Report on the investigation of a

manoverboard accident

FV *Maggie Ann*

Cardigan Bay

on 12 February 2009

resulting in one fatality

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Extract from

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2005 – Regulation 5:

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

NOTE

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

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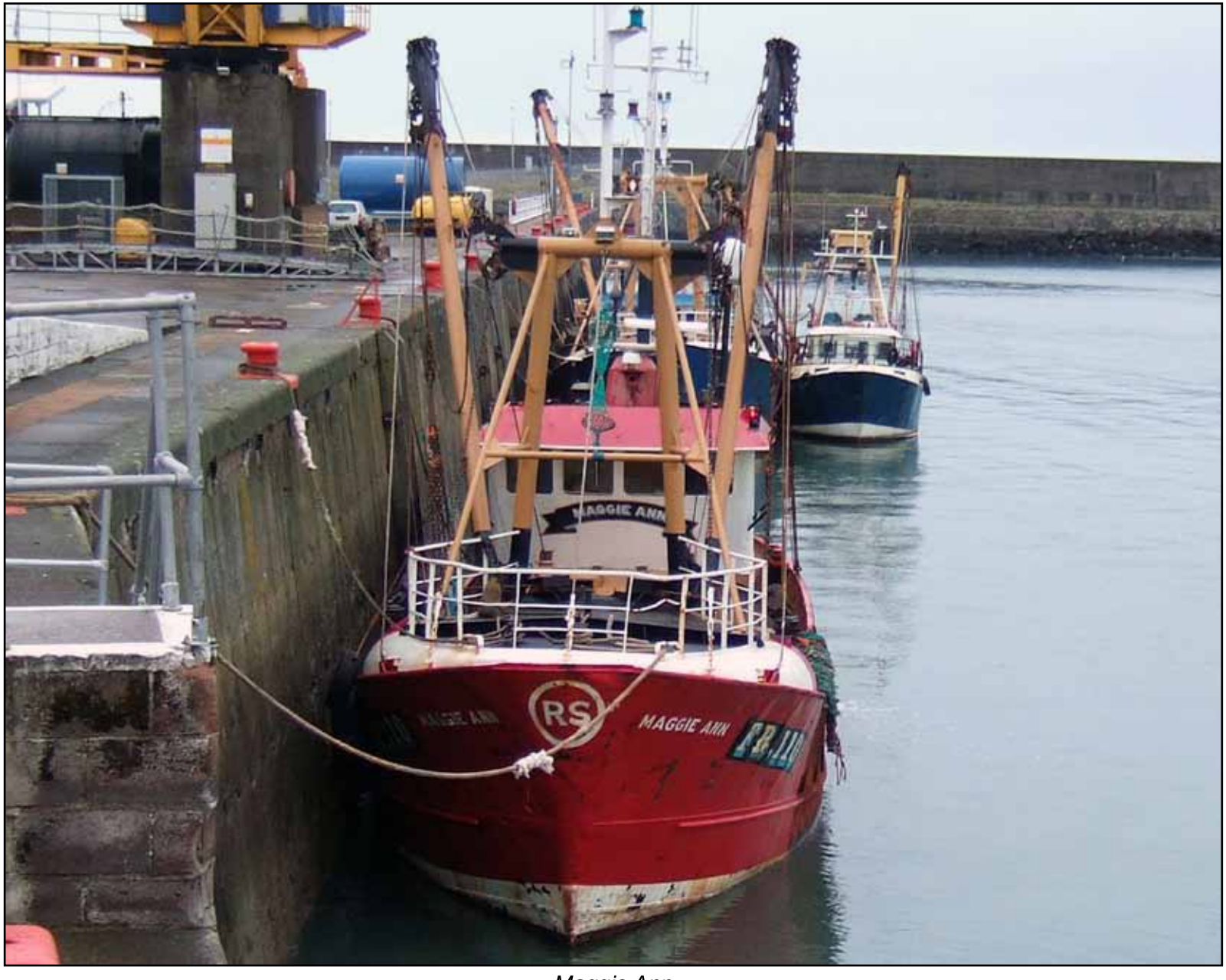
GLOSSARY OF ABBREVIATIONS, ACRONYMS AND TERMS

DH	:	Deckhand
kW	:	kilowatt
MCA	:	Maritime and Coastguard Agency
MGN	:	Marine Guidance Note
MSN	:	Marine Shipping Notice
PPE	:	Personal Protective Equipment
SAR	:	Search and Rescue
Seafish	:	Sea Fish Industry Authority
STCW	:	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended
UTC	:	Universal Co-ordinated Time
VHF	:	Very High Frequency
Dredge bag	:	Combination of chain mail and nylon netting fitted on the mouth of the frame in which scallops are collected.
Fishermen's Safety Guide	:	A guide to safe working practices and emergency procedures for fishermen, issued by the MCA.
Seafish Fishing Vessel Safety Folder	:	A folder developed with the help of fishing federations and endorsed by the MCA to help fishermen comply with the regulations.
'Mayday Relay'	:	An emergency code word used internationally as a distress signal in voice radio communications and transmitted on behalf of a vessel in distress.
Scallop dredge	:	Any appliance with a rigid framed mouth which is towed through the water and is manufactured, adapted, used or intended for the purpose of fishing for king scallops.
Williamson Turn	:	A manoeuvre to bring a ship or boat back to a point it previously passed through, often for the purpose of recovering a manoverboard.

Times: All times used in this report are UTC unless otherwise stated



Maggie Ann

SYNOPSIS

At about 1308 on 12 February 2009, a deckhand on board the UK registered scallop dredger, *Maggie Ann*, fell overboard as he was emptying a dredge bag. He had been standing on the port dredge beam, which was suspended and almost level with the gunwale, when the dredge bag lifting becket parted.

