

REVIEW

MIAIB
MARINE ACCIDENT INVESTIGATION BRANCH

Lifejackets: a review

NOVEMBER 2016

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

- BIM - Bord Iascaigh Mhara (Irish Sea Fisheries board)
- CWPFDF - Constant wear Personal Flotation Device
- EFF - European Fisheries Fund
- FISG - Fishing Industry Safety Group
- ISO - International Organisation for Standardisation
- MCA - Maritime and Coastguard Agency
- MGN - Marine Guidance Note
- MOB - Man overboard
- MSN - Merchant Shipping Notice
- NFFO - National Federation of Fishermen's Organisations
- PFD - Personal Flotation Device
- RNLI - Royal National Lifeboat Institution
- Seafish - Sea Fish Industry Authority
- SFF - Scottish Fishermen's Federation

SUMMARY

MAIB statistics between 2000 and 2014 show no downward trend in the rate of commercial fishermen who have drowned. Also, 67% of those who drowned¹ were not wearing a Personal Flotation Device (PFD) at the time they entered the water.

In 2013, following a number of recommendations from the MAIB, the Fishing Industry Safety Group (FISG) commenced an intensive education campaign aimed at persuading commercial fishermen to wear PFDs while working on deck. This campaign included the provision of grant-funded lifejackets. The same year, the Maritime and Coastguard Agency (MCA) accepted a recommendation² from the MAIB to specify the improvement in safety culture / behavioural change that it is seeking with respect to the voluntary wearing of personal flotation devices and to make arrangements to rapidly introduce the compulsory wearing of personal flotation devices on the working decks of fishing vessels should the sought after improvements not be achieved. Despite agreeing to complete an assessment of the campaign's effectiveness by 31 December 2014, and to mandate PFD wear if non-regulatory steps were failing, at the time of this report the MCA had not agreed the metrics for measuring success and no data had been collected.

Evidence from MAIB statistics and 35 MAIB investigations into accidents involving commercial fishing vessels since 2013 shows that the campaign has not been successful in reducing the fatality rate, and that there has been minimal change in the safety behaviour of fishermen.

A review of evidence from other nations shows that education campaigns are generally ineffective at changing behaviour with respect to the wearing of PFDs unless backed by relevant legislation.

¹ The term 'drown' is used in this Annex to mean death due to inhalation of water, or due to cardiac arrest leading to an inability to swim or stay afloat.

² MAIB Recommendation 2013/108

SCOPE

The purpose of this document is to evaluate the success of initiatives aimed at encouraging commercial fishermen to wear PFDs on the working decks of fishing vessels while at sea. The casualty data from the MAIB, MCA and several international organisations has been reviewed to validate the lifesaving potential of constant wear PFDs when worn on the exposed decks of fishing vessels. All the relevant recommendations made by the MAIB since its inception, and the implementation or otherwise of these recommendations, are also reviewed.

This document also reviews the campaigns carried out by various industry groups in the UK and Ireland, and also examines mandatory regulations the EU and other countries have introduced to ensure that PFDs are being used in the fishing sector. A review of the relevant literature studying the effect of mandating the wear of PFDs is also included.

CASUALTY STATISTICS

MAIB STATISTICS

The MAIB database on marine accidents held 380 cases of persons in the water from UK fishing vessels, between 2000 and 2015. 139 were recorded as fatal drowning accidents. Of these, 93 of the casualties were not wearing PFDs and 17 were wearing them. In the remaining 29 cases it was unknown whether PFDs were worn at the time of the accident (**Table 1, Figure 1**). The statistics show that the likelihood of surviving a man overboard incident is five times greater if a PFD is worn.

Fatal drowning accidents		
PFD not worn	PFD worn	Unknown
93	17	29

Table 1: PFD usage statistics from MAIB database (2000-2015)

