ACCIDENT REPORT

MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

Report on the investigation of

the collision between two

fire and rescue service boats

resulting in one fatality

River Cleddau, Milford Haven, Wales

17 September 2019

VERY SERIOUS MARINE CASUALTY REPORT NO 17/2020 NOVEMBER 2020

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

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NOTE

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AET	-	Appliance, Equipment, Technical instruction for fire service boats
AWOA	-	All Wales Operational Assurance
DEFRA	-	Department for Environment Food and Rural Affairs
FRCO	-	Flood Rescue Concept of Operations
FRS	-	Fire and Rescue Service
GMDSS	-	Global Maritime Distress and Safety System
hp	-	horsepower
kts	-	knots (nautical miles per hour)
m	-	metres
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine guidance note
MHPA	-	Milford Haven Port Authority
MWWFRS	-	Mid and West Wales Fire and Rescue Service
NFCC	-	National Fire Chief's Council
RBO	-	Rescue Boat Operator
RIB	-	Rigid Inflatable Boat
RYA	-	Royal Yachting Association
SRT	-	Swift Water and Flood Rescue Technician
WRBO	-	Water Rescue Boat Operator
VHF	-	Very High Frequency

TIMES: all times used in this report are UTC + 1 unless otherwise stated.

SYNOPSIS

At about 1125 on 17 September 2019, two fire and rescue service boats - a 4.7m Zodiac Milpro inflatable boat and a 6.4m Delta rigid inflatable boat - were in collision while undertaking boat training and familiarisation on the River Cleddau near Milford Haven, Wales. The collision resulted in one of the firefighters who was taking part in the training on board the Zodiac, being struck by the Delta RIB and sustaining fatal injuries. The collision occurred because both boats were operating at speed and carrying out un-coordinated manoeuvres in the same stretch of the river. The Delta RIB's helmsman attempted to pass between the Zodiac and the shoreline as his boat exited a large turn made at speed. The Zodiac's helmsman, initially unaware of the Delta RIB approaching, turned his boat sharply to port as part of his training manoeuvres, which resulted in the boats heading towards each other. The subsequent action taken by both boats to avoid a collision was unsuccessful.

The MAIB investigation found that the accident could have been avoided had the training activities been properly planned. Furthermore:

- No-one was in overall charge of the training and familiarisation activities, so they were not properly managed, briefed or communicated between the crews of both boats.

- The operation of the boats did not adhere to the requirements of the local standard operating procedures or risk assessments.

- The standard operating procedures for all fire and rescue service boats in the Mid and West Wales Fire and Rescue Service were insufficient in content and contained incorrect information.

- The generic risk assessment for boat operations was inadequate.

- The Fire and Rescue Services in the United Kingdom did not operate boats to a common standard or code of practice when not employed on flood rescue duties.

Mid and West Wales Fire and Rescue Service has undertaken its own internal investigation; has implemented a peer review by two other fire and rescue service authorities for various activities, including boat operations; and has reviewed and updated its standard operating procedures and risk assessments for fire service boats. Mid and West Wales Fire and Rescue Service has been recommended to review the crewing and staff qualification requirements for its boats, implement measures to maintain crew competency as boat helmsman, and improve its auditing process to include its boat operations. The National Fire Chief's Council has been recommended to adopt a nationwide standard of boat operations for all craft capable of being operated at sea by any fire and rescue service across the United Kingdom.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *N207* AND *RESCUE 1* AND ACCIDENT

SHIP PARTICULARS		
Vessel's name	*N207*	*Rescue 1*
Type	Zodiac Milpro FC470	Delta 6.4 Rigid Inflatable Boat
Registered owner	Mid and West Wales Fire and Rescue Service	Mid and West Wales Fire and Rescue Service
Manager(s)	Milford Haven Fire and Rescue Service	Milford Haven Fire and Rescue Service
Construction	Duratane™ fabric	Glass Reinforced Plastic hull, Hypalon tubes
Year of build	2017	2001
Length overall	4.7m	6.4m
VOYAGE PARTICULARS		
Port of departure	Gelliswick	Gelliswick
Port of arrival	Neyland	Neyland
Type of voyage	Training	Familiarisation
Cargo information	n/a	n/a
Crewing	3	2
MARINE CASUALTY INFORMATION		
Date and time	17 September 2019; 1125	
Type of marine casualty or incident	Very Serious Marine Casualty	
Location of incident	River Cleddau	
Place on board	Forward starboard bow	Forward bow
Injuries/fatalities	One fatality, one minor injury	None
Damage/environmental impact	Superficial damage to boat	None
Ship operation	n/a	n/a
Voyage segment	n/a	n/a
External & internal environment	Lt airs, smooth water, good visibility	
Persons on board	3	2

1.2 BACKGROUND

The Mid and West Wales Fire and Rescue Service (MWWFRS) was required by Welsh Assembly legislation to provide a flood rescue service within its operational area. Its Milford Haven fire station had two rescue boats: a 4.7m Zodiac Milpro inflatable boat, callsign N 207 (*N207*) **(Figure 1)**, which was used principally for flood rescue; and a 6.4m Delta rigid inflatable boat (RIB), callsign Rescue 1 (*Rescue 1*) **(Figure 2)**, which was used primarily to assist firefighters in the event of an emergency at the local oil and gas terminal jetties.

On the evening of 16 September 2019, a hazardous material spillage de-contamination exercise, planned for the following day at the Milford Haven fire station, was cancelled. The 10 firefighters scheduled to undertake the exercise discussed alternative training options and agreed to assemble at the station and take the boats out for boat handling practice and flood rescue training. This decision was made because two of the firefighters were due to travel to North Wales 2 days later to complete Water Rescue Boat Operator (WRBO) training on the Menai Strait using boats identical to *N207*.

Figure 1: *N207* (Zodiac Milpro FC470)

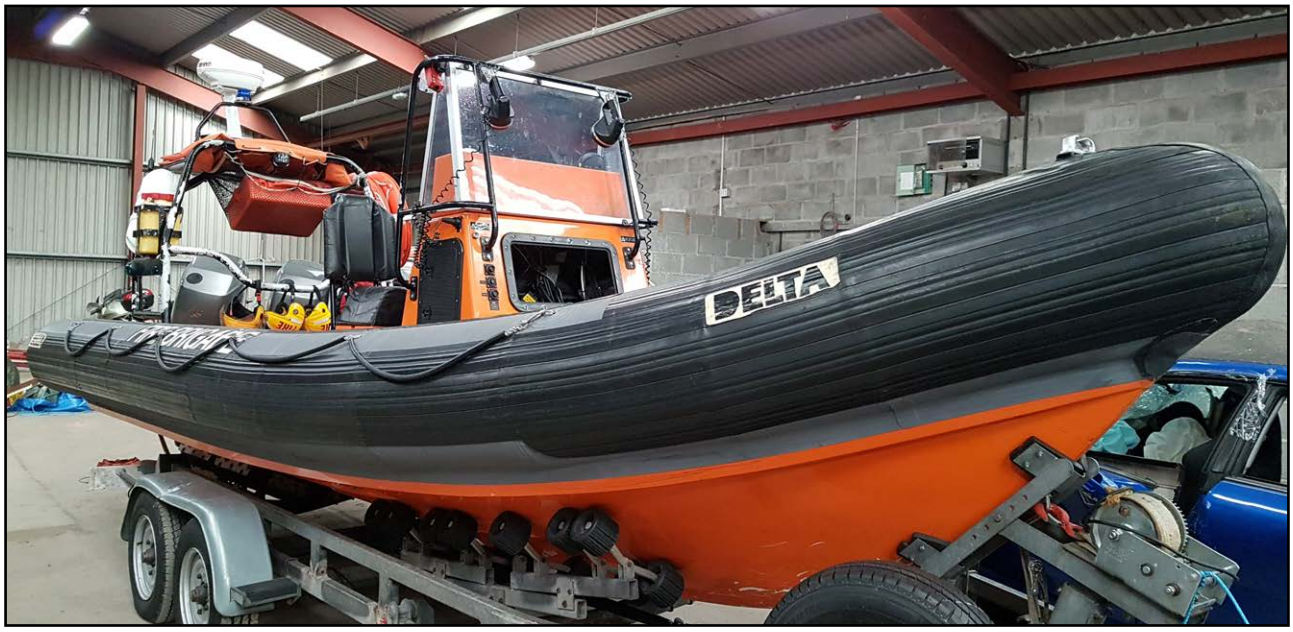

Figure 2: *Rescue 1* (Delta 6.4 RIB)

1.3 ENVIRONMENTAL CONDITIONS

The wind was variable in direction and had a strength of force 1 to 2. It was a sunny day with very few clouds. The temperature was about 19°C and the visibility was excellent.

High water at Neyland was at 0828 with a height of 6.72m, and low water was at 1430 with a height of 1.10m.

1.4 NARRATIVE

At about 0800 on 17 September 2019, the 10 firefighters assembled at Milford Haven fire station and were split into two teams of five. One team was chosen to go out in the boats during the morning while the other manned the fire station. The plan was to swap the teams at lunchtime. At about 0830, following a short discussion, the morning boat team was split into two groups. One of the firefighters was also a WRBO instructor (hereafter referred to as the trainer) and he and the two WRBO trainees were assigned to *N207*. The two remaining firefighters, each of whom held the rank of crew manager, were assigned to *Rescue 1*.

N207 was made ready at the fire station, then towed down to a launch site at Gelliswick **(Figure 3)**. When they arrived, the three firefighters donned their dry-suits, boots and Palm Rescue 800 buoyancy aids. The boat was equipped with Nitro XT water safety helmets, but they were not worn by the crew. At 0938, the firefighters launched and boarded *N207*. One of the firefighters secured the engine kill-cord to his wrist and took the helm; the trainer positioned himself in the middle of the boat and the other firefighter sat in the bow. In the meantime, the towing vehicle and trailer returned to the fire station to collect *Rescue 1*.

At about 0945, *N207* left Gelliswick and was steered eastwards through the Milford Haven waterway and toward the Cleddau bridge. While en route the trainer pointed out different types of buoyage to the firefighters, discussed tides, and talked about his plans for the morning. At the bridge, the trainer asked the firefighters to practise some swift water boat manoeuvres. However, the flow of the ebbing tide at the bridge was insufficient to practise some intended rope and engine work, so they moved the boat a short distance upstream to an old fish farm structure on the south shore where the tide was ebbing with more strength. The firefighters then swapped places and the second firefighter took over the helm.

At 1050, *Rescue 1* was launched with the two crew managers on board. Each was wearing a dry-suit, boots and Crewsaver Offshore 290N inflatable lifejacket. *Rescue 1* was equipped with Geko open face marine safety helmets, but they were not worn by either crew member. The helmsman positioned himself on the port side of the boat behind the steering wheel, and secured the engine kill-cord to his lifejacket. The other crew manager, who was seated on the starboard side next to the helmsman, assumed the role of crewman and used a hand-held VHF radio to inform the local coastguard that *Rescue 1* was on the water. He also explained that they would be engaged in training activities in the eastern part of Milford Haven waterway and in the River Cleddau.

Rescue 1's helmsman steered the RIB eastwards, under the Cleddau bridge, and met up with *N207* at the disused fish farm structure. During a shouted discussion between the two boat crews it was agreed that each would make their way independently upstream, practising operating the boats at high speed, and rendezvous again at Mill Bay on the south shore **(Figure 3)**.

Image courtesy of Google Earth

Figure 3: Milford Haven and River Cleddau

As there were no speed restrictions in that part of the river, both helmsmen proceeded ahead at, or close to, their boat's full speed. *Rescue 1*, which was travelling at a speed of about 28kts, arrived at Mill Bay ahead of *N207*, which was being driven at its full speed of 16kts.

By about 1115, both boats had arrived at Mill Bay and were rafted together, drifting about 20m from the south shore and pointing upstream. As they drifted, the crews discussed the local topography, the nature of the riverbed and local depths of water. During the conversation they agreed to proceed further upstream to the area of Lawrenny and rendezvous again there.

> Note: The accounts of the witnesses with regard to the events after the boats left Mill Bay are not wholly consistent, and this section of the narrative is based upon the investigator's understanding of the most likely sequence of events.

Shortly after 1120, the two boats parted, with *Rescue 1* proceeding ahead and accelerating to about half full speed. Meanwhile, *N207* proceeded upstream at variable speeds, with its helmsman sitting on the starboard side of the boat practising manoeuvres that involved large course alterations. *N207*'s trainer was sitting in the middle of the boat with his back against the port side tube, facing to starboard. The other firefighter, Josh Gardener, was sitting in the bow on the port side **(Figure 4)**.

Once ahead and clear of *N207*, *Rescue 1*'s helmsman commenced a large full-circle turn of the boat to port **(Figure 5a)**. As the boat neared the end of its final turn to port travelling at about 15kts, the helmsman saw *N207* ahead of him in the distance, slightly to port, and noted that it now appeared to be headed downstream towards Mill Bay **(Figure 5b)**. He decided to pass between *N207* and the shoreline. As *Rescue 1* came out of its turn, the helmsman's attention was briefly taken away from *N207* and was split between operating the steering in front of him, checking the engine gauges, and controlling the throttles.