Despite the quick reactions of the skipper and crew, the deckhand sank below the sea surface before he could be rescued. He was not wearing a lifejacket. Although an extensive search and rescue operation followed, his body was not recovered. Analysis of evidence based on eye witness accounts suggests that death was most likely due to cold water shock, leading to drowning or cardiac arrest.

The MAIB investigation identified a number of safety issues including: operation of the fishing gear; the practice of not wearing a lifejacket or safety harness; and a lack of understanding of risk assessments.

A recommendation has been made to the Maritime and Coastguard Agency which seeks to build on existing initiatives designed to improve fishing vessel safety by: expediting the MCA's current work on the use of personal flotation devices by fishermen; ensuring emergency drills and the provision of guidance on risk assessment are undertaken to a consistent standard by all fishing vessel surveyors and inspectors throughout the UK; and the incorporation of guidance into its revision of MGN 265 (F) designed to preclude the need for scallop fishermen to lean outboard of the bulwark during tipping operations.

A recommendation has also been made to the owner, AGR Fishing Company Limited, to improve the safe operation of its vessel, and to the Scallop Association to endorse and promulgate the MAIB flyer which highlights the lessons learned from this tragic accident.

SECTION 1 - FACTUAL INFORMATION

1.1 Particulars of *Maggie Ann* and accident

Vessel details

Registered owner	:	AGR Fishing Company Limited
Port of registry	:	Fraserburgh
Flag	:	UK
Type	:	Fishing Vessel – Scallop Dredger
Built	:	1961 in Dordrecht, Holland
Construction	:	Steel
Length overall	:	26.60 metres
Gross tonnage	:	111
Engine power and/or type	:	272 kW

Accident details

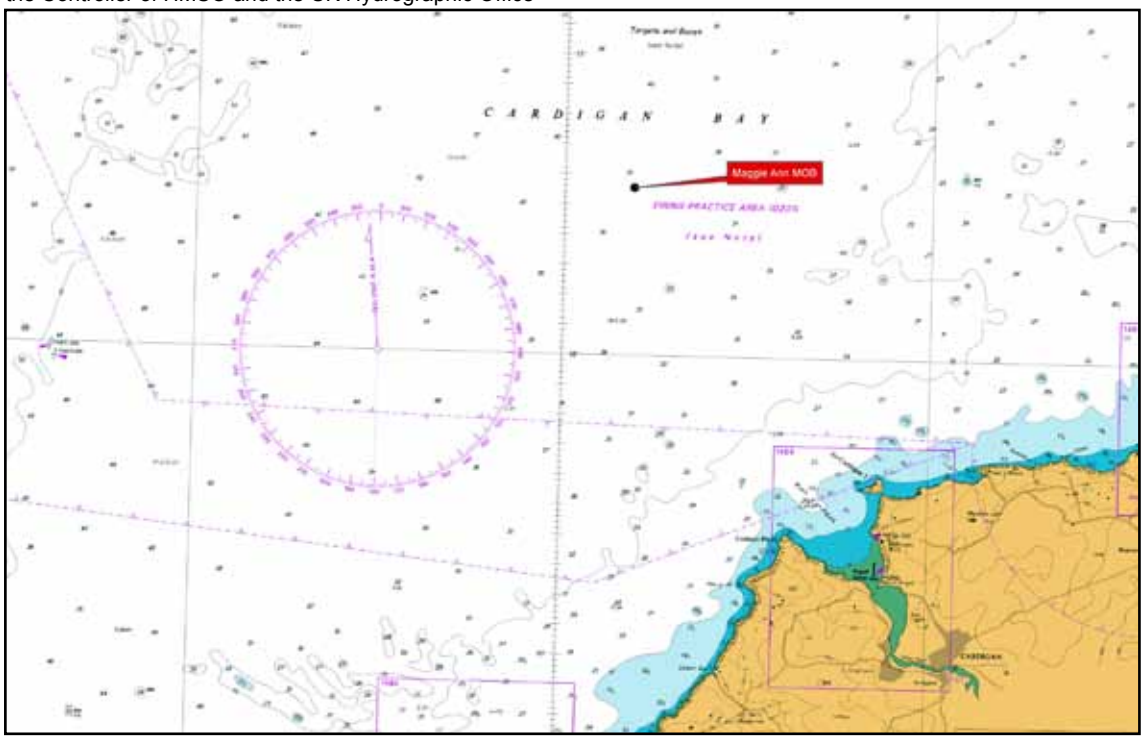
Time and date	:	About 1308 on 12 February 2009
Location of incident	:	Cardigan Bay, 6.3 miles north-north-west of Cemaes Head
Persons on board	:	Six
Fatalities	:	One
Damage	:	None

1.2 NARRATIVE

1.2.1 Events leading to the accident

Maggie Ann departed from the port of Milford Haven on 11 February 2009 at about 0600. She was bound for her fishing grounds in Cardigan Bay **(Figure 1)** and had on board a crew of six, including the skipper. She arrived at her destination at about 1200 and shot her gear at 1215. Thereafter she operated an approximate 2-hour continuous cycle of hauling and shooting her scallop dredges.

