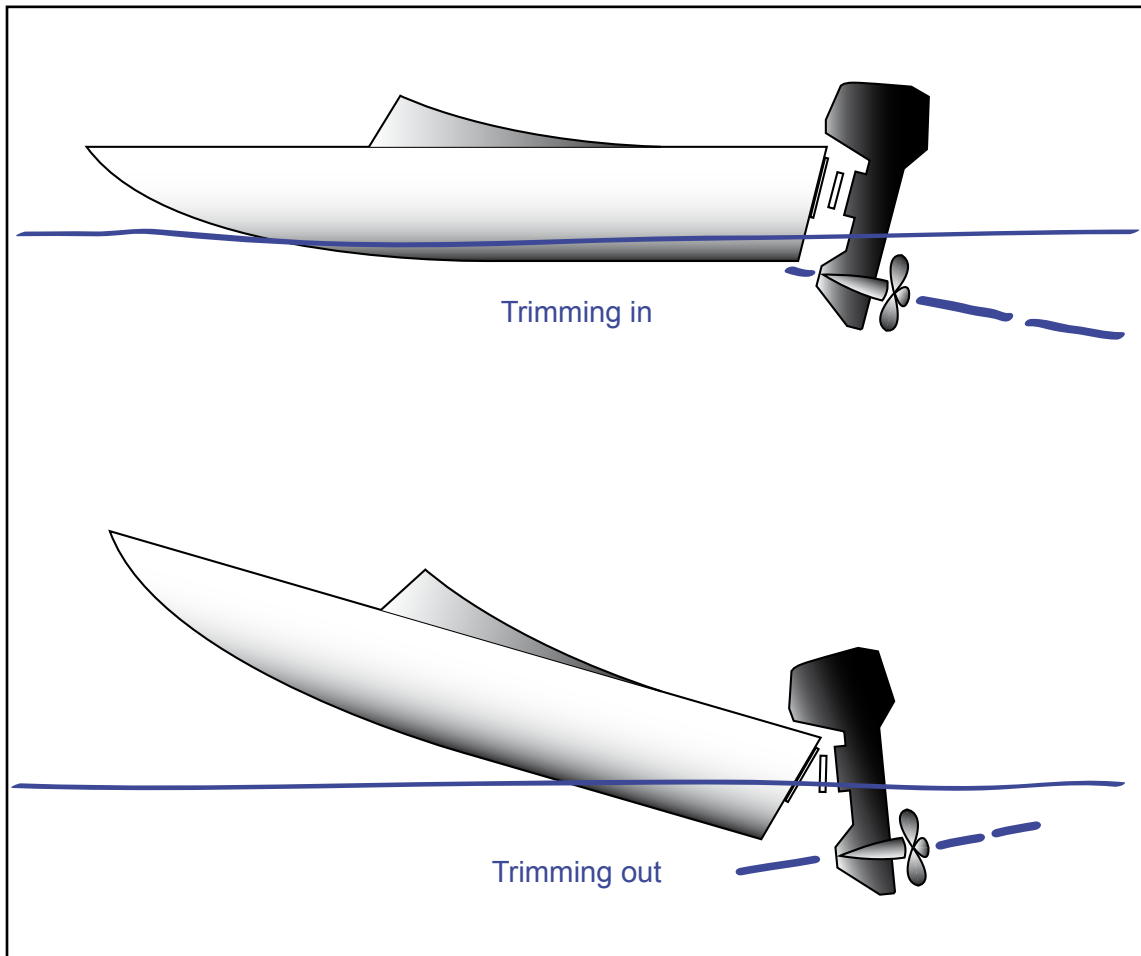
The outboard engines on all the boats in the race were fitted with electric trim controls to adjust the angle of the propeller thrust relative to the hull. This allowed propeller thrust to be balanced against the boat's centre of gravity and the lifting forces from the planing hull in order to optimise speed and handling in different conditions. Trimming the leg of the outboard motor in towards the transom has the effect of lowering the bow so that the front of the boat can grip the water and improve the turning ability. Conversely, trimming the leg away

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<sup>3</sup> RYA Powerboat Racing Manual rule F16(e), '*Yellow Flag Warnings – On seeing the yellow flag signal from a safety boat, competitors must slow down, acknowledge the signal, proceed with caution and keep clear of the danger area. Any competitor who ignores the yellow flag signal will be penalised and/or issued with a Yellow card.*

from the transom raises the bow, which improves the boat's ability to plane and so increases the top speed as less of the hull is in the water (**Figure 9**). However, it becomes more difficult to turn the boat in this state. Experienced racers reported that they adjust trim almost constantly during races to achieve the best balance of control and speed around the course. Both of the crews involved in this accident left their trim at an average setting to avoid additional complication during the race.

Figure 9



Effect of engine trimming

Hooking is most likely to occur during a turn, when the boat becomes out of balance or is upset by rough or turbulent water. However, as boats reach the limit of their performance, margins to keep this balance get smaller, and can only be maintained by combining the use of trim controls and engine power while manoeuvring the boat. It was reported that hooking is common and can be expected to happen in most races. On the third lap of this race, boat A11 had a minor hook while exiting the turn at buoy no. 6, causing it to cross in front of boat A19 and present a risk of collision. However, boats that hook regularly are not competitive, and the two leading boats in this race were driven by experienced racers who reportedly had not suffered a hook for many races.

## 1.5 CREWS AND RACE OFFICIALS

### 1.5.1 Competitors and licensing

Each of the four classes of boats required a crew of two: a driver and a co-driver. Historically, OCR events took place over longer courses where some navigation was required. However, in modern racing the role of the co-driver is primarily to keep a look out for other boats and pass this information to the driver for tactical advantage and to avoid collisions. Experienced racers interviewed during this investigation gave a consistent view that the co-driver's job was just as important as the driver's in making an effective team.

An RYA powerboat racing licence must be purchased to compete in RYA approved events, and this may be one of three types. The most basic is an event licence, designed to allow those just getting interested in the sport to get involved on the day of the race. The holder must pass a basic written theory test and declare that they are medically fit to race. Competitors intending to race more frequently, or to gain points in the championships, need to apply for a provisional national licence. The applicant needs to pass a full medical examination and the written test (assuming that the test had not already been done to get an event licence). After the competitor has been considered by officials to have raced satisfactorily in four events, the licence can be upgraded to a full national licence. Event licences are only valid at the event where they are purchased, and at the time of the accident each person was only allowed a maximum of two per year; national licences must be renewed each year.

The types of licences held by the 18 competitors in the OCR classes at the Dover event are shown below (**Figure 10**).

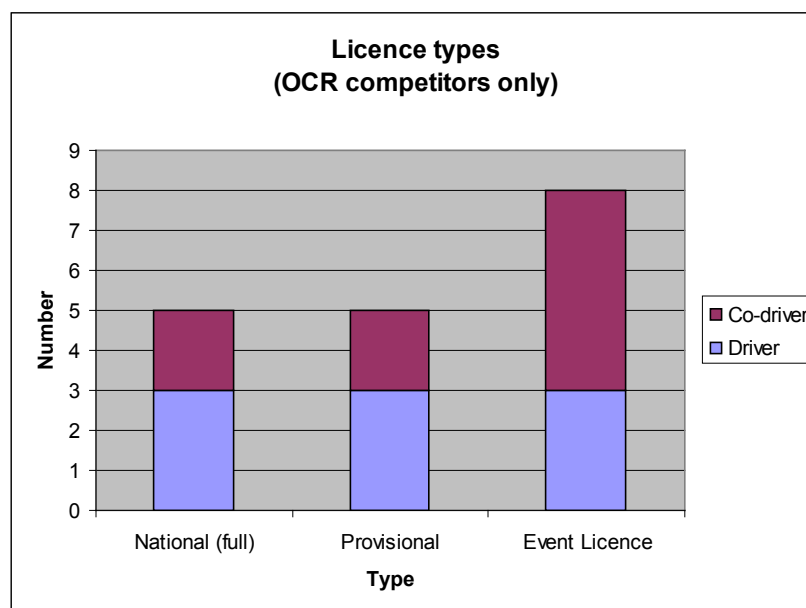


Figure 10: Types of licence held by the competitors in the OCR Classes at the Dover Regatta. (Note: One of the co-drivers with a provisional licence had previously held a full licence, but had recently returned to the sport after an extended period and could not be issued a full licence immediately)

Only one boat, B27, had a pink marking on its engine to indicate that the driver held a provisional or event licence, as required by rule C11 of the RYA's powerboat racing manual (known by its short title, PB1).

### 1.5.2 Crews

The driver of A2 was 22 years old and was in his first full season of powerboat racing. His family had been involved with powerboats for many years and, although he had been close to the sport and had operated fast boats and personal watercraft before, he had no formal boating qualifications. He gained his first event licence in October 2008, and then competed in two basic<sup>4</sup> races, in April and May 2009 using event licences. His provisional licence was issued on 17 June 2009 to allow him to compete in a national race event at Allhallows Yacht Club (AYC) on 20/21 June 2009. The driver had completed a total of 10 race heats at these events and was conscious of his inexperience. He was cautious to avoid difficult racing situations and the risks of hooking or capsizing his boat. There had been three different co-drivers of A2 during the season, and on the day of the accident the driver's younger brother was acting as co-driver. He was 19 years old and was also in his first season of racing. The Dover event was the first time that he had been the co-driver for his brother, but he had raced with his uncle in May, where he had learned the basic elements of the co-driver's role. He was racing using his second event licence.

The driver of A89 was aged 35. His father had been involved in the sport and the driver had operated various fast boats since childhood. Despite this experience, he had no formal boating qualifications and was competing in his second season of racing. He had taken part in two basic races in 2008 and another basic race in April 2009 using event licences. His provisional licence was issued on 28 April 2009, and he had competed in national races at Looe and Torquay in May, AYC in June, and Plymouth in July. Although he understood the potential benefits of adjusting engine trim, he preferred to leave it at an average setting to reduce complication during the race.

The co-driver of A89, Mr Edmonds, was 41 years old. The driver's brother was usually the co-driver of A89, however he had injured his back earlier in the season and had not yet fully recovered. Mr Edmonds volunteered to be the co-driver of A89 in the week before the race. He was a member of AYC and had owned fast boats and personal watercraft. However, he had not raced powerboats before, and on the morning before the race took a written test (**Annex A**) to gain an event licence.

### 1.5.3 Race officials

The principal race officials were the RYA Commissioner, Officer of the Day (OOD) and Safety Officer (SO). They were supported by assistants, medical officers, scrutineers, marshals, timekeepers and a race secretary. All were volunteers.