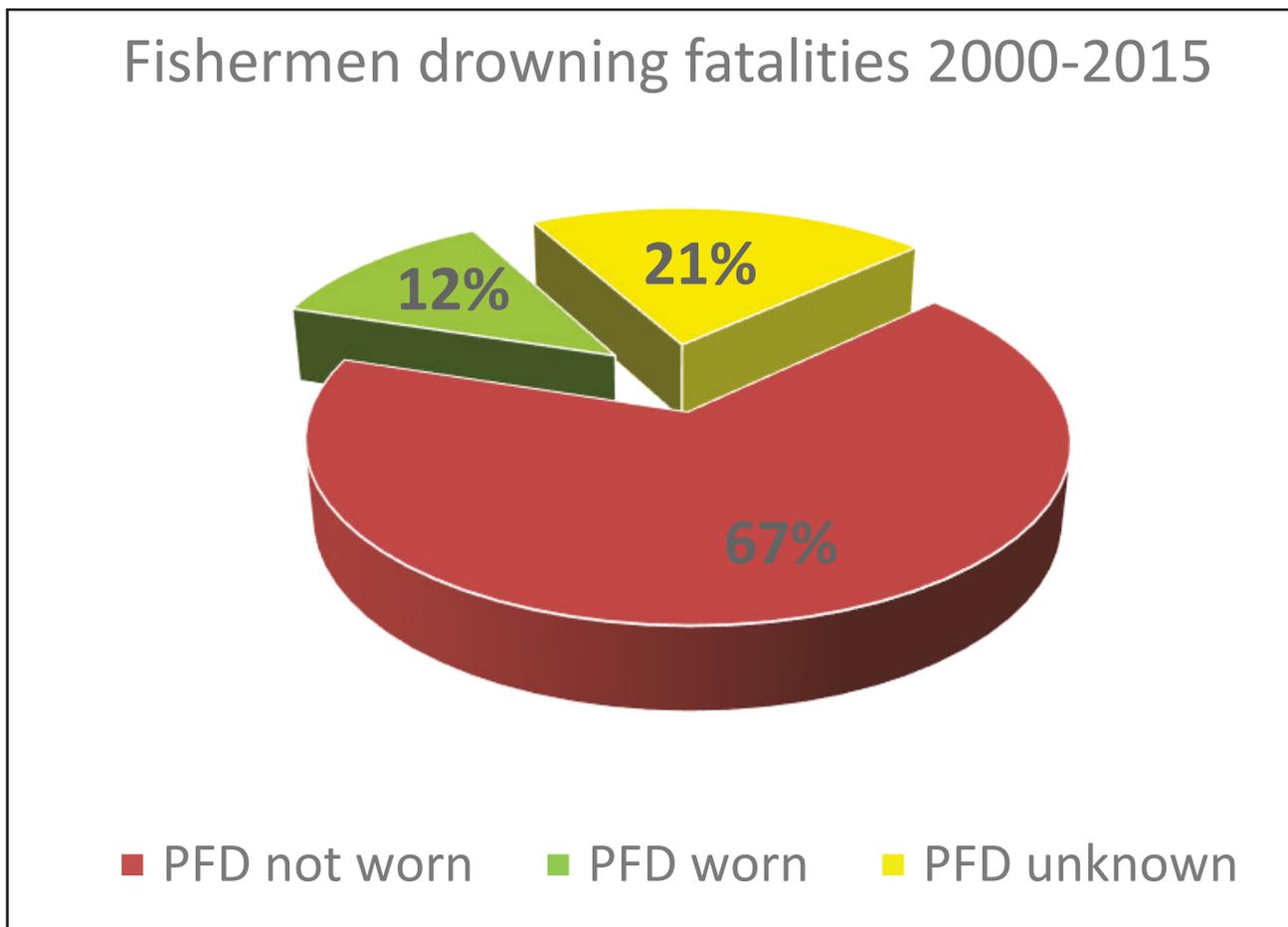


Figure 1: Fatality statistics from MAIB database (2000-2015 as indicated in **Table 1**)

The number of commercial fishermen has varied considerably over this period. So as to enable the number of fatalities from drowning to be compared as a proportion of the population at risk year on year, the number of commercial fishermen in the UK between 2000 and 2014³ was used to produce the annual drowning fatalities per 100,000 (**Figure 2**).