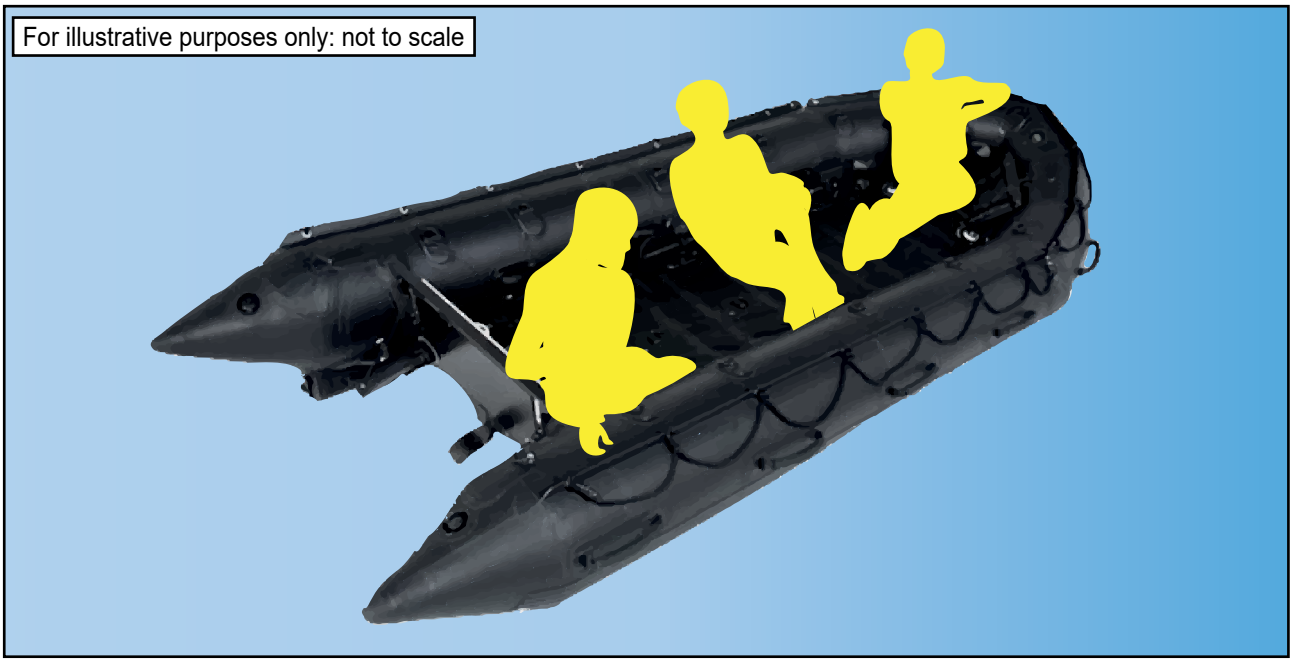

Figure 4: Location of crew in *N207*

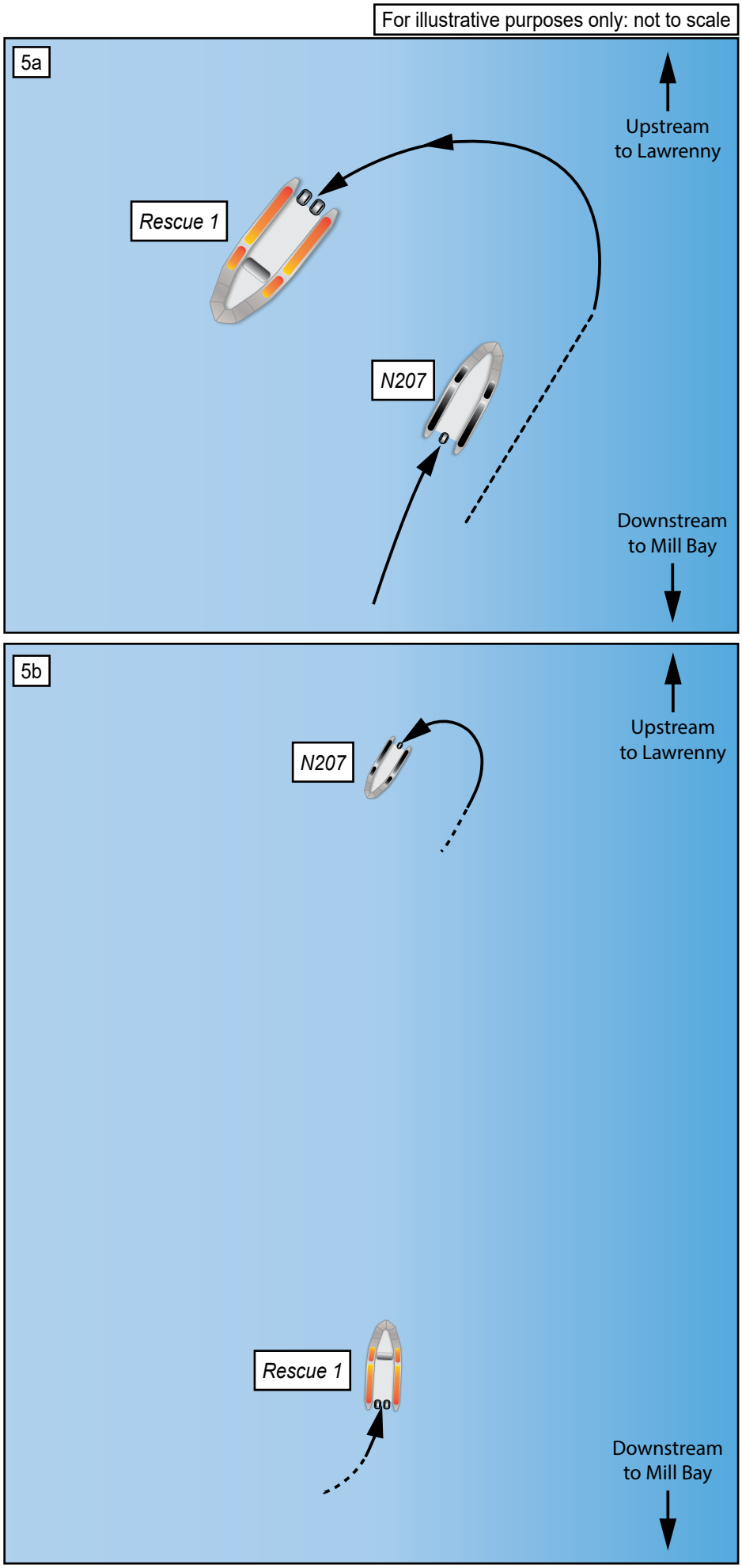

Figure 5: Tracks of boats before collision

After turning *N207* to port and now headed downriver, the helmsman saw *Rescue 1* closing rapidly in front of him. In an attempt to avoid crossing ahead of it, he pulled the outboard motor tiller sharply towards him to turn the boat further to port. The trainer saw that *Rescue 1* was fast approaching, and realised that they were on a collision course. He shouted a warning to the helmsman and pointed at *Rescue 1*. When *Rescue 1*'s helmsman looked ahead, he saw *N207* close in front of him and attempted to avoid a collision by increasing speed and turning full helm to starboard **(Figure 6)**. At about 1125, despite the attempts of both helmsmen, the two boats collided.

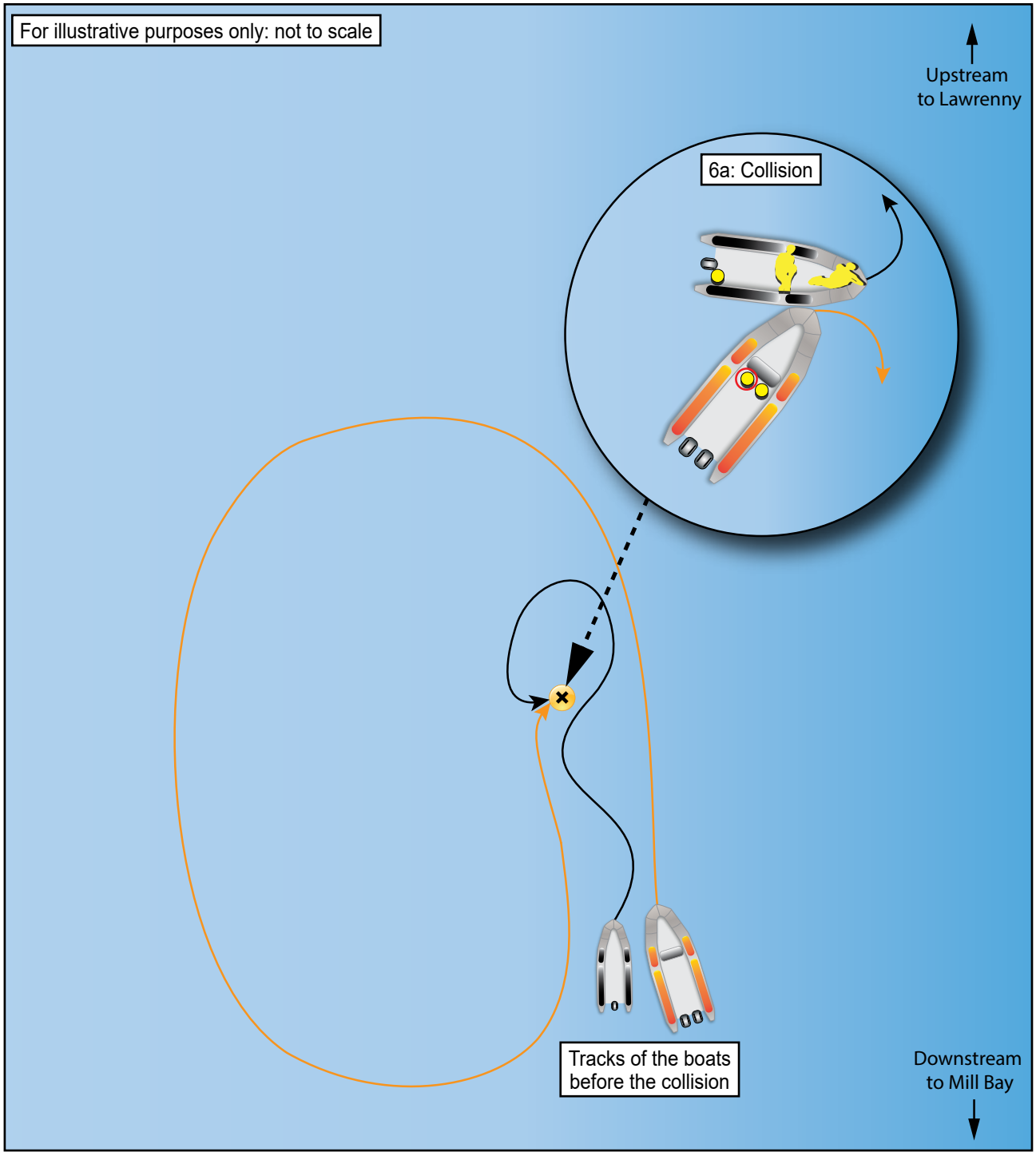

Figure 6: Manoeuvring leading to the collision

Rescue 1's bow struck *N207* in the middle of the boat at an angle of about 45° and rode over its buoyancy tube toward its bow **(Figure 6a)**. *Rescue 1*'s helmsman pulled his kill-cord, which stopped the boat's engines. The force of the impact threw *N207*'s helmsman forward, which pulled out his kill-cord and stopped the boat's engine. The firefighter in the bow of *N207* was knocked or thrown into the water. He was struck on the head during the collision and as the boats separated was seen floating motionless on the water.

1.5 EMERGENCY RESPONSE

N207's trainer immediately jumped into the water to attempt to rescue the casualty, but it quickly became apparent to him, from the severity of the injuries, that the firefighter was dead.

Rescue 1 was manoeuvred alongside the casualty in the water, and his body was recovered onto the boat using the onboard casualty recovery equipment. The trainer climbed back into *N207* and brought it alongside *Rescue 1*. He then transferred into the bigger boat with *N207*'s remaining crewman to assist.

At 1127, the crew manager who had been acting as crew on *Rescue 1* made a telephone call to the fire station watch manager and told him what had happened. At 1129, he called the emergency services and reported the accident.

While the phone calls were being made, *N207* was placed under the casualty recovery equipment and secured alongside *Rescue 1*. The deceased's body was then lowered into the smaller boat, placed in a body bag, and covered over. *Rescue 1* then motored slowly downstream toward Neyland yacht club.

At 1145, while on passage downstream, the crewman on board *Rescue 1* received a call from the local ambulance service to verify that attempts at resuscitation could not be carried out by the firefighters, and to inform them that they would be met on arrival.

At 1155 *Rescue 1* arrived at Neyland yacht club pontoon, where they were met by members of the police, ambulance service and fire and rescue service (FRS). The casualty was formally declared deceased by a paramedic from the ambulance service.

All crew of the two boats were breathalysed by the police; all recorded a zero-alcohol result.

A postmortem external examination carried out by a pathologist a few days later confirmed that the casualty had died as a result of a severe head injury.

1.6 BOATS' CREWS

1.6.1 *N207*

Firefighter Josh Gardener had joined the FRS on 10 September 2018. Prior to this, he had worked at sea on small craft operating in offshore windfarms. He had completed the Royal Yachting Association (RYA) powerboat level 2 training in June 2019.

The trainer held the rank of firefighter and had worked in the FRS since 1996. He held a RYA advanced powerboat operator certificate that had been commercially endorsed, as well as RYA Day Skipper for Sail and Power Craft, RYA radar operator certificates and GMDSS[1] radio operator certificate of competency. He was also qualified to instruct both the RYA powerboat level 2 scheme and the FRS WRBO course, and would periodically act as an instructor at the fire service RYA approved training schools. Several of the trainer's qualifications had been obtained by the trainer at his own expense, including his commercial endorsement.

The other crew member of *N207* also held the rank of firefighter, and had joined the full-time FRS in January 2019. He had previously worked as a retained part-time firefighter since 2013. He had also completed the RYA powerboat level 2 training in June 2019.

1.6.2 *Rescue 1*

Both crew on board *Rescue 1* were very experienced firefighters and both held the rank of crew manager within the fire service. As designated boat operatives, they had both gained the RYA powerboat level 2 qualification and had completed the WRBO training at Menai. Neither held any other marine qualifications.

1.7 MID AND WEST WALES FIRE AND RESCUE SERVICE

1.7.1 Overview

MWWFRS has a legal responsibility under the Fire and Rescue Services Act 2004 to make provision for fire-fighting purposes to protect life and property from fire, and to attend road traffic collisions and other emergencies. In addition, the Fire and Rescue Services (Emergencies) (Wales) (Amendment) Order 2017 introduced a duty requiring MWWFRS to make provision to respond to flooding and inland water emergencies.

The Department for Environment, Food and Rural Affairs (DEFRA) produced a Flood Rescue Concept of Operations (FRCO), which set out the processes for managing and maintaining flood rescue capability. DEFRA also controlled the process for the national co-ordination of flood rescue assets in England and Wales. Six Zodiac Milpro FC470 boats were operated by MWWFRS and were identified within the national asset register. Their operation and local procedures followed the DEFRA FRCO requirements.

1.7.2 *N207*

N207 was one of 16 Zodiac Milpro FC470 inflatable boats purchased by North Wales FRS in October 2017 using a grant from the Welsh Government for flood rescue service. It was one of six boats subsequently transferred to MWWFRS in March 2018 as an equipment upgrade to replace older boats that had come to the end of their service life. The six boats were deployed around the MWWFRS region, with *N207* being allocated to Milford Haven. All of the boats were fitted with a long-shaft Mariner 30hp 4-stroke outboard engine with throttle-controlled gearbox, a propeller guard, and were supplied on a trailer. This model of boat was also fitted with speed tubes on the hull underwater, which provided lift and lateral stabilisation,

[1] GMDSS – Global Maritime Distress and Safety System

thereby reducing drag and improving both stability and manoeuvring capability. This type of boat was referred to as a Swift Water and Flood Rescue Technician (SRT) boat.

1.7.3 *Rescue 1*

Rescue 1 was a Delta 6.4m RIB that came into service with MWWFRS in 2001 to replace a boat that had come to the end of its service life. It was fitted with twin 90hp two-stroke engines, which were not fitted with propeller guards, and was stored on a trailer at the fire station. The engine throttles and gauges were to the right of the steering wheel in the middle of the console in front of the crew **(Figure 7)**. A large windscreen was mounted on top of the console, which was surrounded by a tubular framework **(Figure 8)**. When standing astride the boat's jockey seat, the helmsman's view was not obstructed by the windscreen and framework. However, when standing, the helmsman partially obstructed the seated crewman's field of view to port.

Figure 7: Console arrangement of *Rescue 1*

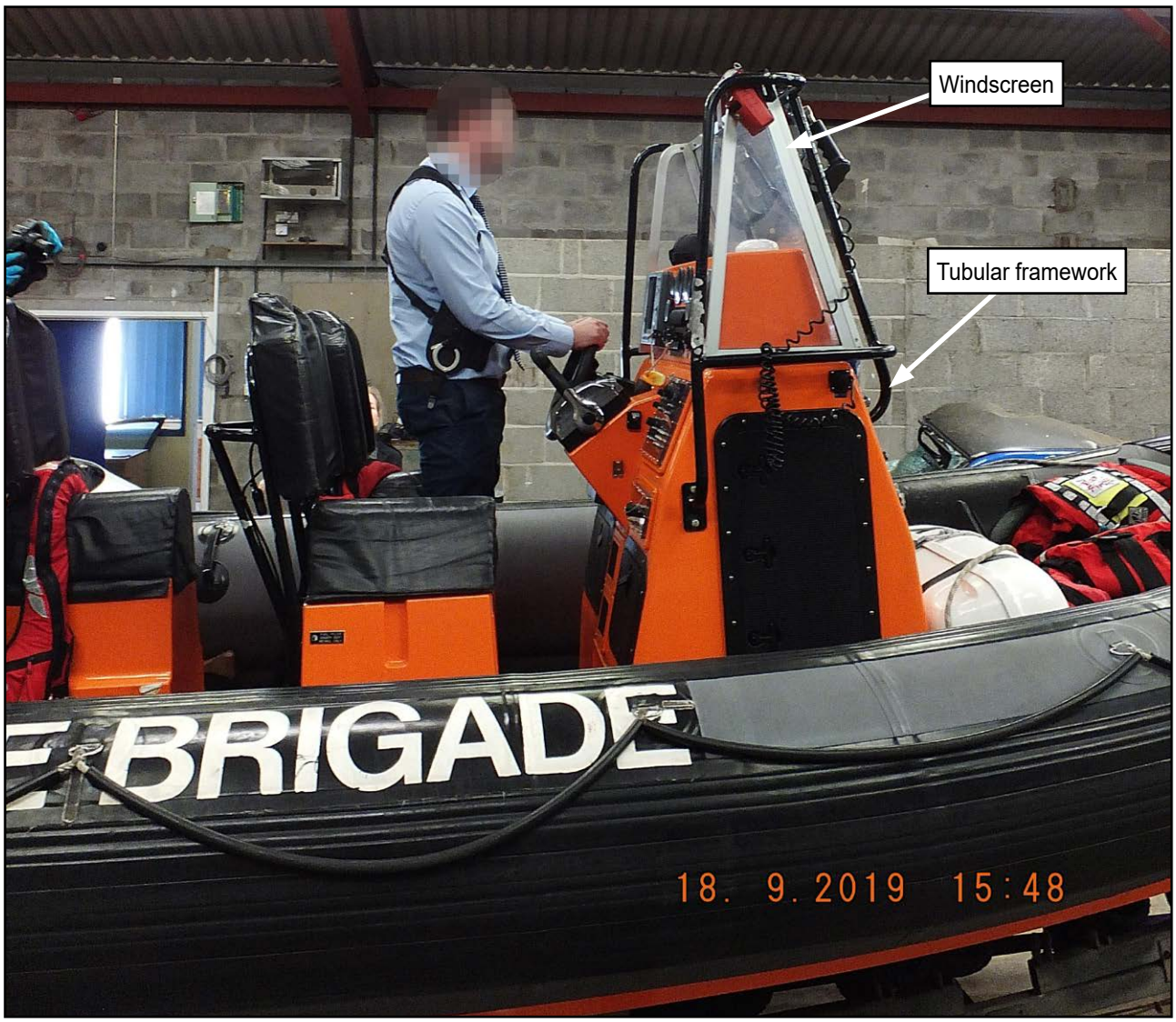

Figure 8: Windscreen of *Rescue 1*

The boat originally had a dual function of providing an operational platform for an FRS dive team, and supporting firefighters working on the oil and gas terminal jetties in the Milford Haven waterway. It could also be used as a transport platform to support an emergency response to local offshore islands.

To enable it to operate in areas outside of Milford Haven waterway, *Rescue 1* was initially coded to the Maritime and Coastguard Agency (MCA) Merchant Shipping (Small Workboats and Pilot Boats) Regulations 1998. However, shortly after the RIB came into service, the dive team was disbanded. As a result, *Rescue 1*'s certification of compliance to the code was not renewed at the end of its validity period. MWWFRS completed an analysis to establish the need to maintain *Rescue 1* as an operational asset subsequent to the disbanding of the dive team and, at that time, it was decided to keep the RIB in service.