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<sup>4</sup> A race that is not part of the national championship is known as a basic race

The RYA Commissioner had been involved in powerboat racing for many years as an event organiser, OOD and SO. The Commissioner's role is to represent the RYA, ensure that an event is run in accordance with the rules and support the other race officials. The RYA Commissioner had been acting in this capacity since 1991 and was also the chairman of the RYA's Offshore Racing Committee (ORC).

The OOD is responsible for running the event on the day, taking charge of all the activities associated with the racing. The OOD at Dover had raced OCR powerboats in the 1980s and was approved by the RYA to act as OOD in the early 1990s. The SO became involved in powerboat racing as a safety boat crew, and was approved to act as SO in 2007. The SO is responsible for controlling the safety of boats on the water and directing the safety crews. Both the OOD and SO regularly acted as race officials.

## 1.6 IMPACT DAMAGE

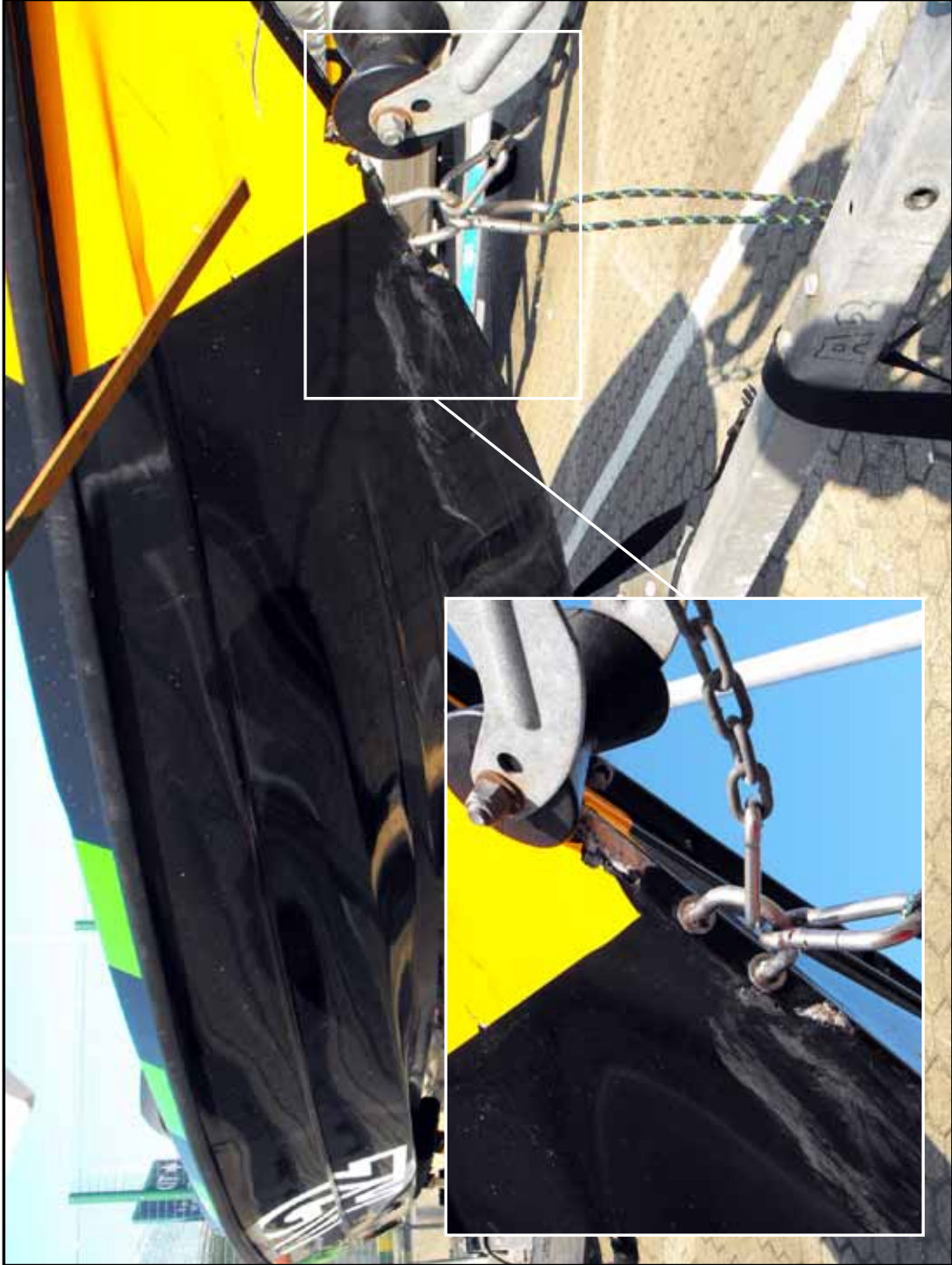
A2 and A89 had been checked during scrutineering procedures before the race, and found to be satisfactory. The boats were taken to a secure storage area after the accident and were inspected by MAIB investigators the following day. Racing rules do not require OCR class boats to be fitted with seat belts, canopies or any structural devices to help protect the crew in a collision.

Boat A2 was found to have impact damage around the towing eye at the bow and scuffing marks down the starboard side near the keel (**Figure 11**). The chine was damaged on the starboard side in the area immediately behind the driver, and the hull had been penetrated where the two surfaces had split apart. A deck moulding that covered the area behind the crew had been deformed and split in places. The outboard engine was securely attached to the transom. Throttle, gear and steering connections worked satisfactorily. The engine could be moved throughout its full range of trim, but was not marked with a pink band to denote that the driver was a provisional licence holder as required by PB1.

Boat A89 was damaged at the coaming on the port side next to the co-driver's seat. A 'v' shaped section of the coaming moulding had been broken away. Both the co-driver's and driver's GRP seats were cracked in several places. The coaming on the starboard side, immediately behind the driver had also been damaged, with blood and tissue embedded in the GRP structure (**Figure 12**). The outboard engine was still attached to the transom, but the engine cowling had been pushed downwards, fracturing the cowling and causing damage to the starter motor and the forward part of the engine. There was no evidence of a pink marking band required to indicate that the driver was a provisional licence holder. The transom was cracked along its upper edge and delaminated in places. Throttle, gear and steering connections worked satisfactorily and, with battery power applied, the engine could be moved throughout its full range of trim.

Both boats were later inspected by an RYA senior scrutineer and no other defects, which could have affected either boat's performance, were reported

Figure 11



Damage to the bow of boat A2



Impact damage to port side cockpit coaming



View looking at point of impact and showing 'driver' leaning forward



Approximate direction of travel of A2 as it crossed A89

Damage to boat A89



### 1.6.1 Protective equipment

Mr Edmonds was of similar physical size to the driver's brother, and had borrowed his racing overalls, buoyancy vest and helmet; scrutineers checked that the helmet fitted the co-driver satisfactorily before the race. Helmets must meet minimum standards which include UN ECE22-05, Snell M2000, M2005 or Snell SA2000 or SA2005, and be coloured orange. These standards are most commonly associated with motorcycle helmets. The helmet worn by Mr Edmonds was later found in the after part of the boat and was a 'Nitro N250VX' with a polycarbonate shell. The design meets the requirements of UN ECE22-05 and the helmet had an Auto Cycle Union Gold rating and an RYA scrutineer's mark for 2009. The race instructions stated that the efficiency of the helmet and other protective clothing were the sole responsibility of the wearer. At the time of the investigation, similar helmets were available for approximately £50.

Examination of the helmet (**Figure 13**) showed that the outer coating had been removed on the left hand side above the temple area, and on the chin guard close to the cheek. The centre and right hand side of the chin guard had shattered and was missing. The padding insert was later recovered, but the outer polycarbonate shell could not be found. The visor was also missing. Padding and the inner lining of the helmet had also come away from the shell on both sides, but the chin strap was still secured.

Figure 13



Helmet damage

## 1.7 RACE ORGANISATION

### 1.7.1 Dover Regatta

The Dover Regatta incorporated many different activities in the harbour and on the sea front. Powerboat racing had been included in the regatta programme for the last 3 years and took place on a course in the recreational craft area

in the outer harbour (**Figure 14**). A representative from Dover Harbour Board sat on the Regatta Committee, and the location of the course and racing times were arranged to avoid potential conflict with commercial traffic and other craft taking part in the regatta. UKFFORC's plan for the powerboat racing events was accepted by the regatta committee and Dover Harbour Board, as they were assured that racing would be conducted in accordance with the RYA's rules, and the plan subject to RYA approval.

Reproduced from Admiralty Chart BA 1698 by permission of the Controller of HMSO and the UK Hydrographic Office