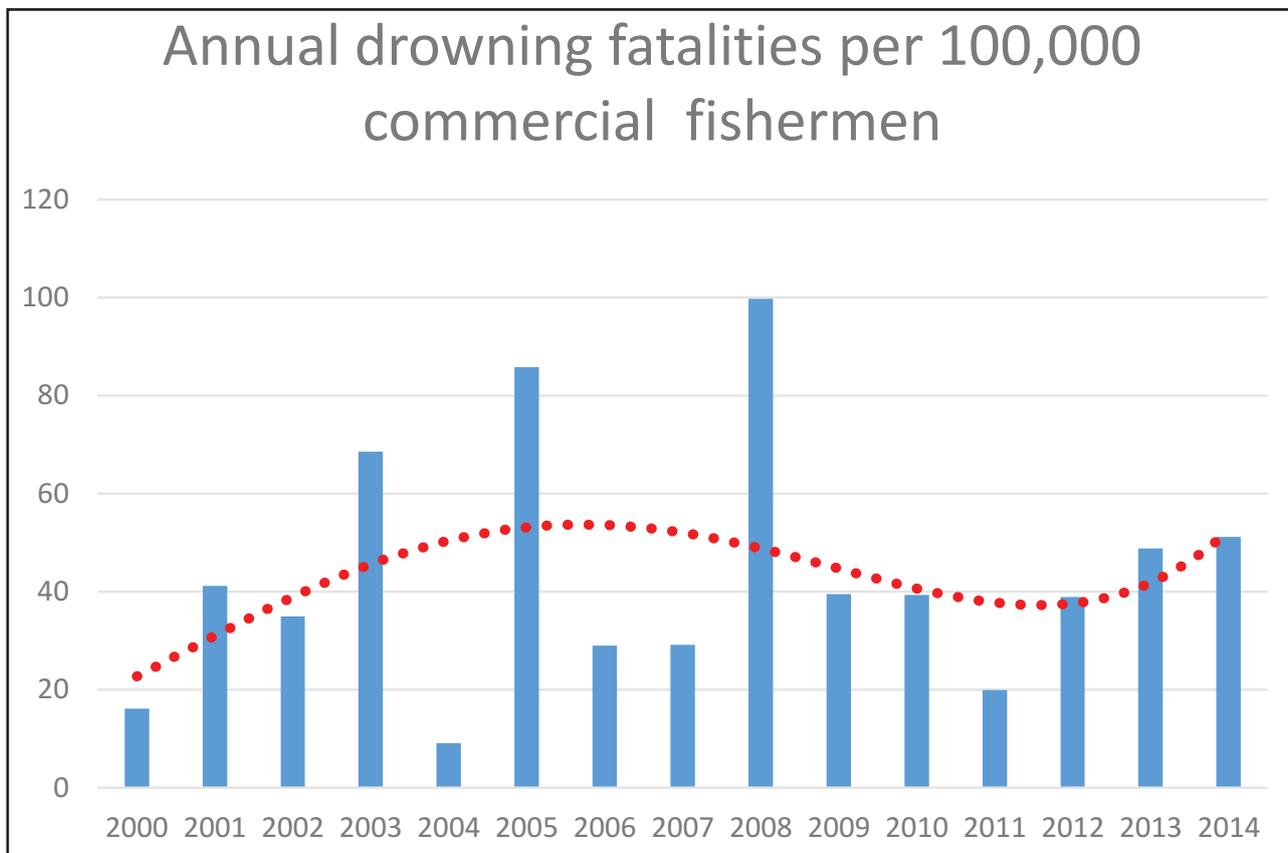


Figure 2: Drowning fatalities from 2000-2014 per 100,000 commercial fishermen

The graph shows no downward trend in the rate of commercial fishermen who have drowned; in fact, there appears to be a slight upward trend in recent years.

OTHER SOURCES

The Casualty Review Panel⁴ led by the MCA carried out a study on marine fatality data from 2007 to 2013 (**Ref 1**). The panel concluded that 148 lives, including 29 commercial fishermen, could have been saved had lifejackets or other buoyancy aids been used.

Statistics published by the US Coastguard for 2012 stated that, of the 459 cases of drowning from recreational vessels, 82% of the casualties had not been wearing lifejackets (**Ref 2**).

³ Data available from the Marine Management Organisation (MMO), 2015 data not available: <https://www.gov.uk/government/organisations/marine-management-organisation>

⁴ Casualty Review Panel comprises the Angling Trust, RNLI, Royal Yachting Association, MAIB, MCA, National Water Safety Forum, British Canoe Union, the lifejacket industry, Scottish Fishermen's Federation and University of Portsmouth

The research project entitled *Will it Float? Mandatory PFD Wear Legislation in Canada (Ref 3)*, was commissioned by the Canadian Safe Boating Council to *examine the advisability of advocating for legislation concerning mandatory PFD use for recreational boaters in small craft*. This report quoted 10 years of statistics provided by the Canadian Red Cross, which showed that lifejackets had not been worn by around 89% of those who had drowned. Similarly high figures are quoted for other countries studied in the report.

Presence / Absence of a PFD on Drowning Victim	1999	1991-1995	1996-2000
Victim was (properly) wearing PFD	11%	12%	11%
Victim was not wearing PFD / wearing PFD improperly / unknown	89%	88%	89%

Table 2: Statistical data on drowning fatalities presented in **Ref 3**
(source of data attributed to The Canadian Red Cross)

SUMMARY

The casualty statistics show that an MOB incident is between five and eight times more likely to result in a fatality when the casualty is not wearing a PFD. This is further corroborated by the findings of the MCA-led Casualty Review Panel establishing that 148 lives could have been saved in a 7-year period had the casualties used some form of buoyancy aid.

MAIB FISHING VESSEL INVESTIGATIONS SINCE 2013

Since 2013, the National Federation of Fishermen's Organisations (NFFO), Scottish Fishermen's Federation (SFF), Fishermen's Mission and Sea Fish Industry Authority (Seafish) have been distributing heavily subsidised or free constant wear lifejackets to fishermen in the UK. To assess the need to mandate the wearing of PFDs, the MCA had intended to review the effectiveness of this campaign by 31 December 2014. However, no metrics were set and no data was collected to enable such an assessment to take place. The MCA has now concluded, in conjunction with the FISG, that MAIB data on fishing vessel casualties will be used to assess the effectiveness of the campaigns.

The MAIB has started 35 investigations into accidents involving commercial fishing vessels since January 2013. The availability, use and relevance to the outcome of the accident of constant wear PFDs (CWPFDF) in these investigations is shown in **Table 3**.