Figure 1

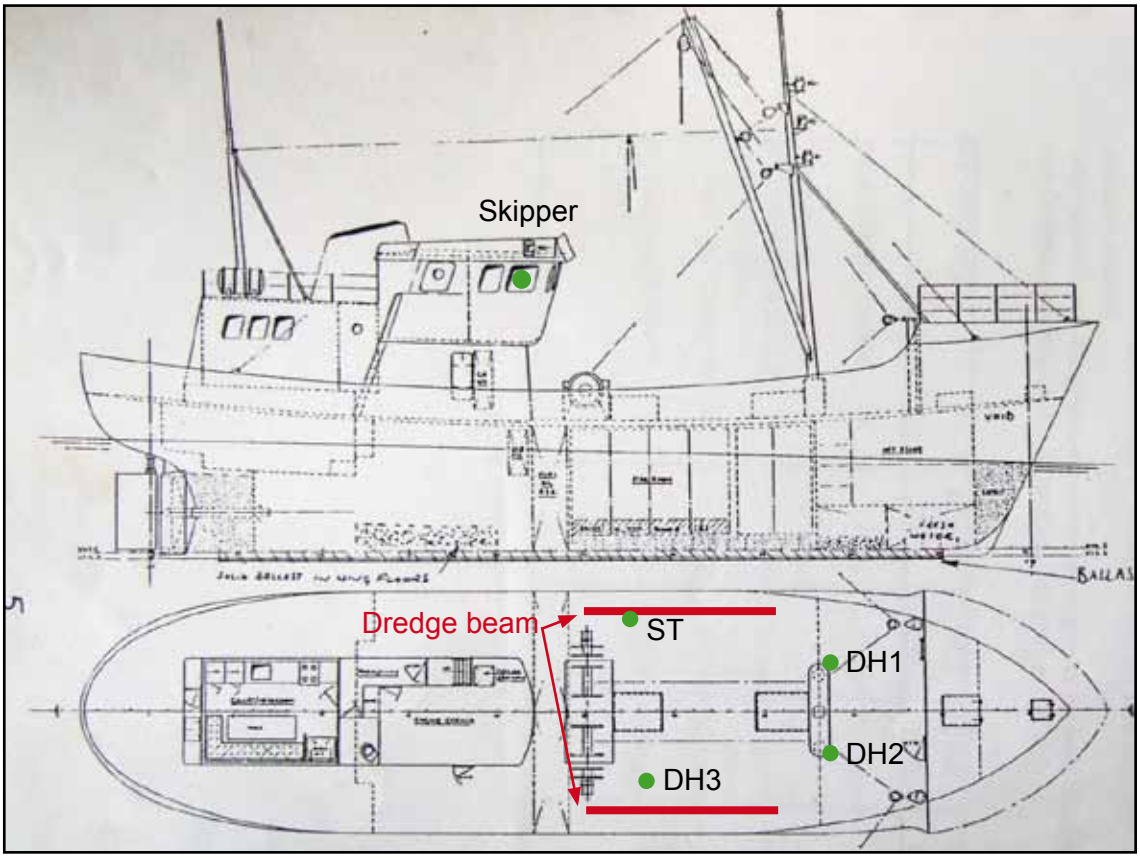


Extract from BA chart 1973 showing accident position

At about 1300 on 12 February, in preparation for hauling, the skipper turned the vessel downwind to provide a stable platform for the crew. As was the routine, four deckhands were deployed in pairs, one pair working each side of the vessel **(Figure 2)**. They were wearing oilskins over their work clothes and sea boots.

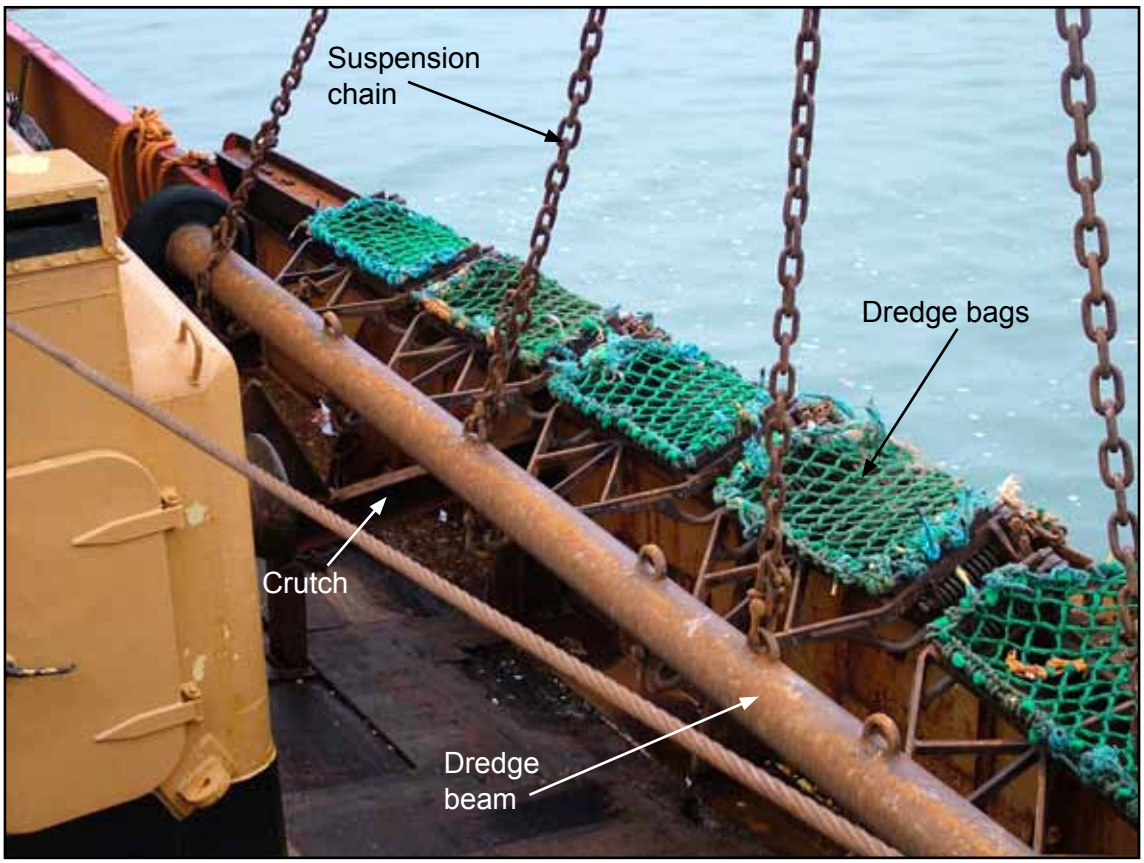
The port and starboard dredge beams were lifted and swung inboard, and the deckhands secured each beam **(Figure 3)** with its respective fore and aft lashings. The skipper then attempted to land the beams in the designated crutches, fitted just above the deck level, with the dredge bags **(Figure 4)** resting on the gunwale. The dredge bags were full of stones as well as scallops, which prevented the beam from being lowered into the crutches. This resulted in the beams remaining suspended and almost level with the gunwale on either side of the vessel **(Figure 5)**.