Figure 14

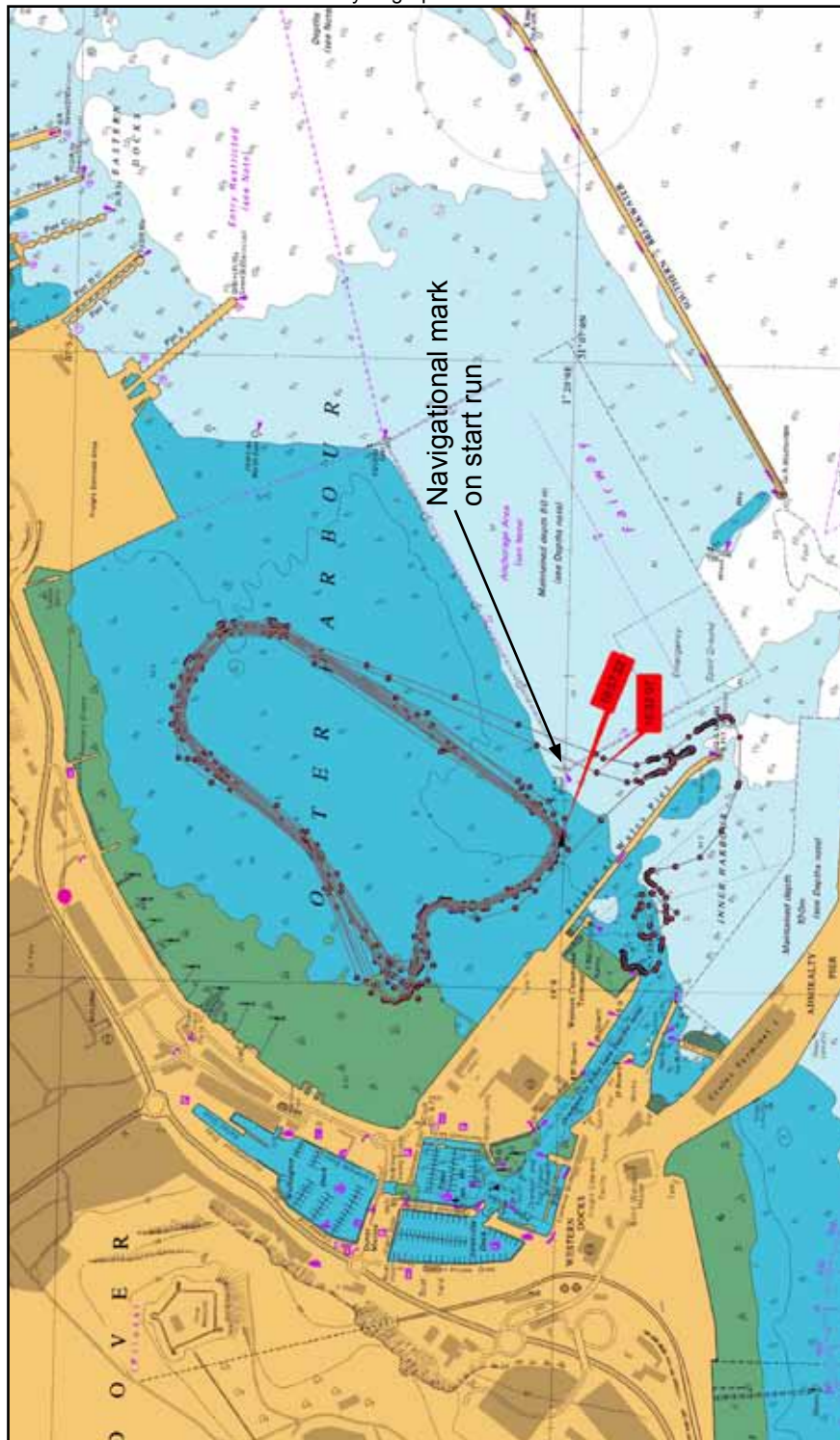


Chart extract with GPS data from boat A89

Separate races at the event were planned, including the fifth round in the OCR national championships, a special race for Thundercats, and national races for Thunderbolt and Thunderkids<sup>5</sup> classes. The racing was organised by UKFFORC in association with M2M Racing, AYC and the South East Powerboat Association (SEPA). SEPA later withdrew from helping to organise the event following a disagreement over which class's racing rules should be applied, but SEPA members took part as competitors and officials. The proposed layout of the racing circuit was checked by the RYA's Course Approvals Committee, and a Race Approval Letter and insurance cover note were issued by the RYA on 6 August 2009.

### **1.7.2 Course**

The total length of each lap was estimated by the organisers to be 1.3nm, but buoys at the end of the course near the Eastern Docks were repositioned to give more clearance to ferry traffic using the linkspans. After the course was laid, buoy no. 8 was moved further away from the special navigation mark at the north eastern corner of the anchorage area, to reduce the risk of boats colliding with it. Collectively, these changes reduced the length of the course. A GPS navigation unit from boat A89 was operating during the race, and the data from this was analysed to show that the average lap length was 1.15nm.

Guidance on the lengths for each lap and the total race distance is given in PB1. Each lap of a basic race (i.e. a race that is not part of the national championship) should be a minimum of 2nm and the total race length should not exceed 50nm. The minimum length of each lap in a national race for OCR boats was not specified, but the total race length should be between 35 and 60nm. A89 was starting its last lap at the time of the accident and, had it finished the race, would have completed 17 laps, a total of 19.62nm. However, OCR class rules state that a race can be divided into two heats, each lasting 25 minutes. At typical racing speeds, the total distance covered in both heats is likely to exceed 35nm, and in this case would have been nearly 40 miles. There is no guidance relating the maximum number of boats to the size of the course.

The distance between the Prince of Wales Pier and the ferry berths was 0.57nm. The length of the starting run into the course was measured using the GPS navigation unit from boat A89; the greatest distance that it could have been was 0.46nm. In practice, because of manoeuvring before the starting flag was raised, the starting run was likely to have been shorter, at about 0.34nm. PB1 rule F13 states that the distance between the starting line and the first turning buoy must be at least 1nm to allow the fleet to spread out before the first corner.

### **1.7.3 Race approval**

Organising clubs must submit details of their events to the RYA to check that they have been planned in accordance with the rules and the appropriate authorities have been consulted. Applications are checked by the Race

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<sup>5</sup> Thundercat, Thunderbolt and Thunderkids classes are rigid inflatable catamaran type boats.

Approvals Committee and must be received at least 30 days before the event. The race approval form for racing at Dover was recorded as received in the RYA office on 22 July 2009, 17 days before the event.

The application set out the race instructions, including the timetable for the event and names of officials. The instructions stated that 'safety takes precedence over racing at all times' and that the International Regulations for the Prevention of Collisions at Sea (COLREGS) must be obeyed at all times.

A scale diagram of the course was included in the application, from which it was possible to determine that the length of the start run was about 0.4nm. The special navigation mark on the starting run was not shown. The application was approved without reference to the areas where the proposed course differed from the rules.

The rules for UKFFORC and OCR classes had a number of differences, and these had to be reconciled for the combined race at Dover. On 4 August 2009 the RYA powerboat racing manager asked the RYA's Offshore Racing Committee (ORC) to approve his recommendation that the event use the UKFFORC rules published in PB1 as they included greater margins between boats than the equivalent OCR rules. The Chairman of the ORC agreed, and the following UKFFORC rules were included in the race instructions:

- *K13 – Rules of the Road.*
  - *(b) No race boat is permitted to follow directly behind another. Any overtaking boat must establish a minimum one boat length lead prior to altering course.*
- *K14 - Rounding marks*
  - *(a) Where two or more boats are approaching a turn mark a minimum one boat length must be maintained by the lead boat(s) before taking a tight turn or significant course change on the mark. The inside boat has the priority and other boat(s) must give water and hold racing lines.*
  - *(b) The driver of the boat(s) must be prepared to take appropriate action to avoid a collision. It is the joint responsibility of the driver and navigator, being aware of the boats around, sea conditions and potential hazards.*
- *K15 - Missed mark.*
  - *Any boat missing a mark or not passing on the correct side will have penalty time added to their finishing time. If any mark is missed more than once or any other mark is missed in the same race, this will result in disqualification. DO NOT RETURN to take missed marks. [sic]*

Other pertinent UKFFORC rules in PB1 were not reproduced in the race instructions and the event approval note only specified that '*the overtaking rule for this event are as per UKFFORC Rule K14*' [sic]. Rule K14 does not however refer to overtaking. Rule K17, requiring chicanes to be omitted on the first lap, was left out of the race instructions, and during the pre-race drivers' briefing the need to apply this rule was debated. The organisers considered that all UKFFORC rules applied to the event, but neither the OOD nor SO had been included in discussions about the rules before the event, and at the pre-race briefing it was concluded that only rules K13 and K14 would be applied.

The race approval application also included a risk assessment (**Annex B**) conducted by the event organisers. It identified the hazard of boats colliding, with the possible effects of injury and damage to craft. The initial risk rating was assessed as high, but application of the following controls was assessed to reduce the risk to low:

- Course design to minimise potential for collisions
- Only licensed drivers in control of craft
- Course controlled by dedicated safety craft
- All members of the public excluded from course and beach area during racing.

The risk assessment was accepted as part of the approval application, and was published with the race instructions. None of the senior race officials had read it before the race and the SO had not received a copy.

#### **1.7.4 Safety management at the event**

The event organisers had arranged a safety team, with eight safety boats and crews including two medics and two divers. This was in excess of the requirements in PB1. The SO reported that he considered the safety team to be comprehensive, and this allowed him to station boats to cover all parts of the course. The small course and its location in an enclosed part of the harbour gave the SO the advantage of being able to monitor the race and the safety teams more closely.

### **1.8 OTHER SIGNIFICANT ACCIDENTS**

#### **1.8.1 Overview**

The RYA has reported that there have been five fatal powerboat racing accidents (including this accident at Dover) in the UK since 1990. Two of these have involved OCR class boats.

Officials are required to submit Incident Report Forms (IRF) after accidents involving damage or injury describing what happened. These are then sent to the RYA to be forwarded to insurers and the committees to allow accident trends to be monitored. The MAIB has examined all the reports that had been

submitted for incidents involving OCR class boats. There were 39 reports for the period from May 2003 to September 2009, but 4 of the fatal accidents occurred outside this period. Injuries were reported in 15 incidents, and 8 cases were recorded where boats hooked at turning marks. Four collisions were reported, two of which shared similarities with the accident at Dover. The first was in 2005, when a boat hooked at a turn and the crew were ejected. Another boat following immediately behind collided with the first boat and caused it to sink. The second happened in 2008, when a boat hooked at a turn. The boat following behind took avoiding action, but in doing so collided with a third boat. No injuries were reported in either case.

### 1.8.2 K-Class collision in Portland Harbour

MAIB investigated a collision between two sorcerer powerboats at a junior K-Class event at Portland Harbour in June 2005. A 13 year old boy suffered serious head injuries when the powerboat, in which he was co-driver, hooked as it was rounding a 90° left hand turn mark and was struck at right angles by a boat following behind. Following the investigation, the MAIB recommended that the RYA should:

*Consider the safety issues arising from this accident, and develop a proactive safety management system which is subject to an independent audit by a professional body, to ensure effective oversight of powerboat racing. Particular attention should be given to developing procedures for the oversight of the K-Class racing classes.*

On 1 August 2006, in a letter to the MAIB the powerboat racing manager (PRM) reported (**Annex C**) that the RYA Council had unanimously approved the MAIB's recommendation. They set a timetable of 12 months for the development and implementation of the safety management system, and a further 6 months to consider the most appropriate verification and audit system.

The club organising K-Class racing made a number of changes to improve safety, which included:

- Increasing the length of the start run to allow greater separation between boats
- Using two buoys to make the first turn of the race less acute
- Reducing the number of boats using the course
- Developing boat designs to improve crew protection from side impacts
- Introducing mandatory training and assessment for junior competitors.

K-Class racing has since developed and the classes are now run by UKFFORC, which has added the larger E900 and E1500 classes to retain the interest of the junior members as they become older. UKFFORC class racing rules have been influenced by the lessons learned from the accident at Portland. However, only one of the points listed above, using two buoys at the first turn, was employed at the race in Dover.

## 1.9 SAFETY MANAGEMENT IN POWERBOAT RACING

The RYA is recognised as the national governing body for boating, and exists to '*promote enjoyable, safe and successful UK sailing and motorboating*'. One of its self declared primary objectives is to increase participation and enjoyment in boating, and in doing so to reduce the number of '*preventable incidents and deaths*'.