Vessel name(s)	Accident Type	CWPFDF relevant to the accident	CWPFDF available on board	CWPFDF worn at the time of the accident	Comment
<i>King Challenger</i>	Man overboard	Yes	Yes	No	One fatality. Crewman lost overboard from the working deck.
<i>Our Sarah Jane</i>	Man overboard	No	Yes	No	One fatality. Deceased entered the water to clear the propeller.
<i>Harvester</i>	Man overboard	Yes	No	No	One fatality and one missing. Vessel foundered having run aground unmanned.

Vessel name(s)	Accident Type	CWPFDF relevant to the accident	CWPFDF available on board	CWPFDF worn at the time of the accident	Comment
<i>Apollo</i>	Man overboard	Yes	Yes	No	One fatality. Crewman lost overboard from the working deck.
<i>Louisa</i>	Flooding and foundering	No	Yes	N/A ⁵	Two fatalities and one missing. Vessel was at anchor and crew were in bed at the time of the accident.
<i>Majestic</i>	Flooding and foundering	Yes	Yes	No	No loss of life. Crew abandoned to liferaft.
<i>Annie T</i>	Man overboard	Yes	Yes	No	One fatality. Crewman lost overboard from the working deck.
<i>Aquarius</i>	Man overboard	Yes	Yes	No	One fatality. Crewman lost overboard from the working deck.
<i>Karen</i>	Submarine contact	Yes	Yes	No	No loss of life. Vessel started to submerge by the stern but broke free before foundering.
<i>JMT</i>	Capsize and sinking	Yes	Unknown	No	Two crew lost with vessel. One body recovered without PFD.
<i>Karinya</i>	Fire and sinking	Yes	Yes	No	No loss of life. Six crew survived having donned CWPFDFs.
<i>St Christophe 1</i>	Capsize alongside	No	Unknown	N/A	No loss of life, vessel moored alongside at the time of the accident.
<i>Enterprise</i>	Man overboard	Yes	Yes	No	One fatality. Crewman lost overboard from the working deck.
<i>Good Intent / Silver Dee</i>	Collision, and sinking	No	Yes	N/A	No loss of life, crew were in bed at the time of the accident but had time to don lifejackets.
<i>Kairos</i>	Capsize and sinking	Yes	Yes	Yes	No loss of life. Crew who were not already wearing CWPFDFs donned lifejackets.
<i>Stella Maris</i>	Capsize and sinking	Yes	Yes	No	No loss of life. CWPFDFs carried but not worn. Liferaft deployed and boarded.

⁵ N/A = Not applicable, i.e. it was not appropriate for the crew to be wearing a CWPFDF at the time.

Vessel name(s)	Accident Type	CWPFD relevant to the accident	CWPFD available on board	CWPFD worn at the time of the accident	Comment
<i>Beryl</i>	Man overboard	Yes	Yes	Yes	One fatality. Crewman lost overboard from the working deck, recovered on board after 49 minutes in cold water but did not survive.
<i>Ocean Way</i>	Capsize and sinking	No	Unknown	N/A	Three fatalities, two survived. Crew in accommodation and did not have time to don lifejackets during abandonment.
<i>Orakai / Margriet</i>	Collision	No	Unknown	N/A	No loss of life. Crew in accommodation at the time of the collision.
<i>Ronan Orla</i>	Occupational accident	No	Yes	No	One fatality. Single handed skipper became trapped in deck equipment. CWPFD on board was unused.
<i>Wanderer II</i>	Occupational accident	No	Yes	Yes	No loss of life. CWPFDs were used when working on deck.
<i>Diamond</i>	Grounding and sinking	Yes	Yes	Yes	One fatality, crewman had no PFD and died. Skipper was wearing a flotation suit and survived.
<i>Water-rail</i>	Navigational error	No	No	No	No loss of life. CWPFDs had been supplied but left at home.
<i>Barnacle III</i>	Man overboard	Yes	Yes	No	One fatality. Crewman lost overboard from the working deck.
<i>Shalimar</i>	Contact with quay, resulting in vessel foundering	No	Yes	No	No loss of life. CWPFDs available on board but not worn while manoeuvring in port.
<i>Karen / Sapphire Stone</i>	Collision resulting in loss of Karen	Yes	No	No	No loss of life. Lifejackets could not be reached. Liferaft deployed and boarded.
<i>Eshcol</i>	Carbon monoxide poisoning	No	Yes	N/A	Two fatalities in the accommodation while vessel was alongside.
<i>New Dawn / Horizon II</i>	Man overboard	No	Yes	No	One fatality. Skipper fell into the water while boarding a vessel moored alongside.