Figure 2



Position of the crew at the time of the accident (1300)

Figure 3

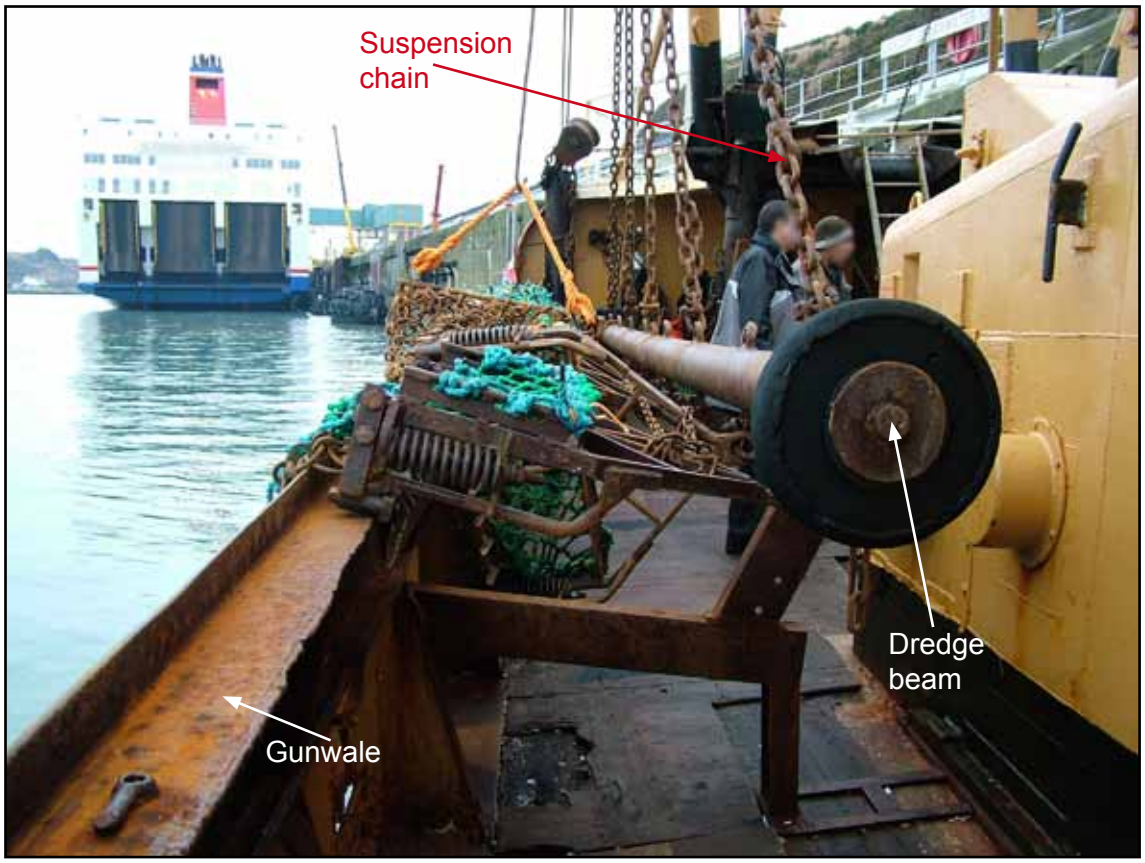


Dredge beam and attached dredge bags

Figure 4

Dredge bags and the parted lifting becket

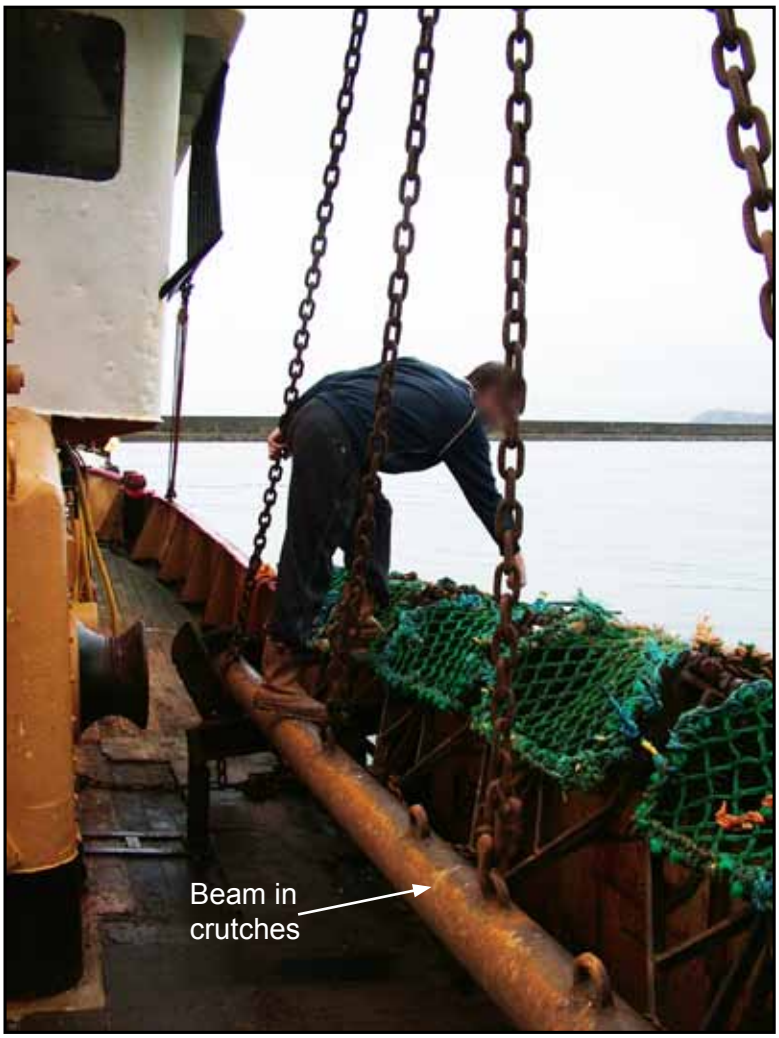
Figure 5



Simulated position of dredge beam at time of accident

Stefan Tamas, who was working with another deckhand (DH1), started emptying each of the dredge bags in turn, working from aft towards the forward end of the dredge array, with DH1 operating the port tipping winch. To do this, he stood on the elevated beam, holding a suspension chain with one hand and using his other hand **(Figure 6)** to snare the dredge bag lifting becket **(Figure 4)** with the tipping hook. This was made fast to a line leading to the tipping winch. He was not wearing a personal flotation device, such as a lifejacket, or a safety harness. DH1 then heaved the line until the dredge bag inverted, allowing its contents to fall onto the deck.

Figure 6



Simulation by deckhand - snaring the lifting becket

To assist the process of emptying the second dredge bag, Stefan let go of the chain and used both hands to shake the bag **(Figure 7)**. As he did so, the lifting becket parted, causing him to fall overboard. DH1, who witnessed the event, immediately raised the alarm and threw a lifebuoy in his direction.

Figure 7

Simulation by deckhand - shaking the dredge bag

1.2.2 Search and rescue operations

On hearing the alarm at about 1308, the skipper immediately put the engine astern. He saw Stefan Tamas in the water, marked the vessel's position on the electronic track plotter and began to manoeuvre the vessel back towards the casualty. DH2 and DH3, who had been alerted by DH1, left their positions and assisted the attempted recovery operation by keeping Stefan Tamas in sight.

Stefan kicked off his sea boots and, as the vessel approached him, the crew threw another lifebuoy towards him, and urged him to grab hold of it. He did not respond and, at about 1316, he sank below the sea surface.

The skipper immediately contacted Milford Haven Coastguard by VHF radio on channel 16 and reported the manoverboard situation. The Coastguard broadcast a 'Mayday Relay' at 1319 and alerted air and sea search and rescue (SAR) units. Many fishing vessels in the area responded and joined in the search. The two Cardigan inshore lifeboats were on scene at 1345 and SAR helicopter R122 arrived on scene at 1418. The Newquay all weather lifeboat joined the search at 1444.