1.7.4 Boat procedures

The MWWFRS documented management system was available to staff via its '*@Work*' intranet portal. Within this there were two procedures related to the operation of *N207* and *Rescue 1*, each of which had an associated risk assessment. These were Standard Operating Procedure (SOP):

- SOP 2.8 - Flooding **(Extracts at Annex A)**
- SOP 2.10 - Rescues; Working Near, On, Or in Water [sic] **(Extracts at Annex B)**.

SOP 2.8 was mainly concerned with inland water operations and only made reference to *Rescue 1* as an asset:

> *Milford Haven also has a larger boat (Rigid Inflatable Boat) that may be suitable for Large Flooding Incidents.*

SOP 2.10 stated that:

> *This Standard Operating Procedure (SOP) considers hazards, risks and control measures for fire & rescue service personnel attending incidents involving rescues; working near, on, or in water. It incorporates the Generic Risk Assessment outcomes of MWWFRS Risk Assessment RA(SOP)2.10.* [sic]

SOP 2.10 made no reference to *Rescue 1*.

The risk assessments for each of these SOPs did not include any reference to the various hazards of working in a boat, or using it as a platform for operations.

In addition to the SOPs, MWWFRS produced an '*Appliance, Equipment, Technical Instruction for Fire Service Boats*' (AET) number 5.17 entitled '*Appliance, Equipment, Technical Instruction for: Fire Service Boats*' **(Extracts at Annex C)**.

This document stated:

> *The Service has a duty to make a suitable and sufficient assessment of the health and safety risks to employees and to provide them with comprehensive and relevant information on the risks identified.*
>
> *The document examines the hazards, risks and control measures relating to fire service personnel using the **Fire Service Boats**.* [sic]

Section 2.1 of the document defined the qualifications required by MWWFRS to be held by the crew:

> *SRT Boats*
>
> *SRT boats are crewed by personnel trained and competent to RYA (Royal Yachting Association) Level 2 as a minimum. If operating in swift moving water then the crew must be trained and competent to Rescue Boat Operator (RBO) level as a minimum.*

RIB

The only RIB within the service is based at Milford Haven and the crews will hold the following additional qualifications

RYA advanced powerboat certificate (for all helms) Radar course

GMDSS (Global Maritime Distress Safety System). [sic]

While the trainer in *N207* held the qualifications required by MWWFRS within AET 5.17 to operate *Rescue 1*, neither crew manager in *Rescue 1* had the stipulated qualifications required to operate the RIB.

1.7.5 Risk assessments

All senior station staff within MWWFRS had undertaken formal training in the development of risk assessments, and station staff were very experienced in undertaking dynamic risk assessments.

MWWFRS produced a '*Health and Safety Procedural Guidance Document 5.19 – Risk Assessment*' **(Annex D)**.

This document provided guidance for those carrying out risk assessments, and Appendix B of the document specifically focused on training risk assessment.

There were no generic risk assessments for undertaking boat training available via the @Work portal. However, several local risk assessments were made available during the investigation. These were task specific risk assessments for boat training exercises that had been conducted between 2005 and 2015, but none of these had been reviewed and none contained reference to the hazard of boat collision.

A risk assessment created in July 2018 entitled '*Water Rescue Boat Operators Training at Milford Haven Waterway*', specifically covered the majority of activities being undertaken by *N207* and *Rescue 1* on the day of the accident. However, this document was not available to Milford Haven fire station staff via the @Work portal.

An internal review of MWWFRS risk assessments undertaken in August 2018 identified that, of the 119 risk assessments listed in the training section, 88 items (74%) were overdue for review.

1.7.6 Control of the activity

Prior to undertaking station-based or off-station training or familiarisation, MWWFRS expected that the person in-charge of the activity would ensure that

- a risk assessment would be carried out for the activity, and
- a safety brief would be undertaken for the activity.

At the general morning briefing in Milford Haven fire station on the day of the accident, nobody was identified as being in charge of the water-based activities for that morning's session. Although an informal dynamic risk assessment was undertaken prior to the boats departing the fire station and launching, no formal

documented risk assessment was carried out, no reference was made to SOPs 2.08 and 2.10, or AET 5.17, and no formal safety briefing was carried out that included both boat crews.

1.7.7 Training and familiarisation

In common with other FRS authorities around the UK, MWWFRS used pdrPro, a commercially available planner-based maintenance of competence system to record their training activities. This electronic recording system was maintained up-to-date by the individual firefighter and monitored by their line manager. In addition, MWWFRS followed the DEFRA FRCO recommendation for skill sustainability training that:

> *'personnel spend a minimum of one day per annum at a suitable swift water training venue, under the supervision and tutorship of appropriately competent trainers'*

It was MWWFRS's policy to undertake an internal annual verification of staff boat operations' competence using qualified instructors from its own RYA approved and accredited training school. At Milford Haven, the last time that this verification had been undertaken was on 17 July 2017.

Milford Haven fire station had an extensive daily training plan for all firefighters to maintain competence in all aspects of their work and core skills **(Figure 9)**. This also included training and familiarisation with *N207* and *Rescue 1*. This boat-specific work was intended to be a combination of time at the fire station and on-water training and familiarisation. The daily plan was necessarily superseded by operational emergency call-outs, but was intended to be sufficiently frequent that MWWFRS training requirements and parameters set within the pdrPro system were met.

Firefighters participating in on-water training were not available to respond immediately to emergency call-outs, unlike those undergoing training on land. To enable on-water training and familiarisation with the boats, off duty staff were required to be called in, or cover provided by another station, potentially increasing response time. This made the ability to conduct on-water training and boat familiarisation difficult to achieve, unless the boats were called out for emergency response. In the 12 months prior to the accident, *N207* had been called out for emergency response seven times and had undertaken one day of training/familiarisation. In that same 12-month period, *Rescue 1* had not been used operationally, but had undertaken 5 days of training/familiarisation. Most of the training/familiarisation had taken place within the Milford Haven waterway, however *Rescue 1* had undertaken a training exercise on 21 June 2019 at Caldey Island **(Figure 10)**, and boat familiarisation in August 2019 that had taken it beyond the Milford Haven waterway, and to sea.

54	14/08/2019	Wednesday	Inv / Rtines	CRR Activity		Team Approach		Hydraulic Cutting Equipt		HFSC	Clean Up	RDS
55	15/08/2019	Thursday	Inv / Rtines	Ejectors / Submersibles		Public Ents - T		Public Ents - P		HFSC	Clean Up	
56	16/08/2019	Friday	Inv / Rtines	Core BA - NOG		BA Modules TCG		Public Ents - Ex Prep		Public Ents-Ex Tab Top	Clean Up	
57	17/08/2019	Saturday	Inv / Rtines	Drillyard		HFSC		HFSC		Watch Administration	Clean Up	
58	18/08/2019	Sunday	Inv / Rtines	TCG Presentation		HFSC		Core Ladders		Debriefing	Clean Up	
59	Comments											
60	19/08/2019	Monday	Inv / Rtines	Standard Tests - (W)		Core BA - NOG		CABA Guidelines		Core Knots & Lines	Clean Up	
61	20/08/2019	Tuesday	Inv / Rtines	NARC Level 1 - T		NARC Level 1 - P		NARC Level 1 - Ex		HFSC	Clean Up	
62	21/08/2019	Wednesday	Inv / Rtines	Core Knots & Lines		Hydraulic Cutting Equipt		HFSC		OPS 45 Reviews	Clean Up	RDS
63	22/08/2019	Thursday	Inv / Rtines	FOT / FEV Flush & Run		Foam Drills - High Ex		Monitors / Curtains		HFSC	Clean Up	
64	23/08/2019	Friday	Inv / Rtines	Team Approach		Equipment Maintenance		Appliance Cleaning		SOPs / GRAs	Clean Up	
65	24/08/2019	Saturday	Inv / Rtines	Inductors / Manifolds		Petrochemicals - T		Petrochemicals - P		Petrochemicals - Ex	Clean Up	
66	25/08/2019	Sunday	Inv / Rtines	Boats / Ancilliaries		OPS 45 / 7.2.d		HFSC		Mop Up / Buffer	Clean Up	
67	Comments											
68	26/08/2019	Monday	Inv / Rtines	Standard Tests - (W)		HFSC		Winches - WRL / Tirfor		HFSC	Clean Up	
69	27/08/2019	Tuesday	Inv / Rtines	Confined Space - T		Confined Space - P		Confined Space - Ex		Confined Space - Ex	Clean Up	
70	28/08/2019	Wednesday	Inv / Rtines	MDT Validation / Update		HFSC		RRP		Darley / Waterous / Fog	Clean Up	RDS
71	29/08/2019	Thursday	Inv / Rtines	Drillyard		NVQ Recap		HFSC		Mop Up / Buffer	Clean Up	
72	30/08/2019	Friday	Inv / Rtines	Cfrmis Update		HFSC		HFSC Admin		CRR - Update		
73	31/08/2019	Saturday	Inv / Rtines	Radio Procedures		CO Response / IEC		NOG BA Procedures		HFSC	Clean Up	
74	Sept											
75	01/09/2019	Sunday	Inv / Rtines	Kit Insp'n / PPE Logs		Stand'd Tests (M) CABA		Stand'd Tests (M) CABA		Stand'd Tests (M) CABA	Clean Up	
76	Comments											
77	02/09/2019	Monday	Inv / Rtines	Standard Tests - (W)		Standard Testing (6M)		CABA Guidelines		CABA Practical Wear	Clean Up	
78	03/09/2019	Tuesday	Inv / Rtines	Drillyard		HFSC		HFSC		CABA Maintenance	Clean Up	
79	04/09/2019	Wednesday	Inv / Rtines	Integral Foam Systems		7.2.d Visit		Debriefing		HFSC	Clean Up	RDS
80	05/09/2019	Thursday	Inv / Rtines	HFSC / CRR Admin		HFSC		Integral Foam Systems		7.2.d Visit	Clean Up	
81	06/09/2019	Friday	Inv / Rtines	Flammables - T		Flammables - P		Flammables - Ex		Flammables - Ex	Clean Up	
82	07/09/2019	Saturday	Inv / Rtines	CO Response / IEC		HFSC		Res 1 Boathandling -T		Boat Electronics Pack	Clean Up	
83	08/09/2019	Sunday	Inv / Rtines	SOPs		HFSC		Quadpod and Ancillaries		Core Knots and Lines	Clean Up	
84	Comments											
85	09/09/2019	Monday	Inv / Rtines	Standard Tests - (W)		NARC Level 2 - T		NARC Level 2 - P		NARC Level 2 - Ex	Clean Up	
86	10/09/2019	Tuesday	Inv / Rtines	HFSC		Core Rescue Equipment		Hyd Cutting Equipment		Team Approach	Clean Up	
87	11/09/2019	Wednesday	Inv / Rtines	Lecture Session		HFSC		Lighting / Generators		AETs / GRAs	Clean Up	RDS
88	12/09/2019	Thursday	Inv / Rtines	HFSC		CABA Ancillaries		CABA Guidelines		CABA Practical Wear	Clean Up	
89	13/09/2019	Friday	Inv / Rtines	SF/F Alongside		Marine Incidents - T & P		Marine Incidents - Ex		Marine Incidents - Ex	Clean Up	
90	14/09/2019	Saturday	Inv / Rtines	NOG BA Procedures		Trailers		HFSC		Mop Up / Buffer	Clean Up	

Figure 9: Training matrix

Image courtesy of Google Earth

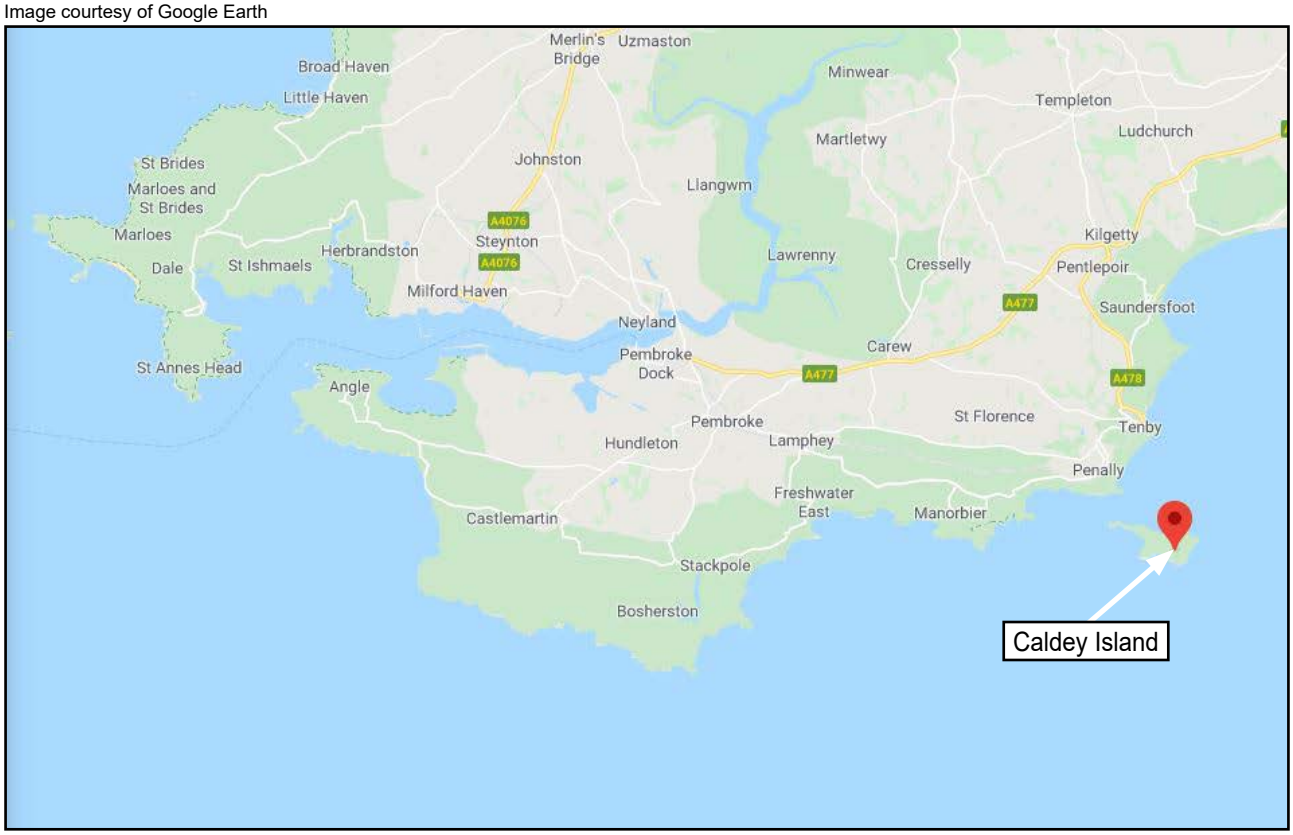

Figure 10: Location of Caldey Island

As part of their WRBO training, firefighters were expected to be able to work with other SRT craft, but not RIBs such as *Rescue 1*, and it focused on flood rescue scenarios. In the 18 months prior to the accident, *N207* and *Rescue 1* had been on only one joint training and familiarisation activity, on 10 July 2018, which had taken place in Milford Haven waterway.

All full-time firefighters at Milford Haven fire station were required to have completed the RYA powerboat level 2 certificate of competency and the WRBO certificate. There was no evidence found that MWWFRS had provided any additional training since 2004 for firefighters to obtain the RYA advanced powerboat certificate, radar qualifications or GMDSS radio operator required by MWWFRS to operate *Rescue 1*. This meant that as firefighters had left the service at Milford Haven, the number of firefighters qualified to the MWWFRS required standard to operate *Rescue 1*, was diminishing. The lack of a sufficient number of firefighters qualified to this higher standard had been raised with MWWFRS regional management several times, most recently by local management at Milford Haven in June 2019.

1.7.8 Audit, inspection and peer review

MWWFRS undertook an internal audit of Milford Haven fire station on 9 January 2018 and a station inspection on 29 November 2018.

The internal audit used a standard checklist that had not been adapted to include the equipment and training required at the stations operating boats. Omissions included the operation of flood rescue craft and the unique status and requirements at Milford Haven for operating *Rescue 1*. Consequently, there was no evidence that the operational status of *N207*, *Rescue 1* or the associated procedures and risk assessments were considered during the internal audit.

The station inspection in November 2018 included an exercise of SRT techniques undertaken in the exercise yard at Milford Haven fire station. In the report it was noted that the demonstration '*highlighted the skills of the crews*' and a comment that '*Overall an excellent standard from a Training and Delivery perspective*'. *The inspection report included the following areas*:

6.1 Operational Risk Management, and

6.2 People and Organisational Development & Training Delivery

The lack of practical on-water training, lack of suitably qualified rescue boat crew, and the lapsed certification and operating standards for *Rescue 1* were not identified as non-conformities in the internal audit report.

During 2017 and 2018, peer review assessment teams, drawn from other UK based FRS regions, visited MWWFRS as part of the All Wales Operational Assurance (AWOA) process. The final report was circulated to the Chief Fire Officer in May 2018 and stated that:

'On introduction of the statutory requirement to respond to water related incidents a small number of stations were enhanced in their water response capabilities. This additional training was absorbed without difficulty into the T&D[2] *Department, however it was apparent that should any further significant enhancement in equipment introduction and associated personnel training over and above of current levels would have a significant impact on the department with respect to the number of available trainers/Instructors for initial acquisition training and ongoing assessment and reaccreditation. Also this would have a significant impact on the T&D training delivery annual plan.'* [sic]

and

'Appropriate levels of initial acquisition, maintenance of competence and re accreditation via the RYA and WRBO are well established in line with the national requalification standards and timeframes.' [sic]

The peer review took into account the flood rescue capability and it referred to national standards required under the DEFRA FRCO. It did not, however, take into account the operational standards of training and certification required for *Rescue 1* as a unique asset at Milford Haven.