Vessel name(s)	Accident Type	CWPFD relevant to the accident	CWPFD available on board	CWPFD worn at the time of the accident	Comment
<i>Sally Jane</i>	Capsize and sinking	Yes	Yes	No	No loss of life. Crew were not on deck when the accident occurred. Liferaft deployed and boarded.
<i>Prospect</i>	Grounding and sinking	Yes	No	No	No loss of life. Only one of four crew donned a lifejacket. Crew transferred to lifeboat.
<i>Speedwell</i>	Flooding and sinking	Yes	Yes	No	One fatality. CWPFD available but not worn on single-handed vessel.
<i>Achieve</i>	Flooding and sinking	Yes	No	No	One fatality. Casualty donned lifejacket but died of hypothermia following rescue.
<i>JCK</i>	Foundering in heavy weather	Yes	Yes	No	One fatality. CWPFD carried but not worn on single-handed vessel.
<i>Vidar</i>	Man overboard	Yes	Yes	No	One fatality. CWPFDs carried but never used.
<i>Amy Harris III</i>	Engine room fire	No	Yes	Unknown	No loss of life. Crew airlifted off the vessel following a fire.

Table 3: Commercial fishing vessel accidents investigated by the MAIB since 2013

SUMMARY

- Of the 22 cases where CWPFDs were relevant to the outcome of the accident, they were available on board in 17 cases and worn in 3 cases.
- 14 lives could have been saved had the casualties been wearing CWPFDs while working on deck and CWPFDs were available on board in 9 of these cases.
- In some cases, the subsidised/free PFDs supplied to fishermen had never been removed from their packaging, and in one case these had been left at home.

MAIB RECOMMENDATIONS ON PFDS

The MAIB has made eight recommendations concerning the wearing of PFDS by fishermen. These are listed below in **Table 4**. On three separate occasions these addressed the question of mandating their usage.

Vessel name or publication	Recommendation No.	Text of the recommendation	Addressee of the recommendation
<i>Heather Anne</i>	2013/103	Specify the improvement in safety culture / behavioural change that it is seeking with respect to the voluntary wearing of personal flotation devices by individuals working on the decks of fishing vessels, and the timescale within which it is to be achieved; and Make arrangements to rapidly introduce the compulsory wearing of personal flotation devices on the working decks of fishing vessels should the sought after improvements not be achieved.	MCA
<i>Maggie Ann</i>	2009/158	As part of your efforts to realise improved safety within the fishing industry: Expedite your current work on the use of personal flotation devices and personal locator beacons in the UK fishing industry (MAIB Recommendation 2008/173 refers).	MCA
Analysis of UK Fishing Vessel Safety 1992 to 2006	2008/173	Review international safety initiatives and transfer best practice to the UK fishing industry with particular reference to the use of PFDS and Personal Locator Beacons.	MCA
<i>Donna M</i>	2000/144	FISG to raise an agenda item on the compulsory wearing of lifejackets for fishermen when working on deck, and to seek the views of fishermen's representatives on this subject.	FISG
<i>Donna Anne</i>	1999/124	Consider introducing the following requirements when compiling safety proposals for under 12m fishing vessels: ... d) owners, skippers and crew should be advised to wear inflatable lifejackets at all times when working on deck when their vessel is at sea.	MCA
<i>Sharona</i>	1996/166	Strongly recommended crew members to wear working buoyancy aids when on deck, in particular any crew members who are unable to swim. This advice is published in the booklet 'Fishermen and Safety', a copy is attached.	Marine Safety Agency

Vessel name or publication	Recommendation No.	Text of the recommendation	Addressee of the recommendation
<i>Kingfisher</i>	1993/153	To pursue their efforts to strongly encourage fishermen and others operating small vessels to wear a buoyancy garment at all times when working on deck.	Marine Directorate, Department of Transport
<i>Majestic</i>	1991/183	All fishing vessel crew members should be advised of the benefits of wearing, at all times when working, personal buoyancy aids with built-in and/or inflatable buoyancy. Further consideration should be given to whether the wearing of such aids should be a mandatory requirement.	Marine Directorate, Department of Transport

Table 4: List of recommendations the MAIB has made on the subject of PFDs, including lifejackets

The first recommendation was made in 1991 to the then Marine Directorate. The recommendation – to consider making the wearing of lifejackets mandatory – was made following the investigation into the capsizing of the fishing vessel *Majestic*, which resulted in the death of five crew members (**Ref 4**).

In the *Analysis of UK Fishing Vessel Safety 1992 to 2006* (**Ref 5**), the MAIB highlighted the high number of fatalities following man overboard incidents, and recommended the MCA to review international practice and implement best practice in the UK. This recommendation was accepted and the MCA committed to conduct a research project with a view to presenting an analysis of international lifejacket initiatives in May 2011. This was to be followed by the implementation of appropriate changes to UK mandatory requirements by 2015. However, the MCA subsequently postponed this to June 2016, a target that has also passed without action. In 2011, during the MAIB investigation into the loss of the skippers from fishing vessels *Breadwinner* and *Discovery* (**Ref 6**), the MCA reiterated these intentions, stating that it was *committed to creating legislation that would make the wearing of PFDs on commercial fishing vessels compulsory*.