A condition of entry for the event at Dover was that all competitors were required to sign an RYA indemnity form. This obliged those taking part to accept that:

*By engaging in active water sports, my physical safety could be endangered. The competitors' actions, the actions or inactions of the organisers of water sports events, including the drivers of safety craft, can also endanger my physical safety.*

In acknowledging this risk, competitors were required to personally assess whether the event or activity was too difficult for them. This was further emphasised in the race instructions which stated that it was the driver's sole responsibility to decide whether to start or continue in a race.

### 1.9.1 Management structure

Although it is a limited company with permanent staff, the RYA draws on the voluntary support of its members to develop and administer its policies for boating activities. The RYA Council is the senior policy making body, and it delegates responsibility for each different area of interest to specialist committees. A chief executive is employed to implement policy and oversee operations.

### 1.9.2 Powerboat racing committees

Powerboat racing is a relatively small part of the RYA's activities, but in 2008 about 1500 racing licences were issued, of which 400 were to new competitors. Setting policy for the sport is delegated to the Powerboat Racing Committee (PBRC) whose chairman is a member of the RYA Council. The PBRC's objectives are stated as:

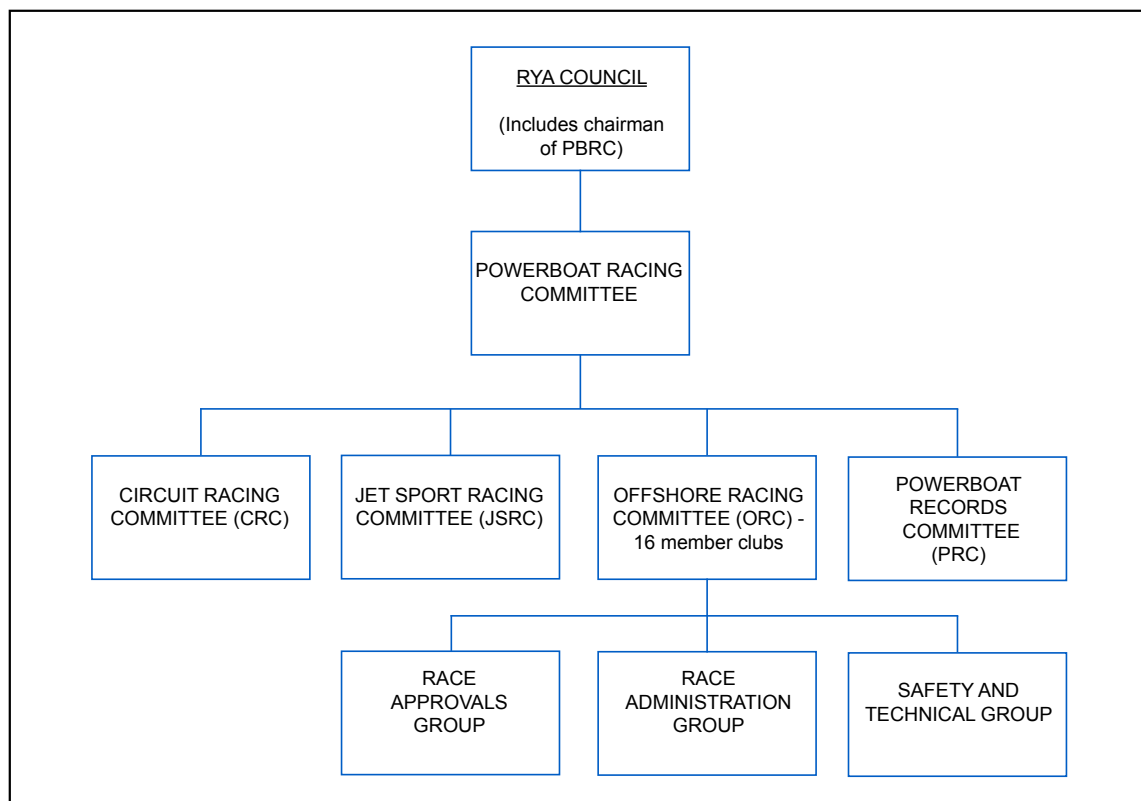
- 1.1 *To promote all forms of powerboat competition nationally and internationally and to control an orderly development of the sport in accordance with the RYA and Union Internationale Motonautique (UIM) rules.*
- 1.2 *To coordinate the work of the PBRC sub committees, working groups and panels to ensure that they are correctly briefed and carrying out their responsibilities.*
- 1.3 *To maintain contact with RYA non-powerboating committees and regions to ensure the work of the PBRC and its sub-committees are as widely known as possible.*

There is no objective relating to safety.

The PBRC delegates to four committees, each from the different branches of the sport (**Figure 15**). Of these, the Offshore Racing Committee (ORC) represents the classes involved in this accident. Its chairman is elected by the 16 voting members, who are from the different clubs which are actively involved in organising events; AYC, UKFFORC and SEPA are all represented. ORC objective 1.3, authorises the committee:

*To co-ordinate and develop national racing rules to reflect changes in design of boats and engines in consideration of national and international rules.*

Figure 15



RYA Powerboat Racing Committee structure

Reporting to the ORC are a number of sub-committees, including safety and technical (SAT), race administration and course approval groups.

The PRM reports to the chief executive and is employed full time to “*develop, promote, manage, and administer the sports of powerboat racing, sportsboats and personal watercraft to ensure smooth running of the sports and an orderly development and growth, in line with RYA policies and principles*”. There is a standing invitation for the PRM to attend PBRC, ORC and the sub-committee meetings, but he has no voting rights or delegated authority on any of the committees. PB1 states that the *Race Approvals Committee shall consist of PRM and two officials agreed between both PRM and chairman of Race Administration Group [sic]*.



### 1.9.3 Control and development of safety

PB1 stated that “*Powerboat racing is fast, furious, fantastically exciting and above all safe. The RYA administers the sport and ensures the rules are applied correctly thus creating affordable safe racing for all*”. The RYA’s ongoing administrative oversight of the sport is intended to be achieved by development of the rules in PB1, applying them at events and monitoring performance through the various committees. The safety of competitors and the impact of serious accidents were included in a risk register maintained by the RYA Council. The council set three Key Performance Indicators (KPIs) for powerboat racing:

*P4.2.1 Increase number of racing licences to juniors.*

*P4.2.2 Increase number of international participation World & Euro [sic]*

*P4.2.2 Increase number of international successes World & Euro [sic]*

There were no KPIs relating to safety or the effectiveness of the safety management system.

The activities of the PBRC, ORC and SAT throughout the period from August 2006 to September 2009 were examined. The most senior group, PBRC had a standing agenda item ‘Safety and Rescue’, however nothing was reported under this item in 10 out of the 15 meetings held during the period. In the remaining meetings, discussions under this item were limited to the appointment and progress of an internal audit group and, on 11 June 2008, it was questioned whether this agenda topic was still needed.

Analysis of racing licences issued by the RYA shows that the numbers of competitors peaked in 2003 and then declined, apart from a boost in 2008 from interest generated by the Round Britain powerboat race and from a trial policy of giving licences free of charge to new competitors. It was apparent from the minutes of meetings that the major focus of the ORC throughout the period examined was to sustain powerboat racing against a variety of downward pressures. A number of people interviewed in the course of the investigation identified measures that were employed throughout the sport in attempts to improve the popularity of powerboat racing:

- Creating a better event for spectators by using courses that were easier to view
- Encouraging newcomers to get involved, with minimal barriers to entry
- Keeping boat designs simple and avoiding the need for potentially costly developments
- Being more lenient when enforcing rules to avoid upsetting competitors and putting them off the sport.

However, some safety issues, such as standards for boats fitted with crew canopies, were discussed periodically. It was also evident that the ORC considered that the standard of some race events and officials was unsatisfactory and spot checks, with unannounced visits by RYA commissioners, were introduced in July 2006.

The cost of running race events was reported to be increasing, and clubs were encouraged to work together to host events where several different classes could compete together. The committee approved the introduction of the E900 class in February 2007 and E1500 class in January 2009 despite concerns that their similarity with existing classes would complicate the rules and divide support. Reports from ORC meetings showed that managing the rules for a growing number of different classes was becoming more demanding. Revision of PB1 was begun in September 2007 and delayed several times before being completed in March 2009.

#### **1.9.4 Incident reporting and investigation**

Incident reports were examined by the SAT and presented to ORC members. Only one incident, a collision between two E900 class boats, was recorded as having been discussed at ORC meetings during the 3 year period that was studied. This occurred at a meeting on 6 August 2008, because parents of the competitors were unhappy with how the incident had been handled at the event. The committee decided that it was a *'racing incident, and that a lack of racing experience from both parties may have been the cause'*. It was recorded that the incident should not have been brought to the ORC or RYA office and the competitors' parents should have protested to race officials on the day. No action was taken to identify or address the root causes of this accident. The committee later noted that the standard of the Incident Report Form (IRF) was unsatisfactory and incomplete. All the committees reported consistently that IRFs were not generally well completed.

#### **1.9.5 Risk assessment**

In February 2006, the ORC discussed more comprehensive risk assessments for racing events, but by the following year the committee opposed plans for risk assessments to be included in race approval applications. However, this was not accepted by the PBRC. In July 2007, the SAT group asked for a standard risk assessment template to be provided for clubs to use. This request was repeated later in the year, and in May 2008 the PRM responded that a template was available, but that it was intended for major events where local government or harbour authorities were involved. It was not considered necessary or suitable for general club use. This template, based on concepts taken from the Port Marine Safety Code, was successfully used in the Round Britain powerboat race in 2008.

### 1.9.6 Internal auditing

In March 2006, the MAIB recommended (see 1.8.2) that the RYA should appoint an independent professional body to audit powerboat racing safety management systems. However, in May 2006 the PBRC proposed to form an internal safety audit group of five people consisting of one volunteer from each racing discipline, and an additional member, who was not involved in powerboat racing but had experience of marine safety audits. The membership of the audit group was confirmed in May 2007. However, the PBRC and ORC considered that a subsequent report produced by the audit group was outside its terms of reference, and therefore the group was disbanded by the PBRC in March 2008. The terms of reference were revised and a past chairman of the PBRC was appointed as the sole safety auditor in June 2008. His first report, covering the 2007 season, was finished in July 2008 and approved by the PBRC on 17 September 2008.