1.8 REGULATION AND OVERSIGHT OF FRS BOAT OPERATIONS

1.8.1 Overview

Although the majority of boats operated by various FRSs in the United Kingdom fall into the SRT category, and comply with the standards required by the DEFRA FRCO, several authorities also operate larger RIBs, similar to *Rescue 1*, and some authorities operate specialist fire-fighting boats in port areas. As fire service boats are not operated for pleasure, for legislative purposes they are classified by the MCA as commercial craft.

[2] T&D – Training and delivery

1.8.2 National Fire Chief's Council

The National Fire Chief's Council (NFCC) represents the whole of UK FRS with the aim of improving national co-ordination, reducing duplication of work and supporting local delivery of service. The chair of the NFCC is a single point of contact for the UK government, fire professionals and local authorities. The programme of work for the NFCC is coordinated by various committees who engage with subject matter experts.

The NFCC's national operational guidance documents were produced by its committees and were promulgated via its website[3]. Guidance for dealing with fires on ships and flood water rescue operations was available on this website. The national operational guidance did not provide information about certification of boats or categorisation of waters around the UK.

1.8.3 Regulations for boat operations

The operation of small commercial craft around the UK is regulated either by the MCA or by the local authority, depending on whether the craft is operating 'at sea' or in 'categorised waters'. Categorised waters include near coast, estuaries, rivers and other inland waters that are graded from A (most sheltered) to D (least sheltered), as defined in Merchant Shipping Notice (MSN) 1827 (M) Amendment 2.

Small commercial vessels of less than 24m in length, that carry no more than 12 persons on board and proceed to sea, are required to comply with The Merchant Shipping (Small Workboats and Pilot Boats) Regulations 1998 (as amended), which is applied by the Workboat Code Edition 2, or The Merchant Shipping (Vessels in Commercial Use for Sport or Pleasure) Regulations 1998 as applied by MGN 280.

Small commercial craft operating in categorised waters are regulated by the local authority responsible for those waters. The local authority sets its own requirements for commercial boat operations, which could include requiring the craft to comply with the Workboat Code Edition 2 or MGN 280. Milford Haven waterway within a line drawn from South Hook to Thorn Point was classified as Category C waters, so MWWFRS boats operating in this area were required to comply with regulation set by the local port authority.

1.8.4 Other boat operating codes

The MCA allows police boats and rescue boats (such as those operated by the Royal National Lifeboat Institution) to operate under either the MGN 518(M) Police Boat Codes, Amendment 3, or the MGN 466(M) Rescue Boat Code, as applicable. These codes were developed between the MCA and the relevant organisations in recognition of the specific status, equipment and training required for these craft to operate effectively at sea, and the codes are accepted by local authorities as meeting their requirements to operate in categorised waters. In the absence of a specific code for FRS boats, MWWFRS boats operating at sea were required to comply with the Workboat Code. When operating in Milford Haven waterway and the River Cleddau, MWWFRS boats were required to comply with any regulations set by the local port authority.

[3] www.ukfrs.com

1.9 PORT AUTHORITY

Milford Haven Port Authority (MHPA) is the statutory harbour authority for Milford Haven waterway and the tidal region of the River Cleddau, including the section of the river where the accident occurred. MHPA is responsible for the navigation, safety and traffic regulation of all vessels navigating within this area. This is achieved through the use of byelaws, General Directions, Special Directions and Notices to Mariners, and included the requirement that all commercial and leisure users within the MHPA area adhere to the International Regulations for Preventing Collisions at Sea 1972 (as amended). Rule 5 of these regulations states:

> *Every vessel shall at all times maintain a proper look out by sight and hearing as well as by all available means appropriate to the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.*

MHPA had designated the area upriver from the Cleddau bridge to the vicinity of Lawrenny as a water-ski area and it was not subject to speed restrictions. Various river areas, including upriver past Lawrenny, were designated as 'Dead Slow Minimum Wake' zones within the MHPA *Leisure Guide* **(Annex E)**. These minimum wake zones were routinely patrolled by an MHPA water ranger to ensure compliance.

As the local authority responsible for ensuring standards of operations, MHPA generally adopted the MCA coding and certification requirements for commercial vessels operating in its area. Once the coding for *Rescue 1* had lapsed, an agreement had been put in place between MHPA and MWWFRS to continue to operate *Rescue 1* within the MHPA area without the requirement for it to be coded. This agreement had never been extended to cover the SRT boats such as *N207*, and no agreement was in place with any other port authority within the MWWFRS area to allow them to operate without adhering to local commercial craft coding and certification requirements.

1.10 PREVIOUS/SIMILAR ACCIDENTS

1.10.1 Collision between two RIBs *Osprey* and *Osprey II* (MAIB Report No 10/2017[4])

Two passenger carrying RIBs, *Osprey* and *Osprey II*, collided in the Firth of Forth. A passenger who was sitting on an inflatable tube of *Osprey II* was crushed between *Osprey*'s bow and *Osprey II*'s helm console, resulting in her sustaining serious injuries.

While proceeding in parallel at a speed of around 6 knots (kts), the skipper of each RIB increased speed and commenced a power turn away from each other with the intention of passing each other in the course of completing a round turn. However, as the RIBs turned towards each other it became apparent to both skippers that the RIBs were in danger of colliding. Although they both acted quickly to reduce the speed of their respective vessels and so lessen the impact, they were unable to prevent the collision. The manoeuvre had previously been carried out successfully on several occasions but it had not been formally risk assessed, and no thought had been given regarding what to do if a collision situation developed.

[4] https://www.gov.uk/maib-reports/collision-between-rigid-inflatable-boats-osprey-and-osprey-ii-resulting-in-serious-injuries-to-1-passenger

1.10.2 Two Cardiff Bay Yacht Club RIBs (MAIB Report No 19/2011[5])

Two club RIBs belonging to Cardiff Bay Yacht Club collided at night while transporting a number of children across Cardiff Bay. The RIBs were proceeding at about 20kts in the dark, and carried no navigation lights or torches. One RIB had one seat and six occupants; the other, two seats and seven occupants. Those without designated seats were sitting on the inflatable tubes. As a result of the accident, three children, who were sitting on the inflatable tubes, were thrown into the water. One of the children sustained a traumatic brain injury, two others required extended medical treatment and several of the children from both boats suffered bruising and soreness following the collision.

[5] https://www.gov.uk/maib-reports/collision-between-2-rigid-inflatable-boats-while-transporting-a-number-of-children-across-cardiff-bay-wales-with-3-people-injured

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 OVERVIEW

The FRS boats *N207* and *Rescue 1* collided because they were carrying out uncoordinated manoeuvres, at speed, in the same stretch of water and neither helmsman realised the risk until it was too late. Firefighter Josh Gardener died because he was struck on the head by *Rescue 1* before or after being knocked out of *N207* into the water.

This section of the report will analyse the circumstances that led to the collision, the reasons why the boats were being operated in the same stretch of water, and the underlying factors that might have contributed to the accident and resultant loss of life.

2.3 THE COLLISION

Once the two boats had left the vicinity of Mill Bay, they were headed for the same agreed location near Lawrenny, with *Rescue 1* ahead and clear of *N207* until its helmsman decided to execute a large full-circle turn to port.

2.3.1 *Rescue 1*

It was unclear why *Rescue 1*'s helmsman decided to undertake the full-circle turn given its proximity to *N207*, rather than proceeding upstream to the agreed rendezvous location. This manoeuvre resulted in the need for *Rescue 1* to subsequently overtake or pass close to *N207*, which was conducting a series of turns under the supervision of the trainer.

The turn to port took *Rescue 1* downstream of *N207*, so it approached the slower boat from behind. When the helmsman saw *N207* heading downstream toward Mill Bay as he executed the final stages of the turn, he thought that it was going to cross clear ahead of him and did not expect *N207* to suddenly turn into his path. The crewman was not keeping an effective lookout and keeping the helmsman informed of the location of *N207*, so as *Rescue 1* came out of its turn and the helmsman looked up, he was surprised to see that collision with *N207* was imminent. The emotional and behavioural response to being surprised might have led to delayed collision avoidance action and disrupted problem solving. His reaction time to implement his decision - to accelerate and turn sharply to starboard - would have been affected by his competence and familiarity with *Rescue 1* and its controls. The qualification to RYA powerboat level 2 should have been sufficient to drive the boat, however the helmsman's lack of practical experience would have diminished his level of competence. Given the speed *Rescue 1* was travelling, it would have been prudent to have planned a greater passing distance from the slower boat, whose exact intentions were unknown.

2.3.2 *N207*

The three crew of *N207* were aware that *Rescue 1* had accelerated away from Mill Bay and away from their boat. However, their collective attention then returned to the boat handling training and practice for the two firefighters. The positions of the trainer in the middle and the firefighter forward in the boat meant that they could both see forward, to starboard and astern, but neither had an easy view to port without physically moving position. The helmsman steering the boat was seated on the starboard side tube aft and had a view to port, but was focused on practice manoeuvres. As a result, during *Rescue 1*'s turn to port, it went out of the immediate view of the crew of *N207*. Because none of *N207*'s crew were keeping a proper lookout, the helmsman was completely unaware of *Rescue 1*'s position when he initially turned to port and headed downstream.

After seeing the position and direction of travel of *Rescue 1*, the helmsman made the decision to turn further to port to avoid crossing ahead of the approaching RIB. However, because of the closing speed between the two boats, there was insufficient time for the helmsman to bring his boat further to port out of the way of *Rescue 1*.

2.4 LOOKOUT

The lack of effective lookout and awareness of each boat's position led to the collision situation arising.

On *N207* the crew were focused on their training, part of which should have been to nominate a member of the crew to keep a good lookout. With only two boats on the water in that locality, the lookout should have been able to provide the helmsman with information on *Rescue 1*'s position, course and speed. With that information the helmsman would not have turned into the path of *Rescue 1*.

On board *Rescue 1*, the crewman had not been tasked with keeping a lookout and was not paying attention to the activity of *N207*. Had he done so, the risk of collision might have been identified earlier, brought to the attention of the helmsman, and the collision avoided.

In the RYA publication, 'Start Powerboating', written to accompany the powerboat level 2 course, it states:

> *When intending to travel at higher speeds, you must keep a really good all-round look-out. Check it is clear before you turn and be aware of other water users...*

In close proximity and with the relative speeds involved, there was little time to make decisions and take evasive action, especially given the level of competence and experience of most of the crew involved.

2.5 PLANNING AND CONTROL OF THE TRAINING AND FAMILIARISATION EVOLUTIONS

MWWFRS procedures for any training activity required that a full briefing was undertaken prior to commencement. This briefing would be expected to include reference to any specific procedures related to the activity, any guidance and risk assessments, identification of the person in-charge and a full discussion of the intended activity. Because the decision to undertake the training/familiarisation

was agreed on the evening prior to the accident, there was little time to plan it thoroughly. The firefighters had assembled in the morning and held an informal discussion about the activity for the day, but because there was no formal briefing, the MWWFRS's pre-activity planning requirements were not met.

Additionally, although the trainer was identified as being in charge of the training undertaken on *N207*, neither of the crew of *Rescue 1* were nominated as being in charge of that boat, and no individual had been identified as being in overall charge of the activity on-water that morning. Consequently, the morning's activities were not formally planned, and the role of each boat was not discussed.

With the two firefighters planned to undertake the training course in Menai the following day, the purpose and structure of the training and activities being undertaken by *N207* on the day of the accident were clear, and under the control of a qualified trainer. What was unclear was the purpose and intention of the two crew managers crewing *Rescue 1*. Unlike *N207*, the crew of *Rescue 1* had no plan of activities and there was no agreement to support, or be part of, *N207*'s training. Had formal planning and briefing taken place, steps might have been taken to avoid both boats operating at speed in the same part of the river.

2.6 QUALIFICATIONS, CREWING AND TRAINING

2.6.1 Overview

The firefighters' qualification to RYA powerboat level 2 provided them with training that was sufficient to operate boats similar to *N207* and *Rescue 1* as leisure users. However, since the firefighters were at work, they were obliged to comply with the higher qualification standards set by MWWFRS for operating its boats.

MWWFRS's procedures did not distinguish between the crewing requirements to be met when the boats were on operations, and when staff were undergoing training or accruing boat familiarisation time in controlled conditions. These requirements included both the numbers of crew per boat, and the level of qualifications they held. For Milford Haven fire station, which operated two boats, it was difficult to undertake any afloat training or boat familiarisation activities while complying with the operational qualification and crewing requirements. This difficulty was evidenced by the few times that either boat had been used solely for training or familiarisation in the 12 months prior to the accident at Milford Haven.

2.6.2 Training

The Health and Safety Executive defines competence as being:

> *the combination of training, skills, experience and knowledge that a person has and their ability to apply them to perform a task safely.*

The records of training within the MWWFRS pdrPro software recorded only that firefighters had been training with the boats, but did not record how much time any individual spent in charge or helming.

The firefighters had initially been trained to a suitable standard, but the systems were not in place to maintain or build their levels of competence. There was a lack of opportunity to undertake training, to practise and hone boat skills, gain experience

and demonstrate knowledge. Further, the skill sustainability training that had been undertaken was focused on the SRT boats and WRBO requirements. It did not include the unique challenges of operating *Rescue 1*, which was the sole asset of its type within the MWWFRS area. Finally, the assurance mechanisms for checking crew competence were not effective as the MWWFRS annual verification of continued competence had not been undertaken, and was 14 months overdue.

At the time of the accident, it is possible that some of Milford Haven's firefighters were suffering from a gradual erosion of their levels of practical boat handling competence, and a general reduction in their level of safety awareness for operating their boats; in particular, *Rescue 1*.

2.6.3 Management oversight of training and certification

MWWFRS required all firefighters crewing boats to hold the RYA powerboat level 2 qualification as a minimum, but these requirements were enhanced for the helmsman operating *Rescue 1* as the boat's operational role required it to operate offshore day and night.

Had effective planning and briefing been carried out on the morning of the accident, with reference to the extant procedures, the senior officers might have recognised that there were insufficient qualified staff allocated to conduct the planned training with *N207* and *Rescue 1* simultaneously, and that neither of the crew managers were qualified to helm *Rescue 1*.

The opportunities for MWWFRS management to recognise that there was a shortfall in training and familiarisation for firefighters at Milford Haven were missed several times during audits, inspections and reviews. It is apparent that once *Rescue 1* had ceased to be required as a support craft for the disbanded dive team, its operational need and function were diminished. Operational documentation made scant reference to it, and the higher standard of training required for it to operate offshore and be commercially coded was no longer provided.

2.7 PROCEDURES

2.7.1 Personal protective equipment

The firefighters in both boats were provided with protective equipment. These were detailed in MWWFRS procedures and as mitigation measures within risk assessments. All firefighters were wearing dry-suits with fleece undersuits, a buoyancy aid or lifejacket, and quick release heavy boots. However, on the morning of the accident, the decision was made to not wear protective headgear on either boat. The reason why this decision was taken is unclear, but some firefighters reported the helmets to be uncomfortable to wear and to hamper communications. In addition, it was a warm and sunny day. The headgear provided on *N207* was of a sufficient standard to provide some impact protection. Nevertheless, given the force of the impact and the extent of the injuries suffered, it is unlikely that the wearing of the head protection provided would have prevented the firefighter's death. By not wearing helmets, none of the firefighters on either boat complied with the personal protective equipment requirements contained within section 2.2 of AET 5.17 **(Annex C)**.

2.7.2 Suitability of procedures and risk assessments

MWWFRS SOPs *2.08 Flooding* and *2.10 Rescues: Working Near, On, or In Water*, focused on flood rescue and the boats used for that purpose. Neither SOP covered the use of *Rescue 1* to respond to incidents in Milford Haven or offshore islands. Furthermore, neither of the risk assessments associated with these procedures made any reference to risks associated with operating boats. They provided very general reference to existing control measures that offered little guidance to the reader. Any additional control measures required to mitigate the risk were limited to a generic '*Regular assessment required*' statement.

Milford Haven fire station did not have local SOPs for routine boat handling familiarisation or for water rescue training. Local risk assessments had been created, but these had been for specific activities.

AET 5.17 contained more useful information and requirements, but had not been updated for some time. The information concerning the SRT boats within it was incorrect, referring to boats that had been replaced by the Zodiac Milpro 470.

There were other weaknesses in the procedures because by not differentiating between familiarisation, instruction and operational call-out crewing requirements, staff were provided with inconsistent messages. AET 5.17 contained an illustration of operations with an SRT boat manned by only one person, and promotional photographs of FRS staff undertaking WRBO training in Menai showed boats with only two FRS crew, contrary to the MWWFRS requirement that all boats were to be operated by three crew. While standards for emergency operation will dictate stringent requirements, the ability to train and conduct familiarisation under the same procedures was difficult, and at local level this led to the divergence from MWWFRS SOPs.