The MAIB investigation report, published in 2013, into the loss of one crewman from the fishing vessel *Heather Anne* (**Ref 8**), stated: *In 2010 ... the MCA concluded that the compulsory wearing of personal flotation devices (PFDs) on the working deck of fishing vessels would have a positive effect on safety and dramatically reduce the number of fatalities. This issue has since been a standing agenda item at the FISG meetings at which the MCA has taken into account fishing industry concerns. Getting fishermen to wear PFDs is now a key part of the MCA's fishing vessel safety project, and its business plan for 2011-2015 included: Put arrangements in place to require fishermen to wear Personal Flotation Devices (PFDs) by December 2012.*

Following the foundering in 2013 of the 6.45m fishing vessel *JCK*, with the loss of its skipper (**Ref 7**), the MAIB investigation report stated: *It has been recognised for some time that many fishermen are reluctant to wear PFDs; indeed it has been the focus of previous MAIB recommendations to the Maritime and Coastguard Agency (MCA) that their wearing should be compulsory on open decks. The MCA is currently monitoring the success of educational campaigns promoting the use and effectiveness of PFDs. If, by the start of 2015, it is found that their use is not more widespread than at present, or MOB survival statistics have not improved, regulation may then be introduced to make the wearing of PFDs mandatory on the open decks of fishing vessels.*

During the investigation into the loss of the crewman from *Annie T*, the MCA reported to the MAIB that December 2020 would be the earliest achievable date for the introduction of legislation mandating the wearing of constant wear PFDs.

SUMMARY

Although the MCA committed to legislating mandatory PFD wear by December 2012, later postponed to 2015 and then June 2016, it has now stated that the earliest this could be achieved would be December 2020.

CAMPAIGNS

A number of organisations have attempted to alter behaviour in the fishing industry by encouraging commercial fishermen to wear PFDs while working on deck. Some of these campaigns are outlined below.

RNLI

In 2005, the RNLI ran the 'Which lifejacket for you?' campaign (**Ref 9**). This involved 120 fishermen who volunteered to wear a range of lifejackets and buoyancy aids while working at sea and to assess their comfort and durability. The RNLI reported that *the fishermen involved that now wear lifejackets all or most of the time has risen by 900% - a sure sign that they have now found a lifejacket that is suitable for their work*. In 2013, the RNLI also published *PFD guidance for commercial fishing* (**Ref 10**), which included detailed guidance on PFDs, the importance of wearing them, the types available, the significance of their buoyancy ratings and their maintenance and service requirements.

SEAFISH

The 'Sea You Home Safe' campaign by Seafish was started in 2014 to encourage fishermen to wear PFDs on open decks while at sea. This campaign also supports the lifejacket distribution scheme funded by the EFF. The distribution of subsidised or free lifejackets by NFFO and SFF began in 2013.

MCA

Lifejackets save lives, a brochure published by the MCA, states under the heading *Advice for fishermen*, that the *MCA recommends that commercial fishermen wear a lifejacket or buoyancy aid at all times whilst on deck*. The brochure provides advice on cold water shock, actions to take in the event of falling into the water and comments that *commercial fishing, angling and sailing are the activities where most lives may be saved by buoyancy-wear*.

BORD IASCAIGH MHARA OF IRELAND, IRISH WATER SAFETY AND THE RNLI

In January 2016, Bord Iascaigh Mhara (BIM) of Ireland, Irish Water Safety and the RNLI ran a 4-week lifejacket safety awareness campaign in Ireland. The campaign known as 'Live to Tell the Tale' was intended to encourage more fishermen to complete the mandatory BIM safety survival training and to wear their lifejackets at sea. The wearing of constant wear lifejackets at sea was made mandatory in Ireland in 2002.

SUMMARY

There have been several campaigns to date to encourage commercial fishermen to wear PFDs. The campaigns included the distribution of printed brochures, trials of PFDs by volunteers and the distribution of free lifejackets and training to commercial fishermen.

WORKING GROUPS

FISHING INDUSTRY SAFETY GROUP⁶ (FISG)

At a FISG meeting held in September 2010, the MCA proposed that the wearing of PFDs should be made mandatory. In November 2010, during another FISG meeting, a detailed discussion took place regarding PFDs, and a proposal was made that lifelines could be considered in lieu of PFDs⁷. A general concern was also raised at this meeting regarding the enforcement of any regulation that may be introduced to make the wearing of PFDs mandatory.

In April 2011, the FISG met again to discuss the specific issue of the wearing of PFDs on the open decks of fishing vessels at sea, and a working group was formed (with representation from the fishing federations, Seafish, RNLI and MCA) to take this work forward. This working group, known as the PFD Project Group, made several decisions regarding the selection of PFDs, including:

- The inclusion of the maintenance and operation of PFDs in the Sea Survival training course.
- The MCA's role in differentiating PFDs from abandon ship lifejackets.
- The application of risk based selection for the appropriate buoyancy to be afforded by PFDs.
- Public relations initiatives on the PFD scheme, including announcements at suitable industry expositions.