Despite an extensive SAR operation, Stefan was not found. R122 departed the scene at 1611. The last lifeboat was released at 1658 and, with light fading fast, *Maggie Ann*'s skipper decided to abandon the search and head towards Fishguard, where the vessel arrived at about 2010.

1.3 ENVIRONMENTAL CONDITIONS

At the time of the accident, the wind was from the south-west, force 3 to 4. The sea state was slight but reported to be choppy as the rescue operations got underway. Visibility was good. Civil Twilight was at 1805.

Weather data captured from a weather monitoring buoy located about 17 miles from the accident position recorded the conditions as:

Wind: south-south-west, 13 knots

Wave height: 1 metre

Wave period: 6 seconds

Air temp: 6.0º C

Sea temp: 6.5º C

Wind chill: 1.5º C

1.4 *MAGGIE ANN*

1.4.1 General

Maggie Ann was bought by the current owner, AGR Fishing Company Limited, in January 2008. The vessel retained her previous name, *Western Belle*, until her name was changed to *Maggie Ann* in August 2008.

She was built in 1961 in Holland as a beam trawler **(Figure 8)**, but had been operated as a scallop dredger since first being registered in the UK in July 1988. She had since changed ownership on four occasions.

Figure 8

Historical photograph of SCH234 now *Maggie Ann*

The Maritime and Coastguard Agency (MCA) issued *Maggie Ann* with a United Kingdom Fishing Vessel Certificate on 12 June 2007 following a renewal survey on 3 April 2007. The intermediate survey was due for completion between 2 April 2009 and 2 April 2010.

1.4.2 Modifications to operations

In July 2006, the previous owner levelled the gunwale on either side of the vessel and fitted a 9 metre length channel section on top of it. The modification effectively increased the height of the bulwark by up to about 250mm **(Figure 9)**. This allowed the scallop dredges to be taken on board in a more controlled manner; the level gunwale enabled the teeth of all of the dredges to be engaged in the channel section simultaneously, and thereby allowed the dredge bags to be emptied in turn without any further adjustment.