2.8 BOAT OPERATING CODES AND GUIDANCE

As part of the investigation, several UK FRSs were contacted to obtain information on the operating standards adopted for their boats. For SRT boats the DEFRA FRCO formed the basis of standards across the FRSs. However, because there was no common approach across the UK to any adopted standard for larger craft, there was a variety of responses. Some boats were certificated to the workboat code, some were not certificated but operated to the standards of the rescue boat code, and some craft were not operating to any code. It was also apparent that various port authorities made assumptions about the operating standards of the FRS craft in their area of responsibility and did not verify to what standard the boats were being operated.

Rescue 1 was well maintained and fully equipped for its intended tasks. However, any FRS boat being operated at sea outside categorised waters, including boats such as *N207*, is required to adhere to a standard agreed with the MCA. In addition, when operating on its categorised waters, most port authorities require commercial craft to be operated to standards of certification that meet the MCA requirements for coded craft. As the SRT boats frequently operate outside the DEFRA FRCO and within port areas, they must meet these requirements. It was apparent that there was no awareness by MWWFRS that local authority requirements to operate all

of its boats to an approved standard should apply. For *Rescue 1*, the lapse in the workboat code certification meant that mobilisation to offshore islands, such as the training exercise at Caldey Island earlier in 2019, and the training in August 2019 did not comply with the MCA certification requirements.

Appropriate certification of its boats would provide a greater level of assurance regionally and nationally that FRS boats are being operated safely by trained and experienced staff, and that the boats are properly maintained and equipped.

To assist the various FRS authorities around the UK, guidance should be provided by the NFCC. Their operations committee for marine operations and water rescue should consult with the MCA and stakeholder authority representatives for categorised waters, regarding a common approach to the application of an appropriate standard.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. The firefighter on board *N207* was fatally injured after being struck on the head by *Rescue 1* when the two boats collided. [2.2]

2. *N207* and *Rescue 1* collided because they were operating at speed in close proximity when *N207* turned into the path of *Rescue 1*. [2.2]

3. It is unclear why *Rescue 1*'s helmsman decided to undertake a circular turn to port in the vicinity of *N207*, but given the speed the RIB was travelling it would have been prudent to have planned a greater passing distance from the slower boat, whose exact intentions were unknown. [2.3.1]

4. The crew of *N207* were focused on their boat handling training, and the helmsman was unaware of *Rescue 1*'s position when he turned sharply into its path. Due to the closing speed of the two vessels, his subsequent actions to avoid collision were not effective. [2.3.2]

5. Neither crew was keeping an effective lookout, and so lacked awareness of the two boats' relative positions and movements. [2.4]

6. Mid and West Wales Fire and Rescue Service's pre-activity planning requirements were not met and its SOPs were not followed, with the consequence that: no individual had responsibility for the overall activity; no-one was nominated to be in charge of *Rescue 1*, which had no clear task; *Rescue 1* had insufficient crew, neither of whom held the qualifications required to be the RIB's helmsman; and, no steps were taken to prevent both boats operating in the same stretch of water in an uncoordinated manner. [2.5, 2.6.3]

7. It was difficult for Milford Haven fire station, which operated two boats, to comply with Mid and West Wales Fire and Rescue Service crewing requirements, which reduced the amount of on-water training and familiarisation conducted in the 12 months prior to the accident. [2.6.1]

8. At the time of the accident it is possible that Milford Haven's firefighters were suffering from a gradual erosion of the levels of practical boat handling competence, and a general reduction in their levels of safety awareness for operating their boats; in particular, *Rescue 1*. [2.6.2]

9. Although the firefighters crewing the boats were not wearing the head protection required by AET 5.17, it is unlikely that head protection would have been sufficient to save the firefighter's life when he was struck by *Rescue 1*. [2.7.1]

10. Mid and West Wales Fire and Rescue Service's procedures for boat operations had not been updated for some time, contained misleading information, and made insufficient reference to *Rescue 1* as a pre-determined operational asset. [2.7.2]

11. While the standards for emergency operation will dictate stringent requirements, the ability to train and conduct familiarisation under the same procedures was difficult, and at local level this led to the divergence from Mid and West Wales Fire and Rescue Service's SOPs. [2.7.2]

12. The investigation has found that some port authorities made assumptions that FRS craft operating in their areas complied with an approved standard. However, it was apparent that Mid and West Wales Fire and Rescue Service had overlooked the requirement to operate all of its boats to an approved standard, or that within a local authority or harbour area locally required standards could apply. [2.8]

3.2 SAFETY ISSUES NOT DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. The recording of training and monitoring of competence was not robust enough to identify when a firefighter was helming a boat, and therefore ensure that sufficient experience was logged. [2.6.2]

2. The chance to recognise that shortfalls in training, experience, qualifications and boat certification by Mid and West Wales Fire and Rescue Service was missed during internal audits and inspections and through external peer review. [2.6.3]

3. Mid and West Wales Fire and Rescue Service standard operating procedures did not contain information relevant to the operation of the Zodiac Milpro 470 or the Delta 6.4m RIB. Furthermore, it did not distinguish between requirements for using the boats when staff were undertaking familiarisation, instruction or were on emergency call-out. [2.7.2]

4. The Fire and Rescue Service was not fully aware of the certification requirements for commercially operated boats operating in categorised and non-categorised waters, and hence *Rescue 1* had been operated at sea without the necessary levels of certification. [2.8]

5. Standards for Fire and Rescue Service boats operating in categorised waters and at sea had been overlooked nationally. [2.8]

SECTION 4 - ACTION TAKEN

4.1 ACTIONS TAKEN BY OTHER ORGANISATIONS

Mid and West Wales Fire and Rescue Service has:

- Appointed an independent peer review to be conducted of water-based activities by another regional Fire and Rescue Service.
- Appointed its own investigation team and commenced an internal investigation.
- Reviewed and revised its procedures 2.1, 2.08, 2.10, and AET 5.17.
- Initiated a full review of water-based requirements.
- Completed an assessment of the future provision of Rescue 1 and taken the decision in April 2020 to remove it from service.
- Reviewed the risk assessments within Mid and West Wales Fire and Rescue Service stations for special appliance activities.
- Secured funding to provide staff with Institution of Occupational Safety and Health (IOSH) and National Examination Board in Occupational Safety and Health (NEBOSH) training.
- Engaged Kent Fire and Rescue Service to undertake peer review of boat operations.
- Set up a group to discuss introducing additional on-watch boat trainers and to make recommendations to senior management.
- Commenced a risk management plan for incidents at offshore islands, including consideration of commercial contract for the transportation of firefighters if needed.
- Engaged with regulatory authorities concerning operational standards for Fire and Rescue Service boats.
- Upgraded the standard of helmets used as Personal Protective Equipment on its SRT boats from Nitro XT to Manta SAR helmets.
- Met with stakeholders in the Milford Haven waterway area to clarify the provision of a safety boat during incidents.
- Engaged with a local tug operator with the aim of establishing a memorandum of understanding for the provision of emergency response to incidents in the Waterway.
- Commenced a gap analysis to encompass the historical evolution of business planning process over the previous 20 years.

SECTION 5 - RECOMMENDATIONS

The **Mid and West Wales Fire and Rescue Service** is recommended to:

2020/130 Undertake a review of the crewing and staff qualification requirements for boats within MWWFRS to determine appropriate levels for familiarisation, training and emergency operations status and include the requirement within revised procedures and guidance.

2020/131 Introduce a method of recording time spent as helmsman of its boats and implement a minimum number of hours required as helmsman to maintain competency.

2020/132 Include reference to its boats within the internal audit and inspection report process.

The **National Fire Chief's Council** is recommended to:

2020/133 Consult with the Maritime and Coastguard Agency and the UK Harbour Master's Association to introduce a standard code for the operation of all fire and rescue service craft when in categorised or non-categorised waters.

Safety recommendations shall in no case create a presumption of blame or liability

Annex A

Extracts from Standard Operating Procedure 2.08 - Flooding

Standard Operating Procedure for: 2.8

Mid & West Wales Fire & Rescue Service

SOP - 2.8

Standard Operating Procedure for:

Flooding

This Standard Operating Procedure (SOP) considers hazards, risks and control measures for fire & rescue service personnel attending incidents involving flooding. It incorporates the Generic Risk Assessment outcomes of MWWFRS Risk Assessment RA(SOP)2.8.

AIDE MEMOIRE	**AIDE MEMOIRE**

1	**SCOPE**	1.1 Fire & rescue response to flooding 1.2 Statutory Duties
2	**SPECIFIC HAZARDS & RISKS**	2.1 Flowing water 2.2 Primary hazards associated with flooding 2.3 Large blocked culverts 2.4 Flash floods 2.5 Working conditions 2.6 Water borne diseases 2.7 Water temperature 2.8 Specialist plant & equipment 2.9 Manual handling
3	**KEY CONTROL MEASURES**	3.1 Pre-planning 3.2 MWWFRS response to flooding 3.3 MWWFRS appliances & equipment

		3.4 Personal protective equipment (PPE) 3.5 Safe systems of work in floodwater 3.6 Training 3.7 Flood & weather warnings 3.8 Closing Highways and Leaving the Scene
4	**OPERATIONAL PROCEDURES**	4.1 Prior to mobilisation 4.2 En-route 4.3 Incident plan 4.4 Equipment & PPE for flooding incidents 4.5 The correct use of MAWWFRS flood response assets 4.6 High volume pumps (HVPS) 4.7 Sandbags 4.8 Urban search and rescue (USAR) 4.9 Requesting helicopter assistance 4.10 Low risk flooding 4.11 Body recovery 4.12 Incident command unit 4.13 Multi-agency command 4.14 Personal hygiene 4.15 Crew welfare & reliefs 4.16 Activation of vehicle airbags at flooding incidents
5	**ADDITIONAL CONSIDERATIONS**	5.1 EAW flood warning codes

6	**REFERENCES**	6.1 Sources of Information 6.2 Related Documents 6.3 Questions & Answers

1. SCOPE

1.1 Fire & rescue service response to flooding

Flooding affects every part of a community's normal daily existence, from shelter in domestic properties, to services such as fuel & power supplies, transport networks and communications such as telephone/computer lines.

Flooding can also lead to the contamination of food and water supplies.

The Fire & Rescue Service (FRS) does not have a statutory responsibility to attend flooding incidents, however Mid and West Wales Fire & Rescue Service (MWWFRS) will respond to calls for assistance in connection with flooding, including rescues from floodwater and pumping out.

This SOP should be read in conjunction with SOP 2.1 – Rescues from Ice & Unstable Ground, and SOP 2.10-Rescues: Working Near, On, or In Water.

1.2 Statutory Duties

Historically the three Welsh Fire and Rescue Authorities (FRAs) respond to flooding and water rescue incidents using their existing general powers to respond to 'other eventualities' that cause or are likely to cause death, injury or illness, as described in Section 11 of the Fire and Rescue Services Act 2004 ('2004 Act'). There was, however, no statutory requirement for them to do so.

The Fire and Rescue Services (Emergencies) (Wales) (Amendment) Order 2017 ("the Order") introduced a duty requiring the three Welsh FRAs to make provision to respond to flooding and inland water emergencies.

Rescue and protection in case of flooding and inland water emergencies

(1) A fire and rescue authority must make provision in its area, to the extent that it considers it reasonable to do so, for the purpose of –

a. rescuing people, or protecting them from serious harm in the event of an emergency involving flooding; and
b. rescuing people in the event of an emergency involving inland water.

(2) The duty within paragraph (1) applies to an emergency falling within section 58(a) of the Fire and Rescue Services Act 2004.

(3) In this article –

"flooding" means any case where land not normally covered by water becomes covered by water;

"inland water" means –

a. rivers, streams and canals; and
b. lakes, reservoirs and water-filled quarries."

c.

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3. KEY CONTROL MEASURES

3.1 Pre-planning

Pre-planning within MWWFRS for an emergency response to flooding combines training and equipment provision for crews, with spate-condition procedures.

Where widespread flooding is likely to affect one or more areas across MWWFRS, Service Control may take necessary measures to deal with the larger amount of calls coming in from the public.

Mapping flood plain overlays for the region are considered from the perspective of both Business Continuity Management (i.e. the likelihood of fire stations being affected by flooding) and for emergency response/assistance to members of the public.

Pre-planning also includes an advance weather warning notification system for operational personnel.

Integrated (multi-agency) major flood response

The operational or physical response to a flood disaster will initially involve the emergency services as they will receive the first calls for assistance from the public. In the early stages, the priority will be the rescue of casualties from life threatening situations, removing victims from the affected area and mitigation of damage to property.

In major flooding the extent of the area affected and the demands on the emergency services can over extend their resources, and it may take some

time to identify priorities and establish a robust and efficient command structure.

In such cases, a coordinated major flood response will potentially involve Local Authorities, the Fire & Rescue Service, Police, Ambulance, Maritime Coastguard Agency, Natural Resources Wales, and military personnel, together with volunteer organisations such as the Women's Royal Voluntary Service, the British Red Cross and the Salvation Army.

Detailed plans for dealing with major flooding will in general be prepared and maintained by a Local Authority Emergency Planning Officer. These plans will include:

- The initial emergency response;
- Rescue operations;
- Provision of specialist equipment;
- Reception areas and rest centres;
- Establishing police casualty bureaus;
- Provision of information through the media;
- VIP visits;
- The recovery phase;
- Finance.

1 Pump or Major pump (Nearest resource Mobilised)

3.2 Flood response assets of MAWWFRS

The following team types have been established in the MAWWFRS region to deal with large scale flooding incidents. These teams have the capabilities as outlined in the DEFRA Flood Rescue National Enhancement Project – Flood Rescue Concept of Operations.

Type E teams – Bank based

All front line appliances can provide this response. The teams can provide the following functions at flooding incidents:

- Pumping Operations.
- Bank Based Rescue.
- Shallow Water Wading (less than height of fire boot) in low energy water.

Type D teams – Wading

These stations have the capability to perform wading duties (low energy water and less than waste height) in order to perform rescues, provide humanitarian services and assist with pumping operations during major flooding incidents. These teams are located in the following stations:

- Newtown
- Llanfair Caereinion

- Talgarth
- Lampeter
- Cardigan
- Fishguard
- Pembroke Dock
- Ponturdulais
- Morriston
- Neath
- Glynneath
- Haverfordwest
- Machynlleth
- Pontardawe
- Llanelli
- Ammanford
- Llandysul
- Llandovery
- Llandrindod Wells
- Haverfordwest
- Fishguard
- Pembroke Dock

The High Volume Pump crew based in Ammanford will also have the capability.

Type C– Swift water rescue technician

Swift water rescue technician (SRT) teams will have the additional capabilities to allow personnel to perform contact rescues by means of tethered swimming. They will also have the equipment to perform technical rescues using tethered boats. The teams are currently based in the following stations:

- Carmarthen
- Hay on Wye
- Aberystwyth
- Swansea Central
- Welshpool

Service boat stations

The Service has powered safety boats (inflatable) that are suitable for deployment during flooding incidents, and are based in the following locations:

- Swansea Central.
- Carmarthen.
- Aberystwyth.
- Hay on Wye.
- Milford Haven

- Welshpool

Milford Haven also has a larger boat (Rigid Inflatable Boat) that may be suitable for Large Flooding Incidents.

3.3 MWWFRS appliances/equipment

Appliances/equipment available within MWWFRS which can be deployed at flooding incidents include:

- Major and portable pumps;
- High Volume Pumps (HVPs);
- Inflatable walkways;
- Safety boats;
- Personal flotation devices (lifejackets and buoyancy aids);
- Dry suits;
- Hose inflation kits;
- Throw lines.

3.4 Personal protective equipment (PPE)

Depending upon the Level of Response, PPE for use at flooding incidents includes:

- Wet weather clothing.
- Lifejackets -all appliances.
- Dry suits - boats, swift water rescue (Type C) and wading personnel (Type D).
- Specific safety headwear and gloves.
- Powered boat operators PPE.

6. REFERENCES

6.1 Sources of Information

- Generic Risk Assessment 2:8 Rescues – Involving Flooding

-

6.2 Related Documents

- SOP 2.1 – Rescues from Ice & Unstable Ground
- SOP 4.5 - Use of Helicopters at Incidents
- SOP 2.10 – Rescues In or near Water

Environment Agency Wales – Flood Warning Plans for local authorities

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Annex B

Extracts from Standard Operating Procedure 2.10 - Rescues; Working Near, On, Or In Water

Standard Operating Procedure for:: 2.10

Mid & West Wales Fire & Rescue Service

SOP - 2.10

Standard Operating Procedure for:

Rescues; Working Near, On, Or In Water

This Standard Operating Procedure (SOP) considers hazards, risks and control measures for fire & rescue service personnel attending incidents involving rescues; working near, on, or in water. It incorporates the Generic Risk Assessment outcomes of MWWFRS Risk Assessment RA(SOP)2.10.