The minutes of the FISG meeting held in March 2013 to discuss the issue of PFDs stated: *Following MAIB's most recent recommendation concerning PFDs, (2013/103), the MCA will be looking at 2015 as a marker for regulatory change if the sought after changes are not delivered.*

In October 2013 the FISG met again, and discussed the initiative to distribute subsidised or free lifejackets to fishermen. It was agreed that a 15-30 minute briefing would be given to each fisherman when the lifejackets were issued. The minutes of the meeting stated: *By doing this there is much higher chance of the PFD being; worn, inspected regularly, and serviced when required.* [sic]

The proposed briefing was to convey the following learning points:

- Heavily subsidised/free PFDs were being handed out in an attempt to address the heavy fatality rate among fishermen due to drowning.
- The operation and features of the PFDs.
- The correct method of wearing the PFDs and an internal examination of the bladder and other components.
- The service requirements of the PFDs.

⁶ FISG comprises representatives from several organisations concerned with the safety of commercial fishing around the UK. Its members include the MCA, Seafish, and representatives from many fishing federations.

⁷ Lifelines in lieu of PFDs was subsequently dismissed.

DISTRIBUTION OF FREE OR SUBSIDISED PFDs

In 2012, the PFD Project Group, taking into account the requirements of fishermen and working with Mullion Survival Technology, specified a new lightweight, compact design of PFD. The result was the Mullion Compact 150 PFD, which complied with ISO 12402 and provided 150N of support.

Starting in 2013, the NFFO, SFF, Fishermen's Mission and Seafish started distributing these PFDs to UK fishermen, either free of charge or heavily subsidised. The project was financed by the European Fisheries Fund (EFF) with additional funding from Seafish. The only prerequisite for receipt of a Mullion Compact 150 PFD was that fishermen had to confirm they had completed the four mandatory basic safety training courses. By the end of March 2016, 7880 PFDs had been distributed through this initiative (**Table 5**).

Country	Number of PFDs distributed	Number of PFDs still to be distributed	Organisation responsible
Scotland	3,100	390	SFF
England	780 2,640	0 1,360	NFFO Seafish
Northern Ireland	220 840	0 0	NFFO Seafish/Fishermen's Mission
Wales	300	200	Seafish
Total	7880	1950	-

Table 5: Distribution of PFDs under the EFF funded PFD Initiative up to March 2016
(data supplied by Seafish)

SUMMARY

FISG formed its PFD Project Group to promote the wearing of PFDs on the open decks of commercial fishing vessels at sea. The PFD Project Group was responsible for engaging with a PFD manufacturer to develop a practical and easy-to-use constant wear PFD. This PFD was subsequently distributed free or heavily subsidised to UK fishermen in an attempt to reduce the number of drowning fatalities. By March 2016 the handing out of subsidised PFDs was approximately 80% complete.

INTERNATIONAL PFD REQUIREMENTS ON FISHING VESSELS

EUROPEAN UNION AND EUROPEAN ECONOMIC ZONE

Within the countries of the European Union and European Economic Zone, the requirement for PFD wear is as follows:

- Ireland enforced the mandatory wearing of PFDs in 2002. Fishermen were required to wear PFDs on exposed decks or at all times on open boats at sea, coming to and from moorings and in harbour. The Irish Fisheries Protection vessels are empowered to enforce these regulations at sea. At the time of writing there was no data to demonstrate whether the introduction of this regulation has increased the usage of PFDs.
- France requires fishermen on all fishing vessels to wear PFDs under certain circumstances, such as working on deck or in bad weather.
- Norway and Belgium require suitable buoyancy aids to be worn by all while working on the exposed decks of fishing vessels.
- Spain enforced the mandatory wearing of PFDs in 2007. Fishermen were required to wear a lifejacket when working on the exposed decks of vessels under 24m in length during bad weather. The Marine Accident and Incident Investigations Standing Commission of Spain has made several recommendations to the Spanish Maritime and Labour Administration to modify these regulations so as to mandate the use of PFDs at all times when working on the exposed decks of all fishing vessels.
- Portugal requires lifejackets to be worn on fishing vessels less than 9m in length.
- Iceland requires fishermen on board all fishing vessels to wear lifejackets while working near open stern gates.

OTHER COUNTRIES

- In 1994 South Africa introduced a mandatory requirement requiring all crew on commercial vessels (regardless of the type) to wear buoyancy aids when working on exposed decks at night, when the risk of being lost overboard has been identified, when operating within 1 nautical mile of the shore and when operating in rough seas or heavy weather. These requirements are reported to have significantly reduced the number of fatalities due to drowning in the South African fishing fleet.

SUMMARY

The introduction of mandatory requirements for fishermen to wear PFDs is widespread throughout Europe. While the effects of these requirements on the fatality rates are not yet clear, none have reported any negative impact in safety resulting from the requirements. The South African Maritime Administration reported a dramatic reduction in fishing vessel fatalities due to drowning, as a result of introducing their legislation in 1994.