Figure 9

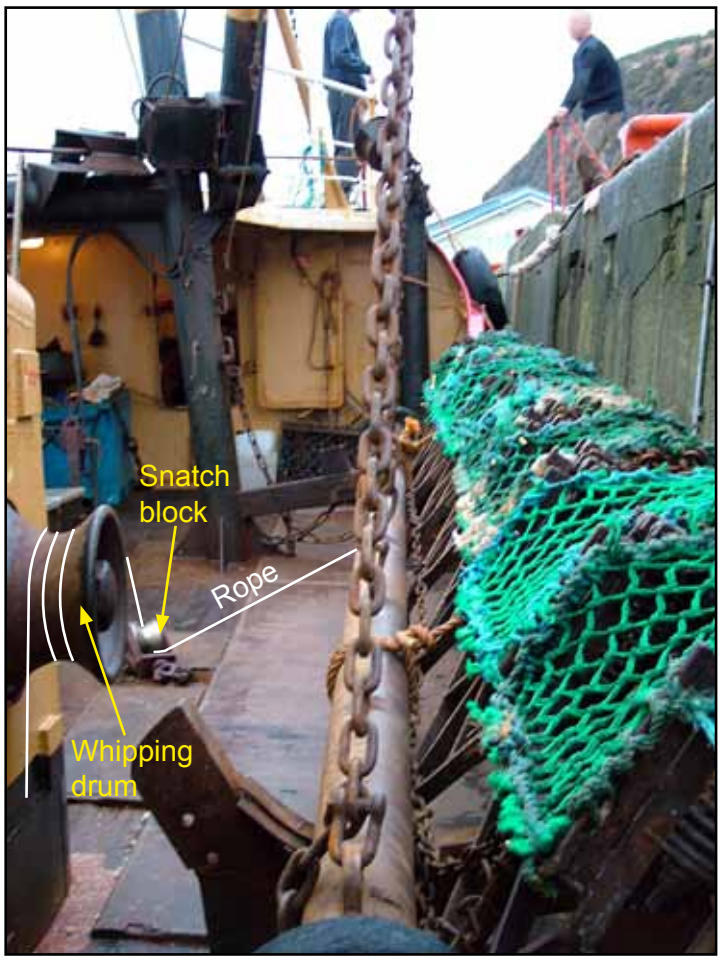
Maggie Ann - showing modification to the bulwark

The increased bulwark height improved crew safety, but the dredge beam could no longer be lowered onto the deck. To allow the dredge beam to rest in a secure position while the dredge bags were being emptied, the owner fitted a pair of crutches to the deck **(Figure 10)** into which the dredge beam was lowered. When the dredge bags were full, the dredge beam had to be pulled inboard and down, by means of a separate line that led to a whipping drum on deck **(Figure 11)**, to enable it to be landed in the crutches. This resulted in the scallop dredge teeth **(Figure 10)** passing inboard of the bulwark with the dredge bags resting on top of the gunwale. The current skipper did not usually make use of the additional line to land the beams onto the crutches, resulting in the dredge beam remaining suspended and almost level with the gunwale when the dredge bags were full and about to be emptied.

Figure 10

Position of dredge beam when resting on crutches

Figure 11



Bowsing in arrangement

1.4.3 Manning and qualifications

Maggie Ann was normally operated by a skipper and four deckhands. However, on this occasion, five deckhands were on board the vessel.

Skipper

The skipper was a UK national and had been a fisherman for 25 years. He held a fishing vessel Class 2 Certificate of Competency, which he obtained in 1992. He had skippered various fishing vessels for the last 18 years and had worked on scallop dredgers since 2003. He had completed all the mandatory safety training courses, the last one being the safety awareness course in December 2002.

Stefan Tamas

Stefan Tamas was a Romanian national, and had joined the vessel on 8 January 2009 as a contracted worker. He had qualified as a fisherman in 1996 and had worked on various Romanian, Irish and Dutch fishing vessels. *Maggie Ann* was the first scallop dredger he had worked on. In 2004, Stefan completed the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) basic safety training courses. He had not attended a safety awareness course.

Other Deckhands

The remaining deckhands, two Latvians and two Romanians, were also contracted workers. Three had completed the basic STCW safety training course, but none had attended a safety awareness course.

The two Latvian deckhands had worked on scallop dredgers previously with the skipper in his former company, and had transferred to *Maggie Ann* when the skipper acquired the vessel in January 2008. One of the Romanian deckhands had worked for the previous owners and had been retained by the skipper when the vessel changed ownership.

1.5 WORKING HOURS

1.5.1 Regulations

The Fishing Vessels (Working Time: Sea-fishermen) Regulations 2004 regulates the working time on board fishing vessels. Guidance on their application can be found in Merchant Shipping Notice (MSN) 1786 (F), Application of the Fishing Vessels (Working Time: Sea-fishermen) Regulations 2004. These regulations apply only to contracted workers and entitle them to adequate rest of not less than 10 hours in any 24 hours and 77 hours for each 7 days; the daily hours of rest may be divided into no more than two periods, one of which shall be at least 6 hours in length; and the average working time over 52 weeks should not exceed 48 hours per 7 day period.

Exemptions to the above regulations are allowed for objective and technical reasons concerning the organisation of the work, provided the conditions in the Fishing Industry Code of Practice on Working Time Standards **(Annex A)** are met. In cases where the 'working time standards', which are almost identical to those in the regulations, cannot be achieved, the health and safety of workers is to be respected by compensating them with more frequent or longer periods of leave.

1.5.2 Onboard routine

Maggie Ann operated an approximate 2-hour continuous cycle of hauling and shooting during trips of 5 to 7 days. Four deckhands were required on deck for the hauling and shooting operations, and rest was normally taken between periods of shooting and hauling, enroute to and from the fishing grounds, or in port, after the catch had been landed.

The carriage of an additional deckhand allowed one of them, in rotation, to get some additional rest. The skipper required a deckhand to relieve him in the wheelhouse from 0000 - 0600 but he was always present when the gear was shot or hauled.

It is estimated that the skipper and crew averaged not more than 6 hours per day of fragmented sleep at sea, while shooting and hauling gear.

1.6 MAINTENANCE OF EQUIPMENT

1.6.1 Mode of failure of becket

The lifting becket was made of polypropylene rope and was attached to two metal rings on the scallop dredge by means of an informal splice. The area of attachment was prone to particular wear and degradation. The lifting becket **(Figure 4)** recovered on board *Maggie Ann* after the accident indicates this to be the point at which the rope parted.

1.6.2 Onboard maintenance

Maintenance on board *Maggie Ann* was carried out in port when all the equipment was reported to have been examined by the skipper and the crew before departure. The fishing gear was also reported to have been inspected for signs of wear and tear during the intervals between hauling and shooting operations.

The wear on the parted lifting becket was not identified prior to the vessel departing port, nor was it identified during the fishing cycle prior to the accident.

1.6.3 Regulations

Maintenance of lifting and work equipment is covered by The Merchant Shipping and Fishing Vessels (Lifting Operations and Lifting Equipment) Regulations 2006 and The Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006 respectively.