AIDE MEMOIRE	**AIDE MEMOIRE**

3	**KEY CONTROL MEASURES**	3.1 Pre-planning 3.2 Rescue assets of MAWWFRS 3.3 PDA 3.4 PPE 3.5 Additional equipment carried on appliances 3.6 Methods of rescue 3.7 Specialist rescue teams 3.8 Training 3.9 Specialist Advisors 3.10 Analytical Risk Assessment 3.11 Closing Highways and Leaving the Scene
4	**OPERATIONAL PROCEDURES**	4.1 Mobilisation to incidents in, on or near water 4.2 Low risk water hazards 4.3 Hazard zones 4.4 PPE 4.5 Specialist Water Rescue Team - Options 4.6 Rescues from moving water 4.7 Sub-surface rescue/recovery 4.8 Body recovery 4.9 Assistance from the RNLI 4.10 Requesting helicopter assistance 4.11 Personal hygiene & Welfare 4.12 Communications 4.13 Search operations

1. SCOPE

1.1 Working in, on or adjacent to water

There is an increasing public expectation that Fire and Rescue Services (FRSs) will attend water-related incidents to save life or render humanitarian services. Mid and West Wales Fire and Rescue Service (MWWFRS) responds to such incidents in accordance with Section 11 of the Fire & Rescue Services Act 2004.

MWWFRS often attends incidents that require personnel to work in, on or adjacent to water.
The conditions at such incidents can vary from still ponds & canals to fast flowing water, weirs and areas of mud and slurry. Climatic extremes can add further to the complexity of these incidents and significantly change the approach required (e.g. extreme cold resulting in water courses forming ice and presenting a new set of hazards to crews).

Further potential variables include geographic factors such as remote locations, steep banking and restricted access.

This SOP should be read in conjunction with SOP 2.1 – Rescues from Ice & Unstable Ground, and SOP 2.8 – Flooding.

1.2 Statutory Duties

Historically the three Welsh Fire and Rescue Authorities (FRAs) respond to flooding and water rescue incidents using their existing general powers to respond to ‘other eventualities’ that cause or are likely to cause death, injury or illness, as described in Section 11 of the Fire and Rescue Services Act 2004 (‘2004 Act’). There was, however, no statutory requirement for them to do so.

The Fire and Rescue Services (Emergencies) (Wales) (Amendment) Order 2017 (“the Order”) introduced a duty requiring the three Welsh FRAs to make provision to respond to flooding and inland water emergencies.

Rescue and protection in case of flooding and inland water emergencies

(1) A fire and rescue authority must make provision in its area, to the extent that it considers it reasonable to do so, for the purpose of –

a. rescuing people, or protecting them from serious harm in the event of an emergency involving flooding; and
b. rescuing people in the event of an emergency involving inland water.

(2) The duty within paragraph (1) applies to an emergency falling within section 58(a) of the Fire and Rescue Services Act 2004.

(3) In this article –

"flooding" means any case where land not normally covered by water becomes covered by water;

"inland water" means –

a. rivers, streams and canals; and
b. lakes, reservoirs and water-filled quarries."

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3. KEY CONTROL MEASURES

3.1 Pre-planning (Ops 45)

Station Managers must make an effective assessment and operational plan for all areas of open water in their station ground. Where applicable recording of the plan may be made using SOP 1.4 Operational Intelligence Gathering.

Consideration must be made in the following areas

- The geospatial reference (12 figure reference);
- The name of the water hazard, including alternative/local names;
- A description of the type of water hazard (e.g. static – quarry);
- An approximation of size/area/width/depth;
- The pre-determined attendance (PDA);
- Other services/agencies that may deploy (e.g. Mountain Rescue, *requested via police*, RNLI);
- Access points/RVPs for appliances (four wheel and non four wheel drive access);
- Access points for personnel;
- Access points for deploying throw lines, inflatable hose, inflatable walkways;
- Access/launch points for rescue boats;

- Access points for damming/pumping (where appropriate).

For rivers and/or larger water hazards, the geospatial reference may relate to access points for appliances or launch points for FRS boats.

3.2 Rescue assets of MAWWFRS

The following team types have been established in the MAWWFRS region to deal with large scale flooding incidents. These teams have the capabilities as outlined in the **DEFRA Flood Rescue National Enhancement Project – Flood Rescue Concept of Operations** and may also be utilised for water rescue incidents:

Type E teams – Bank based

All front line appliances can provide this response. The teams can provide the following functions at incidents:

- Pumping operations.
- Bank based rescue (shout, reach and throw).
- Shallow water wading (less than height of fire boot) in static or slow moving water.

Crews are required to wear eye protection when working on embankments near undergrowth and vegetation.

Type D teams – wading

These stations have the capability to perform wading duties (low energy water and less than waste height) in order to perform rescues, provide humanitarian services and assist with pumping operations during major flooding incidents. These teams are located in the following stations:

• Newtown
• Llanfair Caereinion
• Talgarth
• Cardigan
• Lampeter
• Fishguard
• Pembroke Dock
• Pontarddulais
• Morriston
• Neath
• Glynneath
• Pontardawe
• Llanelli
• Llandysul
• Llandovery
• Llandrindod Wells

The High Volume Pump crew based in Ammanford will also have the capability, however due to their role as HVP operators they will not be declared as a national asset

Non powered boats will be strategically based at certain wading stations and may be deployed for evacuation purpose as part of wading rescue operations.

Note – Wading teams are not on the PDA for water rescue incidents, however an OiC may call upon them to perform limited wading duties at an incident involving low energy water (shallow, still or very slow moving).

Type C– Swift water rescue technician

Swift water rescue technician (SRT) teams will have the additional capabilities to allow personnel to perform contact rescues by means of tethered swimming. They will also have the equipment to perform technical rescues using tethered boats. The teams are currently based in the following stations:

- Carmarthen.
- Hay on Wye.
- Aberystwyth
- Swansea Central.
- Milford Haven
- Welshpool

All type C stations will have powered safety boats (inflatable) that are suitable for deployment during water rescue incidents.

It is the intention of the Service to train all type C stations up to type B standard. Type B is Rescue Boat Operators.

Type B teams will be qualified to operate rescue crafts in swift water environments, and using rescue crafts as a platform for swift water rescues, and tethered boat operations.

A minimum of three trained boat handlers will be required to crew a rescue craft when committed for water rescue operations.

3.4 Personal protective equipment (PPE)

Depending upon the Level of Response, PPE for use when working in, on or adjacent to water includes:

- Lifejackets/PFD.
- Dry suits.
- Specific safety headwear.
- Powered boat operators/swift water rescue technician PPE.
- Crews wearing fire helmets MUST undo chin strap and slacken head band within helmet

- Eye Protection (Visor or Glasses)

6. REFERENCES

6.1 Sources of Information

- Fire & Rescue Services Act 2004
- Generic Risk Assessment 2.1 – Ice & Unstable Ground
- Generic Risk Assessment 2.8 – Flooding

6.2 Related Documents

- SOP 2.1 – Rescues from Ice & Unstable Ground
- SOP 2.8 – Flooding

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Extracts from Appliance, Equipment, Technical Instruction for: Fire Service Boats 5.17

Mid & West Wales Fire & Rescue Service

AET - 5.17

Appliance, Equipment, Technical Instruction for:

Fire Service Boats

The Service has a duty to make a suitable and sufficient assessment of the health and safety risks to employees and to provide them with comprehensive and relevant information on the risks identified.

The document examines the hazards, risks and control measures relating to fire service personnel using the **Fire Service Boats.**

		4.1 Safety 4.2 General Use & Information 4.3 Inventory 4.4 Standard Testing & Maintenance

5	**SOURCES OF INFORMATION/ APPENDICIES**	5.1 Points of Reference

1. SCOPE

1.1 Introduction

Within Mid & West Wales Fire & Rescue Service's geographical area, there are several main arterial waterways, as well as costal areas.

MAWWFRS has three types of boat available for incident response on these waterways

- Powered Inflatables (SRT boats)
- Powered Rigid Inflatable Boat (RIB)
- Unpowered workboats

This Appliance/Equipment Technical Instruction outlines the technical information, significant hazards and risks associated with operating Fire Service Boats, and lays down the procedural guidance to be followed when using them.

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2. SPECIFIC HAZARDS & RISKS

2.1 GENERAL

SRT Boats

SRT boats are crewed by personnel trained and competent to RYA (Royal Yachting Association) Level 2 as a minimum. If operating in swift moving water then the crew must be trained and competent to Rescue Boat Operator (RBO) level as a minimum

RIB

The only RIB within the service is based at Milford Haven and the crews will hold the following additional qualifications

RYA advanced powerboat certificate (for all helms) Radar course

GMDSS (Global Maritime Distress Safety System).

Workboats

Unpowered workboats are available to enable the movement of casualties and members of the public across areas of standing or slow moving water by wading teams

They may also be used by SRT teams in line with their training and safe working practices

2.2 P.P.E.

All boat operators / handlers will wear Service supplied PPE

SRT boats

SRT boat operators will wear their SRT PPE when crewing the boat.

RIB

All crew will wear specialist helmets and the Crewsaver

Crewfit Life Jacket Twin275 (see AET 6.12).

Work Boats

All personnel handling workboats will wear wading PPE as a minimum. Any crew members working within 3 metres of the water's edge must wear appropriate PPE (see SOP 2.8 and 2.10 for details)

2.3 GETTING TO WORK

All powered boats must have a minimum crew of three; all qualified to RYA level 2 standard as a minimum

All boat operators are to work within the safe systems of work as laid down in SOP 2.8 Flooding and 2.10 Working on or near water.

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3. PROCEDURAL GUIDANCE

3.1 GENERAL DESCRIPTION

The Boats used in the service are for effecting rescues from inland and specific costal waterways, they are also used for providing safety for crews working on or near water, therefore providing a safe system of work.

There are three types of boat currently in use within MAWWFRS:-

- Delta 650X(based in Milford Haven)
- Avon ERB400 (Based with each SRT team)
- Avon M9 workboat (Non mobile within each command)

Training Boats and Operational Spares based at Earlswood Training Centre:-

AVON W 465 Heavy Duty Workboat x3

- 5 chambers and keel all inflatable
- Length 4.65 metre
- Width 2.12 metre
- Payload 10 persons or 1000kg
- Aluminium deck

Powered by outboards 30 HP Mariner 2 Stroke Engine

3.2 RIGID INFLATABLE BOATS (RIBs)

A Rigid Inflatable Boat (RIB) is a light-weight but high performance and high capacity boat, constructed with a solid, shaped hull and flexible cylindrical shaped, air inflated tubes to assist in its buoyancy.

- The design is stable and seaworthy, and the inflatable collar means that the buoyancy is not lost if a large quantity of water is shipped aboard.

- RIBs are commonly between 4 to 7 metres (13 to 24 ft) long, and are propelled by one or more outboard motors. Generally the power of the motors is in the range of 5 to 500 horse power (hp).

Their shallow draft allows for high manoeuvrability, speed and relative immunity to damage in low speed collisions**.**

3.2.1 Specification

The Rib is kept inflated and strapped onto its transportation trailer, with the outboard engines fitted and associated equipment stored inside the boat.

RIB at Milford Haven

Boat Type - Delta Rib

Length - 6.5 mtr

Engine type - 2 x Mariner 2 stroke (90Hp each) Maximum capacity - Min crew 3 persons (not max capacity)

Serial number - GB-DPS16473E101

Trailer type - Hallmark super rollercoaster 8

Additional information

Night vision capability Offshore category C DSC/VHF/GPS

Radar

Thermal Imaging

Salvage & pumping (firefighting) capability

3.3 Avon ERB 400 (SRT Boat)

The Avon Professional Emergency Rescue Boats can be used for variable depth residential flood work, river flooding including fast flowing water operations, dam and sluice rescues where accurate shore line positioning is necessary, the craft has also been proven as an effective tool in ice and quick sand rescues.

An integral aluminium slatted deck is covered with tough Avon fabric to ensure 'trip free' search and rescue missions. Load securing points are fitted to the deck to allow fixing of specialised equipment in the craft. The transom can be fitted with an outboard engine.

The large bearing surface of the inflatable tubes and floor spread the rescue load over a wide base, making the craft ideal for rescue operations over thin ice or soft mud.

The ERB has been designed to be capable of being stored deflated and inflated using a compressed air cylinder when the incident scene has been reached. However the Avon ERB 400's used by MAWWFRS boats are kept inflated and are transported to the incident on a trailer. If the pressure of the buoyancy tube drops crews can use a BA cylinder to bring the tube back up to pressure.

3.3.1 SPECIFICATION

Capacity

- Maximum number of persons : 8
- Maximum load (persons, motor & gear) : 900 kg
- Floorboard usable area : 2.26m2
- Buoyancy tube volume : 1.334m3

Dimensions

- Overall length : 4.0m
- Inside length: 2.8m
- Overall width : 1.9m
- Inside width : 0.88m
- Weight empty : 91 kg
- Buoyancy tube diameter : 51 cm
- Folded dimensions : 137 x 72 x 45 cm

Safety / Inflation

- Number of airtight compartments in main buoyancy tube : 4
- Inflation valve : 4 plus keel
- Inflatable keel : 1
- High pressure air (Cylinder) inflation points : 2
- Overpressure valves : 4 plus keel
- Total airtight chambers: 4 plus keel

Engine Power

- Engine: shaft length : (20”) long shaft
- Useful HP range : 10-20 HP
- Maximum HP: 25HP (unguarded propeller outboard) or 30 HP (guarded propeller)
- Maximum weight of engine : 75 kg

The ERB has been equipped with a 25hp Mariner marathon engine which has been fitted with a propeller guard.

SPECIFICATIONS	MARATHON 25
Horsepower	30 hp
Dry weight	48 kg
Revolutions per minute (RPM)	5000-5850
Displacement	429 cc
Cylinder layout	In-line
Number of cylinders	2
Starting	Manual
Alternator system power	76 watt
Trim positions	6
Induction system	Loop charged (1carb)
Gear shift	Forward (F) Neutral (N)
Gear ratio	1.92:1
Steering	Tiller: M, ML
Recommended boat transom type	Short 435 mm -
Fuel tank type	Standard
Fuel type	Gasoline
Closed cooling	N/A
Engine technology	2 strokes

The ERB 400 Boats are located at:

- **Aberystwyth**
- **Welshpool**

- **Swansea Central**
- **Carmarthen**
- **Milford Haven**
- **Hay on Wye**

3.4 STANDARD BOAT INVENTORY (RIB and SRT boats)

Boat including paddles Outboard engine Galvanised Trailer Lifejackets **x 4**

Waterproof lamp & charger **x 1**

Waterproof bag for radio **x 1**

First Aid kit **x 1**

Engine tool kit & propeller **x 1**

Anchor, chain & line (30 mtr) **x 1**

6m Painter (Bow line) **x 1**

Throw line in bag **x 2**

Body bag **x 1**

Plastic survival bag **x 1**

ERB

Inventories may vary slightly from station to station, therefore this inventory is to be taken as a standard requirement.

3.5 M9 Workboats

The work boats have been supplied for crews to be able to transport people across stretches of slow, low energy water. The craft is designed to be exceptionally stable even when tested in white water conditions.

The craft is lightweight and can be stowed in a bag. Its stowed weight is

20kg which can be carried by one man in line with the service manual handling standing order. The bag has several handles which can accommodate a multi person lift should it be deemed necessary in line with a dynamic risk assessment.

The M9 workboats will be stored deflated and can be inflated at the incident using the supplies regulator and a BA cylinder.

The Cylinder is connected to the regulator and the cylinder opened, the pressure relief valve will operate to indicate that the required pressure has been reached.

When inflating the regulator and cylinder will become cold and may cause frosting.

Personnel inflating the work boat must wear appropriate PPE (Gloves and eye protection)

3.5.1 Specification

Length		Beam		Tube	Weight
Overall	Inside	Overall	Inside		
2.74m	2.01m	1.48m	0.70m	0.38m	20kg

Stowed	Displacement		Capacity	
	Dry	Swamped	Weight	Person
89 x 46cm	1100kg	640kg	400kg	4

3.5.2 Transportation

Both the RIBs and the SRT boats are transported via a trailer and a dedicated vehicle assigned to the specific boat station.

The workboats are non-mobile items of equipment and will be taken to an incident by command staff on request. There are several options for mobilising the workboat using both fire appliances and support vehicles. Below are some suggestions on how the work boats may be transported to an incident.

Remove GTS

Stow in tool Locker

Stow in rear cab

In response car (Skoda Yeti shown)

The suggestions above are not a definitive guide on how the work boats may be mobilised and commands may make other arrangements for their transport to an incident.

3.6

MOBILISING & CREWING

Milford Haven RIB

The boat will be mobilised with a minimum crew of three operators qualified to the levels detailed in section 2.0

ERB 400

These boats will be mobilised as part of an SRT response as detailed in SOP 2.10 Working on or near water

Workboats

These boats are part of a command's non mobile equipment and will be available on request through control.