The safety audit report of the 2007 season described the process for reporting incidents, and included the following observations:

- Not all IRFs were sufficiently legible and the standard of their completion needed to be improved. It was recommended that each case was signed off by committees once it had been considered and appropriate actions taken.
- Several instances of technical matters with safety implications which had been reported but had not received attention. Scrutineers' reports were not attached to IRFs where equipment had failed.
- There was poor control over assessing if drivers who had been injured and returned to racing were medically fit, and reluctance to withdraw licences as stated in the rules.
- All racing disciplines had proposed new safety rules.
- A safety handbook and induction booklet had been produced by the jet sport committee and was reported as being a 'considerable body of excellent work' (but there were no recommendations to other branches of the sport to follow its example).

Much of the 2007 safety audit report was reproduced in the 2008 safety audit report. Significant new observations were:

- Legibility and quality of IRFs had improved but was still an occasional problem.
- Several instances were reported where race application forms indicated that local and marine authorities had been informed about races, but were subsequently found not to have been contacted at all.
- IRFs had been misplaced at the RYA office due to the absence of members of staff. Some IRFs had to be found during the audit.

The report made a recommendation to the PBRC to appoint a person from each discipline to inspect each IRF as soon as it was received, and to make a report on IRFs received at the appropriate sub-committee meeting. This was accepted, but there was no record that it had been implemented.

### 1.9.7 Training

Junior competitors have been required to complete training and be assessed before racing since the introduction of the K-Class. This process was improved after the accident at Portland Harbour in 2005, and all competitors in UKFFORC classes must now hold a certificate of competence. In its response to the MAIB's recommendation (see 1.8.2), the RYA reported that it was '*...in consultation with the Safety and Race Administration committees with a view to establishing a club based training system for competitors who were new to the sport or for those seeking licence upgrades*'. In May 2006, the ORC proposed that newcomers to racing should be trained to at least the standard of the RYA advanced powerboat qualification. This was not progressed for all classes of racing because of concerns that the introduction of a mandatory training requirement would deter new people from getting involved in the sport. Only three of the eight major offshore circuit racing classes have subsequently introduced training requirements:

- The ZAPCAT class requires all competitors to obtain the RYA Level 2 Powerboat qualification.
- The Honda Formula Four Stroke powerboat series recommended that competitors obtained the RYA Level 2 Powerboat qualification and a VHF DSC Short Range Radio certificate.
- The Thundercat racing series has established a number of events where competitors and officials train together to improve the quality of the competition and practise emergency procedures.

Training of new race officials was achieved by candidates shadowing existing officials at race events. The appointment of new race officials was approved by the ORC once the individuals concerned were considered 'competent'. Officials were monitored by RYA Commissioners and their performance reported to the relevant committee. An example, in May 2008, was found of the ORC revoking its approval of a Safety Officer after his performance at an event was reported to be unsatisfactory.

Seminars to update officials and improve their knowledge were held each year at the end of the racing season from 2004 to 2006; one was planned in 2008, but not held due to other time constraints. A seminar was held in 2009 following this accident.

## **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 CONTRIBUTORY FACTORS**

The collision and subsequent fatal injuries to the co-driver of A89 were caused by a combination of factors that had been allowed to develop and become common practice in powerboat racing. These included the following:

- The crews involved had no formal race training and were still developing their skills to recognise and avoid dangerous situations.
- The combination of course design and the number of boats racing meant that each boat had less space to manoeuvre.
- The design of the boats offered very little protection to the crew in the event of a collision.

None of these had been identified during preparations for the event, despite all of them being illustrated as factors in previous accidents. Other serious shortcomings in the planning, approval and running of the event included:

- The race was approved by the RYA despite the fact that it did not meet many of the requirements laid down in PB1.
- The process for assessing the risks for the race was weak, and the consequent risk assessment was not challenged by the Race Approvals Committee. There were no mitigation measures considered to reduce the increased risk created by the failure to meet the PB1 requirements.
- The risk assessment had not been read by any of the senior officials present at the event.
- The combined rules, created and approved to allow the two classes to race together were confusing and did not promote safer driving.
- Several unnecessarily hazardous events occurred during the race that were tolerated by both competitors and officials.

The RYA Council's attempts at introducing a safety management system following the accident at Portland Harbour in 2005 were ineffective, and it was unable to effectively control the risks associated with OCR. Specifically, its safety management system did not detect the weaknesses in race planning listed above, and did not enforce its own existing rules for powerboat racing.

## **2.3 COLLISION**

### **2.3.1 Risk of collision**

Boat A89 took a wider line into the turn at buoy no. 8, giving the driver the opportunity of leaving the corner more tightly and potentially gaining a racing advantage. In doing so, the boat was affected by the wakes of boats B27 and A28. The bow of A89 dropped, the boat slowed down and turned more tightly than was needed to follow the course, consistent with it having suffered a moderate hook. Boat A2 approached buoy no. 8 expecting boat A89 to have cleared the turn. The crew of A2 were not able to detect that A89 had hooked, and that there was a risk of collision in sufficient time to take effective avoiding action.

There is no evidence to indicate that any equipment in either boat failed prior to the collision.

### **2.3.2 Training and ability**

The competitors in A89 and A2 had previous experience in operating fast boats, but they were relatively new to powerboat racing and had not done any formal race training. It was evident during the investigation that operating powerboats in a race on a short course needs different knowledge and skills than those required to drive a powerboat for work or leisure. Neither of these crews could be expected to perform to the same level as an experienced racing team, but they were permitted to race on a demanding course in a national championship. Any of the less experienced crews that were taking part could have found themselves being involved in a similar accident.

### **2.3.3 Crew protection**

OCR rules do not require boats to have any additional measures to protect the crew from a collision. By plotting a line through the damaged area on A89 it can be seen that Mr Edmonds would have borne much of the force from the impact. However, both seats were damaged and the driver was extremely fortunate to have escaped without injury (**Figure 12**). All the boats in the OCR and the UKFFORC classes had similar levels of protection to boat A89, and their crews would all have been equally vulnerable to severe injury in the same circumstances. While some other powerboat classes have introduced safety features in their boats to protect crew, the investigation found no evidence of any attempt to improve crew protection in OCR class boats prior to this accident.

## **2.4 NATIONAL GOVERNING BODY**

As with all motorsports, some risk is part of the excitement of racing, but races should be organised and competitors equipped with knowledge and skills to ensure that accidents are avoided and major injuries are prevented. Indemnity forms obliged competitors to accept racing risks based on their own assessment. However, in the absence of any mechanism to equip them with

the ability to make these judgments, they were reliant on the RYA providing them with a safe framework within which racing could be conducted. The RYA's mission statement includes reference to reducing the number of preventable incidents and deaths, and it has elements of a safety management system, including: competitor licensing, race approval processes, race officials, class rules, and a comprehensive structure of committees to oversee the sport. The RYA Council stated in August 2006 that it would develop and implement a safety management system, within 12 months (August 2007) and the audit mechanism within a further 6 months (early 2008). However, the effectiveness of this system was not tested and the requirement for independent audit, which had been accepted by the Council, was not implemented. There were no specific safety objectives in the RYA Council's June 2009 KPIs. Further, it was clear from the KPIs and subordinate committee reports that increasing participation and interest in the sport were their main concerns, and committees even questioned why safety was on their agenda.

Some areas of the sport have made their own improvements to safety, with notable examples being UKFFORC's training programmes for junior competitors and Jet Sport's induction and safety handbook. While these initiatives have been acknowledged by senior committees, there has been no apparent attempt to share these examples of good practice to improve the quality and safety of the sport overall.

The RYA's approval of the race at Dover illustrates weaknesses in its assurance and approval system. The application was submitted late, and should have been rejected in accordance with the organisation's rules; parts of the course were too short; navigational hazards had not been identified; the rules of the competing classes were not clear; and the risk assessment was ineffective. At such a late stage in the approval process, any one of these shortcomings should have required approval to be withheld.

Initiatives to encourage growth, such as lowering barriers to new entrants to the sport and using shorter courses that were closer to spectators, might be acceptable in isolation. However, the collective, albeit unintentional, effect of these and similar measures, was to erode safety margins and create an environment where a serious accident was more likely.

Harbour authorities and other organising bodies have statutory responsibilities for safety, but in most instances they have to rely on national governing bodies to provide them with assurance in specialist areas. Dover Harbour Board relied on the RYA's governance systems as assurance that the powerboat racing event was appropriately planned, approved and conducted. In this instance, the national governing body's processes were ineffective, and the Dover event was approved by the RYA to proceed despite significant failures to meet the required safety standards.

## 2.5 LEARNING FROM PREVIOUS ACCIDENTS

The similarity between this accident and the one in Portland Harbour in 2005 is significant. Both accidents occurred during a moderate left hand turn during which the leading boat hooked and was subsequently struck by a following boat. Both accidents resulted in serious injuries to the leading boat's co-driver as he was hit by the following boat. Incident reports in 2005 and 2008 reinforce the likelihood of this type of accident. However, the PBRC, ORC and SAT committees, and the safety audit report, identified that incident reporting was poor and it is likely that many more cases went unrecorded. Given this and the subsequent lack of attention paid to incident reports by the senior committees, it is extremely unlikely that the RYA had a proper appreciation of the risks prevalent in the sport.

The changes made to K-Class racing after the accident at Portland demonstrate that the issues identified from the collision at Dover had already been considered several years before. Controlling separation between boats, training, and crew protection are common to both cases, and show that classes should not be treated in isolation. Lessons from accidents should, logically, be shared and implemented between classes in order to prevent future tragedies.

Tendencies to dismiss accidents or hazardous near misses as '*racing incidents*', implied that these events were accepted as routine hazards of normal racing and did not need to be considered further. One example of this, recorded in the minutes of an ORC meeting, clearly demonstrated a lack of understanding of the potential safety issues, no recognition of the safety role of the committee, and it also undermined the reporting and safety management system as a whole.

### 2.5.1 Previous recommendations to the RYA

Following the powerboat accident in Portland in 2005, the RYA Council unanimously accepted a recommendation from the MAIB to '*develop a proactive safety management system to ensure effective oversight of powerboat racing*'. While elements of a safety management system certainly existed, there was little evidence of the high level policy and focus needed to make the system work effectively. The PBRC had '*safety and rescue*' as a standing agenda item at its meetings, yet had not recorded any progress in this area and members of the committee had even questioned the requirement for this topic.

MAIB also recommended that the safety management system should be audited by an independent professional body to ensure effective oversight of powerboat racing. However, it took nearly 2 years from the RYA accepting this recommendation for the first internal safety audit report to be approved, and no external audits were commissioned. The first (internal) audit team was subsequently disbanded, and both safety audits that followed were completed by a past chairman of the PBRC. Both of his reports focused narrowly on established processes, and neither challenged the basic presumptions of safety in powerboat racing or the management systems.



As neither of these parts of the MAIB's recommendation was effectively implemented, a number of systemic weaknesses were allowed to persist and these set the pre-conditions for the fatal accident at Dover.