The regulations require regular maintenance and testing of equipment prior to it being put into use. Unlike merchant ships, fishing vessels are not required to maintain a register of lifting appliances and loose gear. However, they must comply with these regulations in all other respects. To assist with compliance, the Fishermen's Safety Guide provides a comprehensive checklist on the recommended thorough examination or inspection frequency of equipment. An extract of the relevant page is at **Annex B.**

1.7 MANDATORY SAFETY TRAINING

From 1 January 2005, The Fishing Vessels (Safety Training) Regulations 1989, as amended in 2004, requires all fishermen serving on board UK registered fishing vessels to have completed the prescribed basic safety training or equivalent courses.

New entrants to the industry are required to attend the basic safety courses on:

- Sea survival
- Fire-fighting and prevention
- First-aid
- Health and safety

"Experienced fishermen", who are categorised as having worked for 2 or more years, are also required to attend a 1-day course on 'Safety Awareness', which includes instruction on the requirements and conduct of risk assessment.

These mandatory courses are conducted in the UK by the Sea Fish Industry Authority (Seafish[1]). Currently there are no requirements for an assessment at the end of a course or for attending a refresher course.

The MCA accepts most of the STCW basic safety training courses, in lieu of the courses conducted by Seafish. These are:

- Personal survival techniques
- Fire prevention and fire-fighting
- Elementary first-aid
- Personal safety and social responsibilities

However, the MCA does not consider the personal safety and social responsibilities course to be equivalent to a safety awareness course, and still requires "experienced" fishermen to attend the latter.

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[1] Seafish is a Non Departmental Public Body funded and supported by the four UK government fisheries departments. It provides vocational and safety training to the industry through its network of affiliated Group Training Associations.

1.8 RISK ASSESSMENT

1.8.1 Requirements

The Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997 require employers to protect their workers and other persons so far as is reasonably practicable, and to arrange for a risk assessment to be conducted for activities on board their vessels, having regard to a number of listed principles, including:

- The avoidance of risks
- The evaluation of unavoidable risks
- Adoption of work patterns and procedures which take account of the capacity of the individual
- Adaptation of procedures to take account of new technology

Further guidance is provided in Marine Guidance Note (MGN) 20 (M+F), Implementation of EC Directive 89/391, Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997, the Seafish Fishing Vessel Safety Folder and the Fishermen's Safety Guide.

1.8.2 *Maggie Ann's* risk assessment

The risk assessments on board *Maggie Ann* had been completed on 14 March 2008 using the Seafish Fishing Vessel Safety Folder as a result of a deficiency identified during an MCA inspection on 10 March. The skipper reviewed them on 28 January 2009 and made no changes. The safety folder had been signed by all the crew confirming they had been given a safety induction and that they had been informed about the risk assessments.

The risk assessments for the Beam Trawling and Dredging activity were recorded in the safety folder. Although the fittings and riggings activity assessment specified a control measure, the risk factor had been incorrectly calculated. Similarly, the bag lifting/dredge discharge activity assessments had been incorrectly calculated and specified no control measures.

1.8.3 MCA initiatives

Since 2002, the MCA has appointed one of its fishing vessel surveyors, an ex-fisherman, to provide practical assistance in improving safety on board fishing vessels in its Scotland and Northern Ireland region. As part of the initiative, the surveyor has visited about 520 vessels and has proactively engaged the skipper and crew in safety discussions. These have then been used to facilitate completion of risk assessments on board. These visits have been viewed a success by the fishermen concerned in improving clarification on the risk assessment process.

A 2004 research project[2], which was aimed partly at assessing the impact of the above initiative, highlighted the efficacy of face to face visits with whole crews to raise safety awareness. It recommended that these visits continue and that consideration be given to extend the scope to other MCA regions. Following an accident on board FV *Danielle*[3] in 2006, the MCA confirmed its intention to do so.

While these visits continue intermittently in the north-east of Scotland, the MCA is trialling a specialist group of surveyors to inspect fishing vessels of under 15 metres in length. These visits are also intended to include giving advice on risk assessments as well as other safety issues. The results of this trial will assist in determining the feasibility of adopting the system throughout the UK, taking into account the geographical distribution of fishing vessels.

1.8.4 Seafish initiatives

Following the accident on board FV *Danielle*, the Marine Accident Investigation Branch (MAIB) recommended Seafish to:

> '*Extend the use of Seafish Group Training Association Officers to provide practical on board guidance to UK fishermen in completing fishing vessel risk assessments.'*

Since then, Seafish, through its Group Training Association officers, has provided 244 fishing vessels with guidance on risk assessments. The guidance was given only to the skipper, and did not involve participation of the crew. The funding for this service, which has now stopped, was provided by the European Union through the Financial Instrument for Fisheries Guidance[4].

1.9 AVAILABLE GUIDANCE ON SCALLOP DREDGING

Guidance on the safe operation of fishing vessels engaged in trawling, including scallop dredging, can be found in MGN 265 (F), Fishing Vessels: The Hazards Associated with Trawling, Including Beam Trawling and Scallop Dredging.

Following the accident on board FV *Danielle*, the MAIB recommended that the MCA include details of the hazards associated with "tipping" and whipping drums on board scallop dredgers in the next revision of MGN 265 (F).

The revision of this MGN has been held in abeyance, awaiting any additional guidance that may arise from this investigation.

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2 Attitudes to Safety Onboard Fishing Vessels in the Northern Periphery, by Iain Campbell and Jason Frowley

3 Report on the investigation of the major injuries sustained by a deckhand on board FV *Danielle*. MAIB report 05/2007 www.maib.gov.uk/publications/investigation_reports/2007/danielle.cfm

4 This guidance sets out the policy and the terms of assistance for the fisheries and the aquaculture sector and was designed to help achieve the aims of the common fisheries policy by providing structural assistance.