LITERATURE REVIEW

MANDATING PFD WEAR AND EDUCATIONAL CAMPAIGNS

A study published in 2014 (**Ref 11**) compared the effectiveness of educational campaigns with mandatory regulations requiring the users of recreational craft to wear lifejackets. Two initiatives, both in the USA, were described: 'Wear It California!', a targeted marketing campaign in the California Delta region, and mandatory wear regulations at four lakes in the state of Mississippi. Before the Californian campaign, the adult PFD wear rate was 8.5%, and this rose to 10.5% during the 3 years of the campaign. In contrast, before the introduction of mandatory regulations, at the four lakes the adult wear rate was 13.7%, increasing to 75.6% during the first year of regulation, before settling at 68.1% in the third year.

A further study of boat users in Washington State in the USA (**Ref 12**) was carried out to assess the relationship between lifejacket use and boating laws. An observational survey of boat users was conducted between August 2010 and September 2010. Age, sex, lifejacket use, boat type, and weather and water conditions were recorded. Of the 5157 users observed, it was found that 30.7% used lifejackets. However, where the state law required that lifejackets be worn under specific circumstances, the compliance was very high: personal watercraft users 96.8%, people being towed (e.g. water-skiers) 95.3% and children under 12 years 81.7%. The authors concluded that efforts to educate boat users fall on deaf ears when not supported by mandatory requirements.

A project sponsored by the Canadian Safe Boating Council (**Ref 3**) concluded that mandatory PFD wear legislation should be introduced. Drawing from the experience of experts in countries such as the USA and Australia, where several states had introduced such legislation, the report commented that the two main barriers to introducing this requirement would be a reluctance on the part of the government to enact new legislation, and the perceived difficulty in enforcing it. Detailed implementation strategies were recommended in the report.

The report entitled MCA Lifejacket Wear – Behavioural Change (**Ref 13**), published in December 2009, stated: *The objectives of this project were to identify why people do not wear lifejackets, develop an intervention to encourage lifejacket wear and measure the effectiveness of this intervention to inform future lifejacket campaigns.*

The report, based on data collected from recreational boating users, concluded that there could be two major reasons why people do not wear lifejackets: a lack of appreciation of the debilitating effects of cold water shock, and a belief that getting back on board after falling into the water would not be difficult. It recommended educational campaigns as one of the strategies to increase the usage of lifejackets. The report also referred to MCA Research Project No. 586, published in 2007 (**Ref 14**), a study of the approach taken by other countries in regulating the recreational boating sector. This study concluded: *increasing monitoring and enforcement was the only way to substantially raise lifejacket wear rates.*

In 2006 a safety campaign was launched in Auckland, New Zealand, to combat a spate of drowning incidents associated with fishing from rocky foreshores. Conducted over a 4-year period, the report (**Ref 15**) concluded: *a change of this magnitude in the voluntary wearing of protective gear (31%) may be an important precursor to the successful implementation of safety legislation.*

A study carried out on recreational boat users in Victoria, Australia, subsequent to introducing the mandatory wearing of PFDs in 2005, reported that in the 5-year period before the introduction of the law, there were 59 fatalities; in the following 5-year period there were only 16 (**Ref 16**).

PFD TRIALS BY COMMERCIAL FISHERMEN

The MAIB's Analysis of UK Fishing Vessel Safety 1992 to 2006 (**Ref 5**) noted that many skippers found it difficult to convince their crews to wear buoyancy aids; some had even resorted to making them sign disclaimers stating that it was their choice not to wear them. Although some static gear⁸ fishermen indicated that the PFDs available at the time were unsuitable for their particular work, many fishermen have confirmed that PFDs can be worn as a matter of course without restricting their ability to work.

In 2005 the RNLI conducted the study 'Which lifejacket for you?' (**Ref 9**), in which 120 fishermen volunteered to wear a range of lifejackets and buoyancy aids to assess their comfort and durability. This was an independent study that demonstrated commercial fishermen could carry out their work unencumbered while wearing a constant wear PFD.

In 2012, a trial conducted in the USA involving 215 fishermen was carried out to evaluate the PFDs best suited to different types of fishing activities (**Ref 17**). Four types of fishing vessels (crabber, gill netter, longliner and trawler) were included in the trial, and six types of PFDs were tested. The parameters evaluated were: weight, tightness, constriction, chafing, bulkiness, snagging, interference, donning and cleaning. The trial lasted 30 days, and the results (from 165 feedback forms) confirmed the general principle that one or more of the six PFDs tested was fit for constant wear during fishing.

SUMMARY

Research has demonstrated that campaigns succeed in changing entrenched behaviours only when backed by mandatory regulations. The development of light and comfortable PFDs, and their successful endorsement by fishermen around the world, has removed any argument against the use of constant wear PFDs on the exposed decks of fishing vessels at sea.

⁸ Static gear is set to allow fish to swim into it, or to attract fish by bait, and consequently become caught in the gear

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