## **2.6 SAFETY MANAGEMENT IN POWERBOAT RACING**

### **2.6.1 Course design and race approval**

While it is not possible to show that the Dover course contributed directly to the collision, it is considered that the combination of course design and the number of boats racing put greater demands on the inexperienced racers taking part, and reduced safety margins.

Of the nine crews taking part in the OCR classes, six drivers and seven co-drivers had either provisional or event licences. RYA rules restricted competitors to two event licences each year, so these competitors must be considered to have been less experienced, or even novices. If the rule requiring them to mark their engines with a pink band had been enforced, officials would have had a highly visual reminder of the proportion of inexperienced racers that were participating. In its investigation, the RYA has since recommended that event licences should not be accepted for entry to national races.

Traditionally, novice OCR competitors learned their racing skills in 'basic' club races, which used simpler courses and had a minimum lap length of 2nm to allow each boat more space. A lap of the Dover course was a little over half this distance and, with the number of competing boats, it was inevitable that the racing would be close. While experienced racers might relish this challenge, and it provided good entertainment for spectators, it was not appropriate for the majority of crews who had limited experience.

At about 0.34nm, the start run was much shorter than the 1nm required by the rules and thus restricted the opportunity for the race fleet to spread out before the first corner. The start run also included a substantial navigation mark and, despite the course being modified by officials prior to the start, many boats passed close to it on both sides, therefore introducing an unnecessary risk of collision. The obstruction was not shown in the course approval application, nor was it discussed in race instructions.

Managing the different rules for a growing number of diverse classes was shown to be challenging, and maintaining and updating PB1 was time consuming. One of the participating clubs withdrew from assisting with organising the event after a disagreement about how the classes' rules should be applied, and the PRM and ORC chairman intervened a few days before the race to attempt to resolve the problem. However, implementation of the rules was still unclear. The race approval note quoted the rules incorrectly, and the PRM's decision that the UKFFORC rules should be used throughout became diluted to a confusing mix of rules from both classes.

The race approval committee had no means of assessing if the race was suitable for the large proportion of inexperienced crews taking part, because neither the number of boats entering the race nor the experience of the competitors was included in the approval documentation for it to consider. When more challenging courses are proposed, officials should consider suitable control measures, including: restricting entry to experienced crews, reducing the number of boats in each heat, or, simplifying the course to allow novices to race safely within their ability.

The RYA's race organisation and approval system did not enforce the rules in PB1, did not properly reconcile rules for multiple classes, and took no action to mitigate the safety weaknesses in the proposed plan before approving it.

### **2.6.2 Risk assessment**

The RYA's policy of only providing a template for the detailed risk assessment of major events did not recognise that the actual risks to individuals remain similar, regardless of the scale of the race. In particular, collision and other accidents are more likely at club events than during international finals because the competitors are likely to be less experienced and the events have less sophisticated support infrastructures. The size and scope of a risk assessment should be determined by the hazards identified, not the public profile of the event.

Collision was one of the hazards identified by the risk assessment for the race at Dover. However, the mitigation measure - for licensed drivers to be in control of craft - proved to be ineffective. The control measure of the course design minimising the risk of collision referred to the segmented first corner, but in practice this was contradicted by the shortened start run and reduced lap length, which resulted in more congestion than at other venues. Other hazards were missed, including: contact with the special navigation mark on the start run; collision with a safety boat attending an incident; and confusion between different class rules. These had all been foreseen by organisers and officials in one way or another, but none was properly addressed. Whatever its contribution might have been in the planning stages of the race, the risk assessment was effectively useless on the day of the Dover race because none of the senior officials had read it and the SO had not even been given a copy.

The risk assessment for the race at Dover was wholly inadequate in that it failed to identify and quantify many of the risks involved in the race, with the result that appropriate countermeasures were not identified and implemented. Its approval by the race approvals committee suggests that the committee either did not recognise the weaknesses, or was willing to tolerate them. The lack of attention to safety and risk mitigation at three levels – event organisers, race approvals committee and race officials indicates a systemic weakness, which by definition, flowed from a lack of oversight from the top of the organisation.

### **2.6.3 Safety teams**

The safety teams on the water were well resourced, had appropriate skills and responded quickly and professionally to the accident. The decision to land the casualty at the beach instead of the slipway as planned was logical, and describing the patient as having cardiac problems guaranteed a rapid response from the emergency services. That Mr Edmonds, tragically, could not be saved, should not detract from using this accident as a very good example of how a safety team should be organised and respond in an emergency.

### **2.6.4 Conduct of competitors and officials**

A number of events occurred during the Dover race that could have been avoided, specifically:

- Two boats, A11 and A19, followed courses that could have led to them missing out the chicane after buoy no. 5 on the first lap. On realising that they might miss the turn at buoy no. 6, the drivers of the boats had to decide whether to follow UKFFORC rules and carry on through the exclusion zone next to the Prince of Wales Pier, or follow OCR rules and retake the missed mark. In the event, they chose to make abrupt alterations to go round buoy no. 6 just in front of boat A10, forcing it to take avoiding action. A11 went on to demonstrate that the risk of hooking in front of another boat is likely, but fortunately the effect was not severe and collision was avoided.
- Boat A19 twice collided with buoy no. 5, and on each occasion officials chose to replace the buoy while the race continued. Two safety boats, flying yellow flags, moved inside the apex of the turn to replace the buoy, but their presence had no discernible effect on the racers. Both safety boats were extremely vulnerable and any boat hooking at the turn was likely to have collided with them at speed. Yellow flags flown further back down the course might have given the racers a clearer warning, but it cannot be acceptable to put safety boats into a position where there is such a risk of serious collision. Although it is not unusual for a turn buoy to be replaced during a race and the risks are evident, it was not identified in the risk assessment. Better procedures are needed for dealing with buoys damaged during racing.
- Immediately after the collision the leading boat, E10, slowed down to offer assistance as required by the rules. However the next boat, A9, continued to race and soon overtook E10. Despite the two boats competing in different classes, E10 then accelerated rapidly away from the crew of A2, who were in the water nearby, and chased A9 until it was able to overtake. Both boats continued to race while yellow and then red flags were flown. Although the safety boats responded very quickly to the accident, both PB1 and the race instructions stated clearly that safety takes priority over racing at all times. Even though safety teams were on hand, assisting fellow competitors should always take priority over regaining race position.

At Dover, the rules created for the classes racing together were confusing, and did little to promote safe driving styles. Nonetheless, several competitors disregarded warning flags, and demonstrated little understanding of how their manoeuvres put others in danger or risked making an emergency situation deteriorate further. Although it is not possible to predict what action officials might have taken if the accident had not happened, immediate action should always be taken where competitors show disregard for the safety of other racers and safety boat crews.

### **2.6.5 Training and assessment**

Mandatory training for powerboat racers has been resisted by OCR classes because it was perceived to create a barrier to new competitors entering the sport. However, the number of 'basic' club races held each year has reduced due to a decrease in the number of participants and the increasing cost of support infrastructure. This has meant that there are now fewer training opportunities for inexperienced crews, which has increased the likelihood that novice crews will enter the highly competitive national events.

Achieving an acceptable balance between a boat's performance and its stability across a range of water conditions takes knowledge and experience. Advanced racers adjust their engine's trim constantly to optimise boat speed and controllability. Neither the drivers of A89 nor A2 used their trim controls to this extent because they were still developing their driving skills. A driver who, for whatever reason, makes little use of the trim control is more reliant on their boat being suitably set up for novice racing. However, less experienced drivers will not be as competent at judging this condition and there is no assurance that the novice will be able to control their boat safely. It is accepted that racing powerboats are at risk from hooking, but the potential for an increased rate of hooking by inexperienced drivers has not been assessed or addressed.

The crew of A2 did not have enough knowledge or experience to appreciate that a risk of collision could develop so quickly. The courses followed by boats A89 and A2 around buoy no. 8 crossed each other, and separation between the boats could be maintained only if they kept the same relative speed. Once A89 had hooked there was very little time for A2's crew to react, and because their courses intersected a collision was inevitable. The current environment in the sport does not prepare crews for recognising or responding to situations like this.

During the investigation, experienced racers emphasised the importance of the driver and co-driver working together as a team. However, A89's co-driver had not raced in the OCR class before and A2 had had a different co-driver in each of the last three races. Passing a short written test required to gain an event (or subsequently provisional) licence gives race officials only the most basic confidence that an individual is competent to race. The current assessments of provisional licence holders by race officials provide some feedback, but cannot hope to check all the areas of crew performance identified by this accident.

Volunteer race officials must be supported with clear guidelines and regular training seminars to keep them updated on their authority to impose safety constraints or stop crews from racing if they believe it necessary.

In high risk activities there is a direct link between competence and safety. It is in the interest of all competitors and officials that crews are taught the fundamentals of racing and develop their skills to become competent racers. Progression through the different types of powerboat racing licences and admittance to races should be based on an objective assessment that the holder can:

- demonstrate how to set up their boat so that it is controllable in the expected range of racing conditions
- operate the boat effectively in racing situations
- anticipate and identify situations where the risk of an accident is increased, and take appropriate action to minimise that risk
- respond correctly to instructions given during a race and can take the proper action in an emergency.

The investigation into the 2005 accident in Portland Harbour identified training as a significant weakness, and in its response to the MAIB's recommendation the RYA Council reported that it was seeking to establish a club based training programme. Following the accident an improved formal training programme was introduced for junior K-Class racing. However, 5 years after the Portland accident no suitable training programme has been developed which would have benefited the novices in either of the classes racing at Dover. It was still possible to enter a national competition without either training or formal assessment of competence to take part.

#### **2.6.6 Collective crew protection**

Boat A89 was travelling at about 45mph around buoy no. 8 and, as A2 followed it for the majority of the race, it is considered that A2 struck A89 while travelling at a similar speed. The only protection for the crew of A89 was provided by the coaming around the seating area. This was a substantial GRP moulding, but it offered no defence in an impact from another boat moving at 75% of its maximum speed.

It is likely from the location and pattern of damage at the bow of boat A2, that its stainless steel towing point was involved in the impact (**Figure 11**). This was a substantial fitting that did not deform and would only have added to the damage caused. Clearly a towing point is necessary, but alternative designs should be introduced that present less of a hazard in a collision.

Although it cannot be stated with certainty, it is possible that the leg of the outboard engine also struck Mr Edmonds as A2 was launched over A89 and rolled to starboard.

Other classes have developed rules to improve crew protection, such as:

- side impact protection / anti-intrusion bars
- crash resistant cells
- cockpit canopies
- sacrificial structures that deform to absorb some of the forces of an impact.