3.7

STANDARD TESTING & MAINTENANCE

All the equipment within the standard inventory is to be inspected and maintained by Fire Service personnel in accordance with manufacturers instructions and this Appliance, Equipment &Technical document & Fire Service Manual Vol'1:

Test Frequency

On Acceptance

After Use After Repair Weekly Quarterly

6 Monthly

Annually

On OIC's Discretion

On completion, Standard Test records must be completed accordingly. Due to the large numbers of various types of equipment within the inventory, standard testing should be staggered to the following frequencies:

Weekly

- Mainscheme Radio on the designated vehicle
- Hand-held radios (portable mainscheme radio if applicable)
- Water-proof lighting
- Keel and sponson (ensure that each section is inflated)
- Life jackets (visual)

Monthly

- Engine (engine tool kit & propeller)

If the engine has not been used for training or at an incident within the past 30 days then the engine should be subjected to an after use flush test as listed in section 3.8 of this AET

Quarterly

- Torches
- Extinguishers
- Trailer unit
- Life jackets
- All Lines
- Anchor, chain & line
- 1st Aid Kit

Other items of equipment which may be present over & above minimum requirement:

- Ratchet strap
- Boat Sling
- Strops & 'D' Shackles
- Winch

6 Monthly (By insurance engineer**)**

- Boat Sling
- Strops & 'D' Shackles

Annually

- Lifejackets

3.7.1 When carrying out a visual standard test on this equipment, things to look out for are:

Boat & Trailer

- The boats main structure is in good condition and that the keel & sponson are adequately inflated.

- The trailer unit is in good condition, all fixings are secure, all straps & ratchets operate correctly and are in good condition and that the wheels are road-worthy.

- It is also important to ensure that the engine is thoroughly flushed with clean water after use.

Ancillary equipment

- Ensure that the equipment is clean and dry whilst in storage.

- Check that the body or structure of the item is not damaged, and that any nuts, bolts and/or fixtures are tight.

- Check that metallic items of equipment are free from rust, if necessary use cloth/wire brush to remove rust and smear with oil or petroleum jelly.

- Ensure that any moving parts are in good order and that the device works efficiently. The item should be lightly oiled or greased if necessary.

- If the condition of a particular item of equipment is unsatisfactory, then an order for a replacement is to be completed using the ops 50 procedure where necessary.

On completion, Standard Test records must be completed accordingly.

3.8 FLUSHING OF ENGINE WITH CLEAN WATER (after use)

After the boat has been used, it will be necessary for the engine to be flushed with clean water, in order to remove any silt, grit or other fine debris which may have been induced into the engine during operation.

Therefore on return to station, the procedure for flushing the engine (outboard motor) is:

- Locate a drum behind the boat and fill with clean water, the advised container is to be a 45 gallon drum with the top removed.

- Crew is then to lower the engine into the container, taking the utmost care when carrying out this procedure.

- When the engine is lowered and the propeller is fully submerged, the Crew are to ensure that container and engine are both secure, only then can the engine be turned on.

THE ENGINE IS TO REMAIN IN NEUTRAL AT ALL TIMES.

- The engine is then left to idle for approx 5 minutes, enabling enough time to flush the engine thoroughly, at the same time ensuring that a fine jet of water in continually expelled from the water coolant drain.

- Once flushed, turn off engine, and crew is to lift the engine clear of the drum.

FULL PPE INCLUDING GLOVES AND SAFETY GLASSES ARE TO BE WORN AT ALL TIMES

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4. Aide Memoir

4.1 SAFETY

All boats within Mid & West Wales Fire & Rescue Service are only to be operated by trained personnel (Minimum RYA Level 2).

FULL PPE IS TO BE WORN i.e: All operators are to wear Dry-suits, Helmets etc

4.2 GENERAL USE & INFORMATION

The Boats used in the service are for effecting rescues and providing safety for crews working on or near water, at inland and specific costal waterways.

There are three types of boat currently in use within MAWWFRS:-

- Delta 650X(based in Milford Haven)
- Avon ERB400 (Based with each SRT team)
- Avon M9 workboat (Non mobile within each command)

The Delta 650X RIB located at:

- Milford Haven

The Inflatable Boats are located at:

- Aberystwyth
- Milford Haven
- Carmarthen
- Llanelli
- Welshpool
- Hay on Wye
- Swansea Central

The Avon W465 training boat/operational spare located at:

- Earlswood Training Centre

4.3 INVENTORIES

Inventory found within this document is the minimum requirement for an operational boat, however may vary slightly from station to station.

4.4 STANDARD TESTING & MAINTENANCE Test Frequency

On Acceptance

After Use After Repair Weekly Quarterly

6 Monthly

Annually

On OIC's Discretion

On completion, Standard Test records must be completed accordingly.

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5. SOURCES OF INFORMATION (& APPENDICIES if necessary)

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5.1 POINTS OF REFERENCE

Manufacturers information

DEFRA guidance

SOP 2.8 Flooding

SOP 2.10 Working on or near water

[back to top]

ORIGINAL AUTHOR	[redacted]
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REVIEWED BY	
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Annex D

Health and Safety Procedural Guidance Document 5.19 - Risk Assessment

MID & WEST WALES FIRE & RESCUE SERVICE
HEALTH & SAFETY PROCEDURAL GUIDANCE DOCUMENT

5.19 – Risk Assessment

US – Indicates Updated Section (US) - (for initial circulation / publishing)

Contents

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1.0 Risk Assessment

1.1 Risk assessments can be carried out by any member of staff within a Department or Station.

1.2 Advice and guidance on undertaking risk assessments can be found within this procedure. Additional information on lone workers can be found within Procedure CR 5.21 Lone Working.

1.3 This guidance is for use by all staff to carry out risk assessments across the broad spectrum of Service activities within their own sphere of competence.

1.4 A list of those members of staff who have successfully passed either the NEBOSH or IOSH exam can be obtained from the People and Development Department. The holders of these qualifications are able to assist any member of staff with risk assessments. When approached, a qualified member of staff should respond positively and should bear in mind that it is their knowledge of the risk assessment procedures that is required and not an in-depth knowledge of the task or job to be assessed. This will be provided by the individual requesting assistance. Therefore, any risk assessment being undertaken should involve both the worker and where requested the NEBOSH or IOSH holder.

1.5 To enable uniformity of standards to be monitored and to assess the effectiveness of the risk assessment programme, copies of all risk assessments are to be forwarded to the Corporate Risk Dept, Service Headquarters, for uploading to the Service @work site. A copy should also be retained within the Station /Department. Heads of Area Response /Department Heads will have the responsibility of implementing any remedial action that may be required. (This will normally be as a result of a stage two assessment).

1.6 Department Heads will indicate on the form what action has been taken to resolve any problems before passing the assessments onto the Corporate Risk Dept.

2.0 Review of Procedure

This procedure shall be reviewed following:

i. receipt of new information;
ii when introducing change to or new working procedures;
iii introduction of new agreements;
iv in any event after 36 months;
v at any other time when the current procedure is deemed to be invalid.

Risk Assessment Guidance

This guidance is intended to help personnel to carry out Risk Assessments by following the procedure detailed below.

An Assessment is nothing more than a careful examination of what in your work, can harm people/property. This assessment will help to decide whether sufficient precautions have been taken; or if more needs to be done to prevent harm.

The overall aim is to make sure that no one is injured, becomes ill and that damage does not occur to equipment or property.

The important things that need to be decided are whether the hazards that have been identified are significant and whether they have been covered by adequate control measures so that the resulting risk is small.

e.g. Exposure to some chemicals presents a serious risk to health. However, by wearing Chemical Protection Suits, and Positive Pressure Breathing Apparatus, this Risk becomes negligible.

Risk Assessment Methodology

The process of Risk Assessment is carried out in two stages.

Stage 1

Identifies all significant Hazards that are present in the Workplace and takes account of:-

- who will be harmed;
- the chance of that harm occurring (likely occurrence);
- how much harm will occur (likely severity).

Hazards which present Risks that cannot easily be controlled require further attention, and the Stage II Assessment should be undertaken.

Stage 2

Identifies:

- the Hazards that require more attention;
- the extra controls that are required to reduce the Risk to an acceptable level;
- who will provide the extra controls;
- when the controls are to be implemented.

The Risk Assessment should be completed by Personnel who are competent in the subject that is being assessed by their knowledge, experience or training.

Stage 1 Form (Guidance For Completion)

Does any task expose personnel or other persons to Hazardous Substances or Hazardous Environments that may affect their health?

N.B. The "Hazard Type – Guidance to Stage 1 Assessment" and "Manual Handling Assessment Stage 1" can be used in association with the guidance below.

Activity/Workplace

In order to identify the Hazards present, all the activities or Workplaces must be listed. If a procedure is being assessed, all the events of that procedure should be listed in sequence.

Hazard

The next stage is to identify the Hazards associated with each of the "Areas of Assessment" as applied to each Event, Activity or Workplace.

The Areas of Assessment are:-

Actions what tasks are being undertaken that present hazards;

Environment what elements of the working environment act on the tasks being undertaken that may cause hazards e.g. heat, humidity, cold, slippery surfaces, poor lighting, rough terrain etc.;

Equipment does any equipment being used present hazards to the operations or other persons? e.g. light weight, pump hydraulic rescue equipment, disc cutters;

Occupational Health does any task expose personnel or other persons to hazardous substances or hazardous environments that may affect their health?

e.g.
- biological agents;
- noise;
- smoke;
- radiation;
- fumes;
- lubricants;
- sewers;
- flammable liquids etc.

Litigation Are there any acts or omissions possibly performed by personnel that would be deemed as negligent towards other personnel, other persons, equipment, property or the environment.

Persons at Risk Once all the significant hazards have been established, the persons that will be at risk from the hazards must be identified e.g. operational personnel, contractors, members of the public etc. This should also include the numbers of persons involved.

Existing Controls Any existing control measure relating to each Hazard should be identified and recorded. These will be taken into account when determining the Risk Rating.

Risk Rating The final part of the Stage 1 Assessment process will be to calculate the Risk Rating for each identified Hazard. This is done by estimating the likelihood of harm occurring and the Likely Severity should an accident happen.

Any existing control measure relating to each Hazard should be identified and recorded. These will be taken into account when determining the Risk Rating.

As mentioned earlier the existing control measures should be taken into consideration at this point, and the result of the calculation applied to the Risk Rating Interpretation.

Any risk that requires further action should be subject to a Stage 2 Assessment.

On Completion of the STAGE 1 Assessment Form

- one copy is to be forwarded to the Head of Area Response / Head of Department;
- one copy is to be forwarded to the Corporate Risk Department;
- one copy is to be kept in the Station / Department.

Stage 2 Form (HSRA 8) Guidance for Completion

Review of the assessment should be carried out on a regular basis.

Activity/Hazard The Hazard in question should be identified.

Controls Required Further control measures that are required to reduce the Risk to an acceptable level should be recorded. If the Risk Rating is very high and further control measures cannot reduce it, then it would be unacceptable to continue, and the activity should be halted.

Action by and Target Date Personnel should be identified who are going to put the controls in place and a date set for when they are to be introduced.

Monitor and Review of Assessment

It is the results of this stage ii assessment that will be recorded, monitored and reviewed periodically

The Monitoring process should ensure that the Safety Controls put in place stay in place and remain effective. This should be reflected in the 'Controls Required' column on the Stage II Assessment form (HSRA 8).

The review, and if necessary a modification of the Assessment should be carried out on a regular basis.

Unless:

- the nature of the work changes;
- the appreciation of Hazards and Risk increases;
- there is reason to suspect that the Assessment is no longer valid;
- accidents / near misses occur which were previously unforeseeable.

On completion of the STAGE 2 Assessment Form

- One copy is to be forwarded to the Head of Area Response / Head of Department;
- One copy is to be forwarded to the Corporate Risk Department;
- One copy is to be kept in the folder or electronically at the location.

Training Risk Assessment

Training for Realism

Risk that is introduced into training must be a planned exposure with a definite purpose in mind.

- The standard drill, as set out in the Fire Service Training manual is the cornerstone of all practical training.

- The procedures and safety precautions written into the drills ensure that the safety of personnel taking part is paramount. This results in little exposure to risk whilst performing those drills.

- As skills develop, personnel should progress to more advanced types of training exercises.

- Ideally, the first time firefighters are exposed to a risk should not be at an operational incident where they would rely solely on someone else's experience to deal with that risk.

- Personnel must, therefore, be exposed to risk whilst training and this is recognised by the Health and Safety Executive, for further guidance please see the following link.

- *"If, in order to discharge his Section 2 duty, the employer has to expose the firefighter to an element of risk on the Training Ground, then the Health and Safety at Work Act does not prevent it, provided that all is done by the way of supervision and the provision of safeguards to ensure that overall, the arrangements are a safe as can sensibly be".*

  Also;

  "The exposure of firefighters to the risk of the training ground must be a planned exposure with a definite purpose in mind and one for which the way ahead has been prepared in previous training".

- In order to follow this concept, drills and exercises must be formulated that introduce elements of realism. These can be conducted on station drill grounds and also at off station sites/premises.

- A drill yard at a Fire Station or Training Centre is normally a safe area until Fire Service activities are performed on it. Hazards are introduced into these training areas which have the potential for serious harm and only the controls of the risks that have been created by the hazards prevent injuries and damage from occurring.

On Station

As more Risk has to be introduced into training, then the control of that risk must be increased:-

- As more risk has to be introduced within training scenarios, as suggested by the Health and Safety Executive, then the controls of these risks must be increased.

- In order to assist Officers-in-Charge of drills/exercises to identify hazards and, therefore, determine the extent that crews are being exposed to risks, a guide has been produced that will aid the assessment of those risks and once identified controls of the risks can be formulated.

- The guide provided is for general purpose risk assessment use but can easily be adapted for any situation, including training scenarios. The assessment is carried out in two stages. Refer to the Risk Assessment Procedure Appendix 'A'.

Planning and Organising Arrangements of the Safety Controls

- The controls that have been identified must be planned and organised in such a way that they remain in place throughout the training period and that also includes the making up of equipment following the completion of the exercise.

Monitoring of the Safety Controls

- The Officer in Charge of the exercise must observe the safety controls and note if they were effective during the training period. This includes actions taken against recommendations of a safety brief. Nominated safety officers may also carry out this function.

Review of the Safety Controls

Any observations relating to the success or not of the safety controls must be raised as part of the debrief. Any ***significant*** observations that have any bearing on Service or Fire Service activities must be reported via the Operational Learning System (OLS).

The ORM Department will sift through any reported learnings for actioning by the Head of ORM Department. An email will then be circulated to the relevant Department to take appropriate action.

In the event that a learning outcome is highlighted relating to risk critical activities, the Head of ORM will forward an email to the relevant Department.

All actions undertaken are then fedback into the OLS system for audit purposes.

Observations would include:

- any injuries, Near Miss Events occurring;

- observations regarding safety controls;
- any comments that will improve safety in future training periods.

Off Station Exercise Sites

Risk Assessment is carried out in two stages

- Opportunities to hold Training Exercises at off station locations occur from time to time and full advantage should be made of them.

- The procedure for assessments will be similar as for station drills, but more reliance will be placed on the Hazard Type Guidance to Stage I because the site/premises being assessed will be relatively unfamiliar.

Safety Representatives

- Persons who have been nominated as Safety Representatives under the Safety Representatives and Safety Committee Regulations 1977 have legal rights to inspect the workplace and this includes exercise sites.

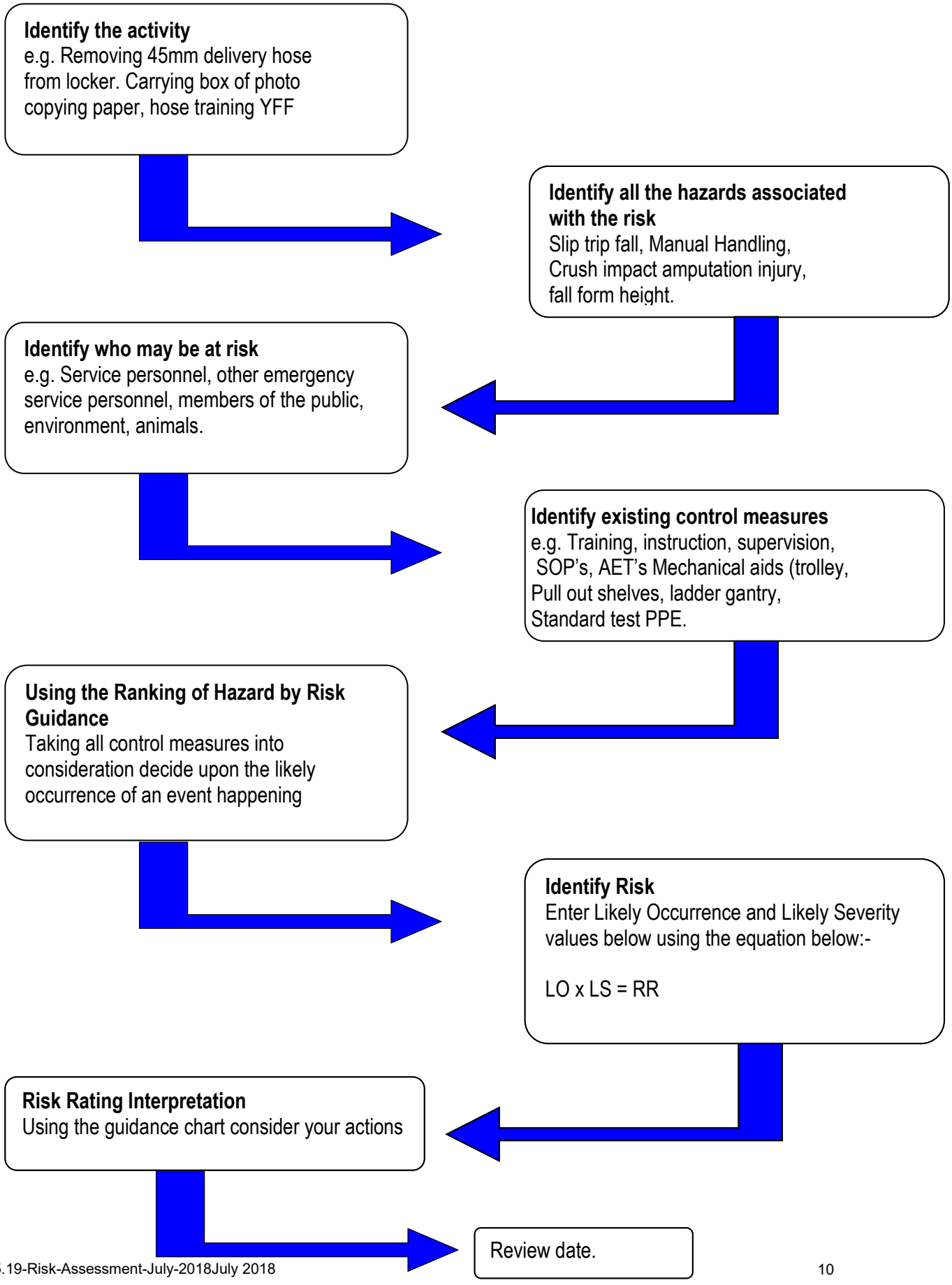
- Every effort should be made to liaise with the relevant health, safety and welfare representative in order than if they so request, they can inspect the site and details of the exercise can be viewed by them.