While it might be impractical to retrofit some of these features to established boat designs, careful review of all classes is required to thoroughly explore and evaluate ways of improving the protection given to the crew by the boat's structure. Protection must be optimised so that it does not create new hazards, such as trapping crew in a capsized boat. If it is considered that improvements cannot be made, the risks of continuing to operate that type or class of boat should be assessed, and other ways found to minimise the hazards.

The RYA lost an opportunity to improve crew protection in offshore circuit racing boats when both the E900 and E1500 classes were introduced with much the same standards of protection as existing OCR class boats. As the national governing body, the RYA should take every opportunity to make improvements to safety. While improving safety in existing classes might have its challenges, it is essential that approval of any new class should be dependent on the latest appropriate standards of safety being incorporated.

### **2.6.7 Helmets**

Although the wearing of helmets which comply with motorcycle standards was introduced for powerboat racing in 2006, this accident demonstrates the limitations of helmets of this type. The localised damage to Mr Edmonds' helmet suggests that it was struck by part of A2 with a relatively small cross sectional area, such as the point of the bow, the towing point, or the leg of the outboard engine.

It is widely accepted that a broad range of helmets is able to meet the motorcycle standards, but that better quality helmets can give greater protection. The Department for Transport introduced the SHARP<sup>6</sup> programme in 2007 to independently test the performance of helmets, with the aim of improving the safety of motorcyclists. The programme estimated that if all motorcyclists wore the most effective helmets, around 50 deaths could be prevented each year.

Helmets are key safety equipment and a fundamental part of risk mitigation. Although an improved helmet might not have altered the outcome of this accident, the RYA should continue to keep the standards of helmet safety under review and offer practical advice so that competitors can make an informed choice. This notwithstanding, racing regulations should require that the most appropriate helmets are worn by competitors.

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<sup>6</sup> Safety Helmet Assessment and Rating Programme, <http://sharp.direct.gov.uk>

## SECTION 3 - CONCLUSIONS

The collision and fatal injuries to the co-driver of A89 were caused by a combination of factors that had been allowed to develop and become common practice in powerboat racing. The RYA's attempts to apply the lessons learned from the accident at Portland Harbour in 2005 were ineffective, and allowed systemic weaknesses in the management of powerboat racing to persist. These set the pre-conditions for this accident.

1. Boat A89 suffered a moderate hook while exiting a turn, and lay across the path of boat A2. The crew of boat A2 did not have enough time to recognise the risk of collision and take effective action to avoid it. [2.3.1]
2. Both of the crews involved had limited racing experience but were allowed to race on a demanding course in a national championship. Any of the less experienced crews that were taking part could have found themselves being involved in a similar accident. [2.3.2]
3. Crews operating the classes of boat used in this race are vulnerable to severe injury in a collision. [2.3.3]
4. The RYA did not have adequate policies to develop, apply and evaluate safety measures in powerboat racing. [2.4]
5. The collective effect of initiatives to encourage growth and participation in the sport eroded safety margins and created an environment where a serious accident was more likely. [2.4]
6. Both competitors and harbour authorities hosting events rely on the RYA's system of governance and race approval to give assurance that there is a safe framework in which racing can take place. This framework was significantly compromised at Dover. [2.4]
7. Lessons from previous accidents over several years have not been identified or shared effectively, preventing the risks in powerboat racing from being understood or addressed. [2.5]
8. Recommendations from the MAIB to the RYA following investigation of a similar accident have not been implemented properly and not as the RYA described at the time. This has allowed a number of systemic weaknesses in its safety management to persist. [2.5.1]
9. While it is not possible to show that the Dover course contributed directly to the collision, it is considered that the combination of course design and the number of boats racing put greater demands on the inexperienced racers taking part, and reduced safety margins. [2.6.1]

10. The RYA's race organisation and approval system had no way of assessing if the race was suitable for the inexperienced racers taking part; did not enforce the rules in PB1; did not properly reconcile rules for multiple classes; and took no action to mitigate the safety weaknesses in the proposed plan before approving it. [2.6.1]
11. Formal assessment of the risks during the organisation and preparation for the event was inadequate and illustrates weaknesses in safety management at every level of the association. [2.6.2]
12. The RYA's policy of only conducting detailed risk assessments for major events did not recognise that the risk to individuals remains similar, regardless of the scale of the race. The size and scope of a risk assessment should be determined by the hazards recognised, not the public profile of the event. [2.6.2]
13. The response to the accident on the water was a good example of how a safety team should be organised and react in an emergency. [2.6.3]
14. Competitors and officials should not take actions which introduce unnecessary hazards into racing. [2.6.4]
15. The rules created for UKFFORC and ORC classes to race together were confusing and did not promote safer driving. [2.6.4]
16. Mandatory training and assessment is required to develop the skills and measure the competence of all powerboat racers. [2.6.5]
17. Volunteer race officials must be supported with clear guidelines and regular training seminars to keep them updated on the authority to impose safety constraints. [2.6.5]
18. Careful review of all classes of powerboat racing boats is required to thoroughly explore and evaluate ways of improving crew protection and minimising racing hazards. [2.6.6]
19. Approval of new racing classes should be dependent on demonstration that safety has been measurably improved. [2.6.6]
20. Standards of helmet safety must be kept under continuous review and only the most appropriate helmets worn by competitors. [2.6.7]



## SECTION 4 - ACTION TAKEN

The RYA began its own investigation shortly after the accident. The investigation concluded that:

- Boat A89 suffered a moderate hook during the turn at buoy no. 8.
- Boat A2 could not have anticipated the sudden change of A89's direction and had no opportunity to take avoiding action.
- The course was too small and had too many turns for the number of boats taking part.
- The serious outcome of the accident might have been mitigated by the boats having side impact protection to shoulder height.

The investigation team identified shortcomings with the race application process and differences in the rules of the classes racing, but did not consider them to have contributed to the accident. The crews' lack of racing experience was not thought to be a contributory factor.

A number of recommendations were made, which have been reproduced in full at **Annex C**. The most notable of these include:

- Side impact protection for crew to be defined and specified. Rule changes reflecting this to be implemented for the 2010 racing season.
- Minimum lap lengths suitable for each class of boat to be specified. The number and type of boats racing together to be considered during applications for race approval.
- Introduction of pre-race training for drivers and co-drivers, and consideration given to requiring all new drivers to have a minimum RYA Powerboat Level 2 qualification.
- All drivers entering national races to hold a provisional licence as a minimum.
- Greater consideration of whether the applicant has adequate boating experience before issuing an Event Licence.
- Examination of existing class rules and consideration given to standardising racing rules across all classes. Mixed class racing to be suspended where the rules of those classes is fundamentally different.

The RYA has been working to develop all these areas and has also introduced operational safety manuals for key officials, OODs and SOs which will be phased into the sport in 2010.

Further, at a meeting of the Board of Directors of the Royal Yachting Association (“Council”) held on Wednesday 16<sup>th</sup> June, a unanimous decision was made to approve the following proposals:

- To affirm its ownership of safety and provide clear guidance and oversight of safety issues covering all levels of the RYA;
- To ensure that its subordinate committees/structures are provided with clearly defined responsibilities, authority and accountability in respect to safety issues;
- To actively promote and develop the culture of continuous safety improvement within its sports; and
- To enhance its systems and procedures for auditing and monitoring safety within the RYA.

Council unanimously approved that the Chief Executive should produce a detailed proposal for a subsequent Council meeting setting out how these proposals might best be implemented.

## **SECTION 5 - RECOMMENDATIONS**

In light of the actions taken there are no recommendations following this investigation.

**Marine Accident Investigation Branch  
July 2010**



Paper for the RYA Powerboat Racing Licence





RYA House, Ensign Way, Hamble, Hampshire SO31 4YA

Paper for the RYA Powerboat Racing Licence

Paper 1

COMPETITOR'S NAME: ALEX EDMONDS	LICENCE NO: E43179
CLASS/ES RACED: 'A' OCR	
EVENT Dover	DATE: 8/8/09
PASS/FAIL: PASS	
Note: If pass, RYA Official must fill out Upgrade form	

Please Tick the Correct Answer

1)

Overtaking

Any overtaking boat must?

- A) Give way to the overtaken boat
- B) Expect the overtaken boat to give way
- C) Jostle for position and see who wins

2)

Retirement Flag

What Colour is the retirement flag?

- A) Red
- B) Blue
- C) Orange

3)

Yellow Cards

A Yellow card may be given for behaviour on the water, how long does it last?

- A) 60 Days
- B) 12 Months
- C) 3 Months

4)

Collision avoidance at Sea

If two vessels are approaching each other head on the following action should be taken?

- A) Both vessels should slow down and wait to see which one will give way.
- B) Both vessels should turn to Starboard for avoiding action.
- C) Both vessels should turn to Port for avoiding action.

Collision avoidance at Sea

Whilst leaving Harbour to enter a race a sailing vessel appears to Port crossing your position from Port to Starboard, which vessel has right of way?

- A) The sailing vessel
- B) Your vessel
- C) Neither vessel

6)

Safety

It is mandatory to wear your crash helmet from?

- A) The moment you are launched until the moment you are recovered.
- B) All the time the boat is on the plane
- C) Only when racing

7)

Safety

Protective race overalls are?

- A) Mandatory
- B) Voluntary
- C) The decision of your race club

8)

Equipment

What is the minimum length of anchor line you should carry?

- A) 30 Meters
- B) 50 Meters
- C) 100 Meters

9)

Race start procedure

What flags will be shown to indicate the start procedure has commenced?

- A) A Green flag followed by a Yellow Flag
- B) A Yellow flag followed by a Green Flag
- C) A Orange flag followed by a Black Flag


10)

Drivers' Briefing

If you do not attend drivers briefing and you do not have special Dispensation what are the penalties?

- A) The Officer of the day tells you off
- B) You are disqualified
- C) You have points deducted from that race

Competitor's Signature:.....*O. Edmund*.....

RYA Official's Signature:..........