Risk Assessment Proforma

The following risk assessment forms will be available for Officers in Charge of exercises to carry out their assessments.

- Manual Handling Assessment – Stage I (HSMHRA Initial)
  Blank Manual Handling Risk Assessment Forms (HSMHRA 5)
- Blank Stage I Risk Assessment Forms (HSRA 7)
- Blank Stage II Risk Assessment Forms (HSRA 8)

How to complete a Risk Assessment



Risk Ranking Table

		Likely Severity									
		Catastrophic		Critical		Very Serious		Serious		Marginal	
Likely Occurrence		10	9	8	7	6	5	4	3	2	1
Highly Likely	10	100	90	80	70	60	50	40	30	20	10
	9	90	81	72	63	54	45	36	27	18	9
Probable	8	80	72	64	56	48	40	32	24	16	8
	7	70	63	56	49	42	35	28	21	14	7
Reasonably Probable	6	60	54	48	42	36	30	24	18	12	6
	5	50	45	40	35	30	25	20	15	10	5
Remote	4	40	36	32	28	24	20	16	12	8	4
	3	30	27	24	21	18	15	12	9	6	3
Unlikely	2	20	18	16	14	12	10	8	6	4	2
	1	10	9	8	7	6	5	4	3	2	1

Milford Haven Port Authority - Leisure Guide

2019 Leisure User Guide

Please see over for more information about the Waterway.

Dead Slow Minimum Wake
These areas are designated for navigational safety and importance for wildlife. Bays, creeks and tributaries provide vital feeding and breeding areas. At low water most of these areas may dry out or become very shallow revealing submerged natural features. The restriction on speed and wake reduces disturbance and helps protect wildlife from swamping or being panicked by fast moving vessels, and the environment from damaging effects of wake and vessel contacts. Operating at slow speed in these areas also reduces the possibility of serious injury or damage and also helps to reduce conflicts between users and ensures safe navigation for all.

Jet Ski/PWC Aquabatics Area
Personal Watercraft (PWC) aquabatics are ONLY permitted in the Pwllchrochan Flats PWC area. PWCs are permitted elsewhere in the Haven if they navigate considerately with due care and attention and in compliance with Harbour Bye-laws and zoning.

Water-skiing Areas
In the interest of safety, vessel owners should be mindful of their wake in these areas and transit with caution.

Potential Renewable Test Bed Sites

Sensitive Habitat Zone - Voluntary No Anchoring

National Park

Hotel or Public House

Launch Site

Public Pontoon (Seasonal)

Castle

Yacht Club

Fuel

Privately owned/operated Pontoon (Seasonal)

Marker Buoys

Moorings (Commercial)

Day Visitor Moorings
These moorings are for the use of vessels up to a max length of 40ft and max weight of 10 tonnes during daylight only. The skipper must ensure sufficient depth of water and swinging area is available for the vessel to be secured. Full conditions of use can be found at www.mhpa.co.uk/marine-leisure-services/

Defibrillator *(accessible from water)*
Defibrillators can be found at:
Hazelbeach: public toilet wall at the top of the pontoon
Burton: public toilet wall in the car park
Neyland Marina: top of the gangway entrance
Milford Marina: Pier Head **Dale:** the boathouse
Lawrenny Arms: behind the bar **Black Tar:** top of slipway.

All Pilot Vessels and the Water Ranger RHIB carry defibrillators (contact details overleaf.)

Leading Lights in the Haven

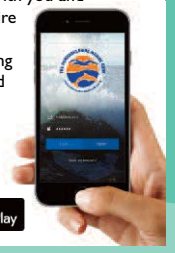
Haven Approach:
West Blockhouse **(WBH)**
Watwick Beacon **(WB)** 022(T)

West Channel:
Great Castle Head **(GCH)**
Little Castle Head **(LCH)** 040(T)

Main Channel:
Popton and Bullwell beacons **(PP) (BW)** in line 095(T) 094(T)

Milford Shelf:
Beacons above Newton Noyes **(NN)** 080(T) 087(T)

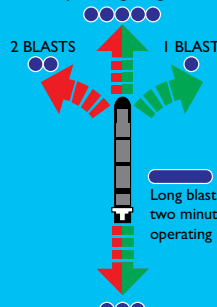
Please respect this environment: take your litter home with you and follow the Pembrokeshire Marine Code. Together we'll protect the amazing plants and wildlife found along the Waterway. To find out how you can protect marine wildlife go to www.pembrokeshiremarinecode.org.uk or download the Pembrokeshire Marine Code App.



Available on the App Store | GET IT ON Google Play

Horn Signals

5 BLASTS (DANGER)
You must make clear your intentions and indicate that you are getting out of the way



CAUTION: These areas have a high incidence of close quarters situations between craft of less than 20 metres in length, and vessels which can only safely navigate within the fairway. Recreational craft should navigate with extreme caution in these areas and should monitor VHF channel 12 at all times when within the Haven. Users are advised that Port Vessels and Police Marine Unit vessels patrol near Terminals to maintain BL27.

Haverfordwest
Little Milford
Hook
Millin Pill
Picton Castle
Slebech
Blackpool Mill
Western Cleddau
Picton Point
Eastern Cleddau
Landshipping
Sprinkle Pill
Llangwm
Beggar's Reach
Garron Pill
Benton Castle
Cresswell Quay
Lawrenny
Cresswell River
Carew and Cresswell Rivers
Navigable only with great care and local knowledge.
Upton
Carew River
Carew
Sandy Haven
Puma Energy Ltd.
St Ishmaels
Dale
Area used by sail training centres for teaching beginners. Proceed with caution.
Dale Anchorage
Lighthouse
(LCH)
(GCH)
South Hook LNG
Gelliswick
Milford Haven
Milford Marina
Milford Haven Port Control
Stack Rock
Small boat passages marked orange
Tanker Terminal Keep Clear
See Caution
Castle Pill
(NN)
Valero Pembrokeshire Oil Terminal & Dragon LNG
Llanstadwell
Westfield Pill Nature Reserve
Neyland
Neyland Marina
Burton
Rudder's Boatyard
Toll Bridge
Pembroke Ferry
Area used by sail training centres for teaching beginners. Proceed with caution.
Hobbs Point
Ferry Port
Pembroke Dock
East Llanion Marine
Cosheston Pill
Wear Spit Beacon
Pwllchrochan Flats (shallow at low tide)
(WB)
(WBH)
Thorn Island
RNLI Lifeboat Station
Angle
(PP)
(BW)
Valero Refinery
Pembroke Power Station
Pembroke River
Navigable only with great care and local knowledge
Pembroke
Lighthouse
St Ann's Head
West Channel
East Channel
Mid Channel Rocks

NOTE: Tugwash may be experienced at the entrance and in the west channel whilst escorting tankers.

*** Approximate Ferry Times**

St. Ann's inwards at	1145 hours
Depart Ferry Terminal at	1445 hours
St. Ann's inwards at	2345 hours
Depart Ferry Terminal at	0245 hours

Pembroke Barrage
To request barrage opening, ring County Hall 01437 764551
Operating times 07:00-19:00 weekdays 09:00-12:00 Saturdays
Please request 72hrs in advance

N
0 1 2 3
Kilometres

List of Admiralty Charts 1478, 2878, 3273, 3274, 3275
Leisure Charts SC5620 folio | Imray Y26 and 2600 ATLAS refer

NOT TO BE USED FOR NAVIGATION

Port of Milford Haven

www.mhpa.co.uk
PortofMilfordHaven
@mh_port

It is recommended that you:

Inform Tell others where you are going and when you will be back.

Tides and Weather Check the tides and forecast to ensure conditions are and will remain suitable for your vessel and activity.

SOS Device Carry a marine VHF radio with Ch16 and capable of listening to Ch12 (harbour working channel) as well as any other means of calling for help.

Wear a Lifejacket You never know when you might need it and it could just save your life.

Engine and Equipment checks Ensure you have appropriate working equipment and spares aboard and that all moorings or anchors being used are capable of withstanding extreme weather conditions.

Training Ensure your vessel is handled in a competent manner and avoid taking unnecessary risks.

RNLI safety information is available by visiting www.rnli.org.uk

Been involved in an incident on the Waterway?
Report to Milford Haven Port Control on 01646 696136/7 or complete an incident report form, found on the Port's website: goo.gl/yqhWwz

The Water Ranger

The Water Ranger patrols the Waterway in a grey RHIB with Patrol on the sides from St Ann's Head at the entrance to the Haven, upriver to Haverfordwest on the Western Cleddau, and Blackpool Mill on the Eastern Cleddau. The main aim of this service is to provide information, advice and assistance to all Waterway users, police the zoning system and enforce the appropriate Bye-laws. www.mhpa.co.uk/water-ranger

If you wish to contact the Water Ranger please call 01646 696100.

Further information for recreation users can be found by visiting www.mhpa.co.uk/marine-leisure-services

Waterway patrol vessels

Port pilot vessels operate throughout the Waterway 24/7 and can be recognised by their green hulls and white superstructure. All patrol vessels keep radio watch on channel 12.

Sharing the Estuary Safely

You are sharing the Haven with wildlife, commercial activity and a whole range of other leisure activities. To promote the safety of navigation and reduce conflict between users, the Waterway is zoned for high speed activity. The zones also ensure that the sensitive areas of the Haven remain tranquil and can be used for quiet enjoyment. The Milford Haven Port Authority Bye-laws (see page 14) control navigation and should be followed at all times.

Conservation & Wildlife

The Haven is a special place, protected for its tranquil, scenic landscape and varied wildlife. The upper and lower reaches form part of the Pembrokeshire Coast National Park because of their unspoilt character. For more information on exploring the National Park visit: www.pembrokeshirecoast.org.uk

In spring and summer the peaceful bays and rivers form breeding grounds for many birds, whilst in winter up to 25,000 birds such as shelduck, teal, widgeon, curlew and redshank come here to feed. Many parts of the foreshore are Sites of Special Scientific Interest and the whole Haven forms part of the Pembrokeshire Marine Special Area of Conservation because of its international importance for marine wildlife above and below the water. For more information visit www.pembrokeshiremarinesac.org.uk

Human activities in the Haven can damage and disturb wildlife and its habitats. Please think and act in an environmentally friendly way by following the zoning, Bye-laws and Pembrokeshire Marine Code. Following the Marine Code will help you to enjoy the best of the coast without disturbing sensitive wildlife. www.pembrokeshiremarinecode.org.uk

Recreation Activities

A whole range of water-based recreation activities take place on the Waterway, including sailing, power boating, water-skiing, personal watercraft use (jet-skiing), windsurfing, canoeing, fishing, diving and bathing. Activities take place both on an informal basis and through organised events.

Navigation Notes

Commercial Vessel Speed

Large commercial vessels may, at times, make passage at higher speeds than expected to maintain proper control and steerage. Users should monitor the approach of vessels and remain clear when required.

Approach for Milford Docks

Leading lights 348° fixed blue in line with fixed blue on white background attached to wall below the Lord Nelson Hotel.

Cleddau Bridge

There may be confused water by bridge piers approximately 1 hour before and after High Water springs.

Lifeboats

A Tamar class lifeboat and an inflatable 'D' class inshore lifeboat are based at Angle. **People in danger and needing rescue services should contact Milford Coastguard - 999** - ask for Coastguard, or call on VHF channel 16 using accepted emergency procedures.

Public Pontoons (Mar-Oct)

A maximum stay of 12hrs is permitted with no return within 24hrs. The 'T-Head' must remain clear at all times for embarking /disembarking.

Fishing Restrictions

Welsh Government legislation and the Bass Order 1990 restrict fishing between 30th April and 1st November in areas of the Waterway. Fishing methods, minimum sizes and catch quantities are also controlled throughout. For information call 0300 025 3500. Fishing for salmon, trout, freshwater species and eels within the Waterway requires a valid UK rod licence.

Local Weather Information

Weather forecasts are broadcast by **Milford Haven Coastguard on channels 16 and 84.** Times: Inshore weather 0750, repeated three hourly, and 1950, repeated three hourly. Strong wind and gale warnings are broadcast as soon as they have been received and on subsequent three hour forecasts.

Tidal Information

Differences at High Water

Approximate times to be applied to Milford Haven High Water predictions

Dover	+5 hrs	Tenby	-14 mins
Fishguard	+1 hr 3 mins	Swansea	+5 mins
Neyland	+2 mins	Ilfracombe	-30 mins
Haverfordwest	+10 mins	Padstow	-50 mins

Tidal Streams

Across the entrance to Milford Haven the streams run approximately at right angles to the line of approach; well within the entrance they run nearly parallel to the channel.

The tidal streams run approximately as follows:

Position	Interval from High Water Milford Haven	Direction
1 mile outside entrance	+0455	East
	-0125	West
	Maximum spring rate in each direction is 2.25 knots	
Inside the entrance	-0555	Ingoing
	+0030	Outgoing
	Maximum spring ingoing rate is 1.5 knots and outgoing rate is 1.75 knots	

It should be noted that heavy swell may be experienced until inside St Ann's Head in adverse conditions as far as Angle Light-bouy.

Tidal streams within the Haven run in the direction of the deepwater channel as far as Wear Point (51°42'N, 04°59'W). In the reach above the Wear Point the ingoing stream is deflected to the north side of the channel by Carr Spit (51°42'N, 04°57'.8W).

In Pembroke Reach the ingoing stream runs principally in the channel north of Dockyard Bank, attaining a spring rate of 2.0 knots; it is weak and irregular in the channel south of this bank, in which it attains a spring rate of 0.5 knot. The outgoing stream runs strongly in the channel south of the Dockyard Bank, attaining a spring rate of 2 knots. It is weak on the south side of the channel, north of the bank; in the north part of the latter channel an eddy runs strongly during the outgoing stream.

Safety

FOG - recommended procedure for small craft in visibility of 0.5 mile or less

1. All craft with VHF radio maintain a listening watch on channel 12
2. Provided you are aware of your position and you intend staying out of the fairway, monitor the commercial activity reported on channel 12
3. If you are uncertain of your position, it may be prudent to anchor clear of the shipping channel until visibility improves

Sound signals used by vessels in the area (Bye-laws No 9)

Signal	Meaning
Four short blasts in rapid succession	A power-driven vessel underway is about to turn around (altering course more than 135°)
Followed after a short interval by	
One short blast	Vessel turning with head to starboard
or	
Two short blasts	Vessel turning with head to port
Three short blasts	Vessel operating to stern
One long blast, two short blasts	Power-driven vessel or vessel not under command unable to give way to a sailing vessel
Five short blasts	A vessel is doubtful if you are taking sufficient avoiding action

Further Information

Key Contacts	VHF Channel	STD number
Milford Haven Port Control	12	01646 696137
Water Ranger	12 & 16	01646 696100
Milford Pierhead	14	01646 696310
Castlemartin Firing Range	16	01646 662367

Emergency Numbers	
HM Coastguard	999 or 01646 690909
Police (inc. Marine Unit)	999 or 0845 330 2000
Customs	0800 595000
Withybush Hospital, Haverfordwest	01437 764545
Natural Resources Wales (Incident Hotline)	0300 065 3000

Berths/Boatyards/Chandlery	
Dale Sailing	01646 603110
East Llanion Marine	01646 686866
Lawrenny Quay	01646 651212
Milford Marina and Boatyard	01646 696312/3
Neyland Marina	01646 601601
Quadra Marine	01646 278270
Rudders Boatyard	01646 600288
Windjammer Marine	01646 699070

Yacht Clubs	
Dale	01646 636362
Neyland	01646 600267
Pembrokeshire	01646 692799
Pembroke Haven	01646 684403

Other	
Tourist Information Centre, Haverfordwest	01437 775244
Pembrokeshire Coast National Park	01646 624800
Pembrokeshire County Council Beaches Dept.	01646 602105
Crime Stoppers	0800 555111

Marine Accident Report