Risk assessment for the race at the Dover Regatta





# RYA POWERBOAT – Risk Assessment



Event: Dover Regatta UKFFORC, AYC, SEPA	Classes: E1500, E900, F400 S250& OCR A/B Thundercats	Reference: UKFFORC RA 004	Completed By: [REDACTED]	Date: 10/07/2009
Club:  People affected / at risk of being harmed: Participants, Club Officials, venue staff and members of the public				

No	Hazards	Possible Affects / Harm	Pre Control Risk Rating			Existing/Required Controls	Residual Risk Rating		
			High	Medium	Low		High	Medium	Low
1	Boat collision	Crush/impact injury. Cut/laceration or broken bones. Damage to craft.	✓			Course design to minimise potential for collisions. Only licensed drivers in control of craft. Course controlled by dedicated safety craft. All members of public excluded from course and beech area during racing.			✓
2	Fire, fuels & oils	Burns, scolds or explosion. Environmental impact		✓		100% no smoking imposed on pit area. Boats to meet PB1 safety requirements. All crew to wear appropriate protective clothing. Dry Powder/CO2 type extinguishers posted in pit and beech areas. Spill control materials provided. Fuelling only in permitted location. Water supply to treat any burn type injury			✓
3	Vehicle movements/ beech activities	Crush/impact injury or broken bones		✓		Marshals to control all vehicle/trailer movements. Non essential personnel to be excluded from movement/ beech areas. Qualified Paramedic in attendance.			✓

Continue on additional sheets where necessary



Letter to the MAIB from the Powerboat Racing Manager on 1 August 2006



MAIB  
- 2 AUG 2006  
RECEIVED



**APPENDIX 1 TO MAIB  
RECOMMENDATION NUMBER 2006/144**

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**IMPLEMENTATION OF MAIB'S RECOMMENDATION to:**

"Consider the safety issues arising from this accident, and develop a pro-active safety management system which is subject to an independent audit by a professional body, to ensure effective oversight of powerboat racing. Particular attention should be given to developing procedures for the oversight of the K Class racing classes."

Extract from the RYA Council meeting held at the Royal Thames Yacht Club, London 21 June 2006:

**"Minute 22.3**

**JUNIOR POWERBOAT RACING ACCIDENT IN PORTLAND HARBOUR ON 19 JUNE 2005**

Council had received extracts from the report by the Marine Accident Investigation Branch (MAIB) into the collision between 2 Sorcerer Powerboats during a junior racing event at Portland Harbour on 19 June 2005. A 13 year old boy had suffered serious injuries when the powerboat in which he was co-driver was struck by another race boat during a K-200 class Junior Offshore National Championship.

Following this incident, the safety and technical committees immediately suspended K-200 class racing for 8 to 12 year olds and at the same time implemented an internal enquiry. As a result of the enquiry the RYA commissioned an independent body to carry out a full investigation into the suitability of the helmets which were being used in the sport. The report recommended that all helmets should be to BS6658 or higher.

The Powerboat Racing Chairman, [REDACTED], reported that the recommendations of this report had been widely circulated within the sport and standard approved helmet stickers had been found which would be issued to all competitors who met the standard and would be readily recognisable to scrutineers at future events. In addition, a comprehensive new training programme for K class competitors had been implemented and an independent review of standards of K-class competitors was well advanced.

The Training Chairman questioned whether the RYA should be supporting powerboat racing for children. As the President pointed out youngsters were naturally drawn to pursuits involving speed and excitement, and it was better for the RYA to oversee it and set the standards. The Chief Executive agreed. He maintained that the RYA was best placed to do this. It would ensure that the appropriate measures were put in place to allow all those who wanted to compete, regardless of age, to do so in a safe and responsible manner. Powerboat racing for children might be perceived as dangerous but, in reality, was it any more dangerous than high wind racing or windsurfing for 13 year olds? [REDACTED] added that it had been agreed that head to head racing in the K-200 class for 8 to 12 year olds would no longer be acceptable.

**Council unanimously approved the following MAIB recommendation:**

**The Royal Yachting Association is recommended to:**

**Consider the safety issues arising from this accident, and develop a proactive safety management system which is subject to an independent audit by a profession body, to ensure effective oversight of powerboat racing. Particular attention should be given to developing procedures for the oversight of the K-class racing classes.**

**It also approved the following timetable for the development and implementation of the safety management system, namely:**

- **12 months (maximum) to develop and trial the new system and develop the audit trail.**
- **Thereafter, a further 6 months to consider the most appropriate verification and audit mechanism.”**

Actions taken to date by the RYA to develop a pro-active safety management system with particular reference to K Class racing classes:

**K250 CLASS** – All racing has been suspended in the 8-12 year old class.

**K CLASS RACING – NEW RACE TRAINING PROGRAMME** – Implemented February 2006. An independent RYA assessment of the competency skills of all junior K Class competitors was carried out on 4 March as part of an annual ongoing safety review.

**NEW RACE TRAINING PROGRAMME OTHER JUNIOR CLASSES** – Implemented February onwards.

**NEW GENERAL RACE TRAINING PROGRAMME FOR OFFSHORE ADULT CLASSES** – The RYA is in consultation with the Safety and Race Administration committees with a view to establishing a new club based training programme for competitors who are new to the sport and for those seeking licence upgrades.

**ANNUAL SAFETY SEMINARS** – The RYA, again in consultation with its Safety and Race Administration committees, has requested that Jet Sport, Circuit and Offshore arrange a Safety Seminar on a yearly basis. The purpose is to record and update the competent skills of RYA Officials.

**INDEPENDENT SAFETY AUDIT** – This either be by use of an established quality assurance organisation and/or by the development by an audit mechanism specifically designed for the needs of powerboat racing safety in the marine environment. The Powerboat Racing Committee will be making recommendations on the constitution of this group following their meeting of the 23 August 2006.

**HELMET SAFETY** – The RYA commissioned an independent study by QinetiQ to research into the suitability of helmets available within the sport. The results of this report were made available from the second week in April and circulated to the sport in general. The current information relating to use of helmets is currently set out on the RYA website:



**" HELMET RULE AMENDMENT  
SAFETY BULLETIN JUNE 2006**

- Competitors are reminded that it is mandatory to wear a helmet made to a minimum of BS 6658.B or a similar standard to include UN ECE22-05, and Snell M2000, M2005.
- **Class rules as published in PB1 and PB2 plus current JSRA rules, relating to the colour of helmets must be adhered to. General racing rules require helmets to be coloured predominantly orange, at least 50%.**
- It is recommended that for craft capable of over 80 MPH the helmet complies with BS 6658.A or Snell SA2000, SA2005
- It is also recommended that helmets are replaced when they reach five years old from date of manufacture.
- RYA Scrutineers will examine helmets at all race meetings and will shortly be issuing competitors with RYA approved stickers indicating that the competitor's helmet complies with the above minimum standards.

Note: When a helmet is first produced for scrutineering the wearer *must* prove compliance with the above standards; this may be by means of product literature. Once the scrutineer is satisfied; the helmet will be marked with a "RYA helmet approved date sticker". Proof of *compliance* will then no longer be required for subsequent races until the following season.

***RYA Scrutineers will however reject any defective or damaged helmets found during scrutineering."***

**RYA COMMISSIONERS** – A decision was taken by the Offshore Racing Committee that all future K Class events would be subject a visit by an independent RYA Commissioner who would be responsible for checking all aspects of safety and course design. This was implemented at the beginning of the racing season and copies of the Commissioners' reports are held in RYA HQ.

**SPOT CHECK COMMISSIONERS (ACTIVE AUDITORS)** – This system was recommended by the Race Administration Group. A selection of senior, experienced, independent officials have been listed and are currently being tasked with visiting race venues on a 'no notice' basis.

**INCIDENT/ACCIDENT REPORT FORMS** – It has been mandated by the Powerboat Racing Committee that all Incident/Accident Report Forms are to be returned immediately to the RYA, and these forms are then sent to the main Powerboat Racing Committee Chairmen and Co-optees, Safety and Technical Committees and our Insurers, for appraisal and further discussion/action.

A yearly analysis is currently being maintained to establish any significant 'patterns' or trends of accidents.

**RISK ASSESSMENT** – The RYA Race Approvals Committees now requires all clubs to submit a comprehensive risk assessment with their Race Approval applications.



Recommendations from the RYA's investigation



## SECTION 5 - RECOMMENDATIONS

### **A Safety Structures:**

- A1 The Board strongly recommend that SAT consider a final definition and specification for side-impact protection for the crew and implement a ruling accordingly for the 2010 season.
- A2 As this would be a structural change, 'side-impact protection' should be an additional item on the boats' Measurement Certificate.

### **B Scrutineering:**

Attention should be paid at all events to the fitting of helmets, particularly in the case of a new or substitute competitor – as was carefully achieved in this instance.

### **C Lap Lengths:**

- C.1 SAT should consider a minimum lap length suitable for each class of racing.
- C.2 Course Approval Committee should carefully consider the lap length proposed in the Race Application with regard to the number of boats and type of classes proposed to be racing together.
- C.3 Even if circumstances require a submitted course/lap to be altered at an event, the minimum lap length should be adhered to.

### **D Training:**

- D1 The Board recommend that the RYA urgently reviews pre-race training for all classes of powerboat racing.
- D2 Training programmes should be devised to include both drivers in control of the boats and co-drivers who act as navigators. The programmes should include classroom theory as well as on water practical racing applications for all newcomers to the sport.
- D3 The RYA should consider a minimum qualification of Powerboat Level 2 for all new drivers, including those entering basic events.
- D4 Following the Seminar for race officials set for December 5<sup>th</sup>, the ORC and RAM should ensure that the bulk of the subsequent training sessions take place before the summer of 2010.

### **E Licensing**

- E1 The Board recommend that the RYA reconsider the various licences to be used at each level of racing, particularly the use of Event Licences.
- E2 Drivers at national race level should hold a provisional licence or better. Event Licences should not be used.

- E3 Drivers applying for a provisional licence should supply a fully detailed C.V. of their boating experience. This should also apply to all Event Licence applicants in both basic and national races in all categories, except for the categories of passenger, press and VIP who may be on board boats in larger classes in addition to the driver and co-driver.
- E4 In view of the training programmes recommended above, consideration should be given to annual licences being specific to the competitors' roles i.e. a driver's licence and a co-driver's licence.
- F Racing Rules:**
- F1 The current practice of allowing each class to write their own rules has resulted in different rules per class for the same on-water issues, particularly as outlined in Section 2 – Item 5.  
The Board recommend that the RYA examines the specific class rules in PB1 with a view to standardising the racing rules.
- F2 Until an outcome from F1 has been determined, there should be no further mixed class races between classes with fundamentally differing race rules.
- G Measurement Certificates:**
- G1 The Board recommends that measurement Certificates be renewed annually at minimal cost to the competitor. Thus change of owner, boat name, boat colours, boat structure, boat damage and any other changes will be properly recorded.
- G2 PB1 Rule J7 should be revised as this rule for OCR conflicts with PB1 Rule D1 (c) on measurement certificates.

*Signed:* \_\_\_\_\_

*Signed:* \_\_\_\_\_

*Signed:* \_\_\_\_\_

*Date:* \_\_\_\_\_