1.10 PERSONAL PROTECTIVE EQUIPMENT

The Merchant Shipping and Fishing Vessels (Personal Protective Equipment) Regulations 1999 are explained in MSN 1731 (M+F). The regulations require employers to provide personal protective equipment to their workers.

Further guidance is given in MGN 311 (F), Working and Protective Gear for Fishermen. Annex 1 to this MGN provides a comprehensive matrix of work activities, and can be used as a checklist in considering what work and protective gear is required to prevent injury in a hazardous situation. This annex can be found at **Annex C**.

The matrix highlights the wearing of a lifejacket as a high priority/essential item while working on deck, and the wearing of a safety harness as a priority dependent upon the local circumstances and the location of activity. This guidance is reiterated in MSN 1731 (M+F), which requires a lifebuoy with a line attached for immediate use and an appropriate lifejacket to be provided when any work is carried out from a position where there is a reasonably foreseeable risk of falling overboard.

As part of this investigation, the MAIB contracted Professor Mike Tipton, a renowned consultant on sea and cold water survival, to consider whether a lifejacket would have helped prevent the fatality from *Maggie Ann*. His response regarding the possible causes of death and the benefits of wearing a lifejacket is at **Annex D**.

1.11 EMERGENCY PREPAREDNESS

The Code of Safe Working Practice for the Construction and Use of 15 metre length overall to less than 24 metre registered length Fishing Vessels requires the skipper to ensure that his crew are trained in the use of all lifesaving and fire-fighting appliances with which the vessel is provided. This training, in the form of drills, should be carried out and recorded at intervals not exceeding 1 month. The Fishermen's Safety Guide and the Seafish Fishing Vessel Safety Folder provide guidance and a means for recording drills. There were no records of any drills carried out on board *Maggie Ann*, and it was not the practice of the skipper to conduct them.

The vessel was also required to have a means of recovering a person from the water. Although a scramble net and lifting device were recorded in the Seafish Fishing Vessel Safety Folder as being located in the skipper's cabin, this equipment was not on board.

As part of improving consistency across the MCA regions, attending surveyors are now required to witness emergency drills conducted by the crew on board fishing vessels at the time of survey. No drills had been witnessed by an MCA surveyor on board *Maggie Ann* as the vessel had not been surveyed since this policy was introduced.

1.12 SCALLOP ASSOCIATION

The Scallop Association was founded in 1998 and represents the interests of UK based members of the catching, gear manufacturing and processing sectors of the scallop industry at local, national and European level.

1.13 SIMILAR ACCIDENTS

In November 2008 the MAIB published its Analysis of UK Fishing Vessel Safety 1992 to 2006. Of the 256 fatalities recorded during this period, 82 fishermen (nearly one third) lost their lives as a result of going overboard, 65 of which happened at sea. These figures exclude persons overboard as a result of other events e.g. capsizing.

Most fatalities occurred when crew members were engaged in shooting or hauling fishing gear or as a result of being washed overboard during heavy weather, and only one was reported to be wearing a lifejacket at the time.

As a result of its analysis, the MAIB made a number of recommendations. These can be found at **Annex E**.

This accident brings the total number of fatalities due to persons being lost overboard since 1992, to 94.

SECTION 2 - ANALYSIS

2.1 AIM

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

2.2 FATIGUE

Scallop dredging is a very labour intensive activity and can be physically demanding on the crew. *Maggie Ann*'s crew operated an informal shift pattern which was linked to the cycle of shooting and hauling the gear, and lasted up to 7 days. This generally allowed them no more than 90 minutes between shooting and hauling, to sleep, eat or otherwise relax. It seems unlikely that the crew averaged more than 6 hours of sleep per day. Given the disruption in rest periods, the work pattern might have been in conflict with The Fishing Vessels (Working Time: Sea Fishermen) Regulations 2004.

The skipper had identified long and disrupted working hours as a potential problem, and had taken on an additional crew member to allow one deckhand to have an occasional longer break. However, as the trip progressed, it is probable that the crew would have increasingly suffered from fatigue, impairing their decision making capability. It is unlikely that fatigue was a significant contributory factor on this occasion as the accident happened on day two of the fishing trip.

2.3 MANOVERBOARD EVENT

Stefan Tamas was a seasoned fisherman, but was new to scallop dredging and had worked on board *Maggie Ann* for only 5 weeks. He had signed the Seafish Fishing Vessel Safety Folder to confirm that he had received a safety induction from the skipper, which stressed the importance of maintaining a secure hold of a suspension chain while attending to the dredge bags. However, as the risk assessment form neither identified any significant risk nor recorded any control measures against falling overboard, he is unlikely to have had a full appreciation of the actual risks involved with scallop dredging.

Stefan was not wearing a personal flotation device or a safety harness when he stepped onto the elevated dredge beam, and it was not the practice for deckhands to do so. On this occasion, he let go of the suspension chain to facilitate his emptying one of the dredge bags. As he grasped the dredge bag with both hands, the lifting becket parted, causing him to fall forward and, because the bulwark offered no protection, to fall overboard.

2.4 CAUSE OF DEATH

Stefan was in the water, which had a temperature of about 6.5ºC, for no more than approximately 8 minutes. This therefore rules out hypothermia as a cause of death since the estimated survival time for the prevailing conditions is about 2 hours. In accordance with the analysis provided by Professor Tipton **(Annex D)**, witness evidence suggests that death was most likely due to cold water shock, leading to drowning or cardiac arrest.

2.5 WEARING A LIFEJACKET

Although the provision of a lifejacket or other personal flotation device for use by the crew is mandatory where there is a reasonably foreseeable risk of falling overboard, the wearing of one is not. However, MGN 311 (F), which provides operational guidance, considers it to be an essential item.

The wearing of a lifejacket has value in:

- Keeping the airway and face clear of the water.
- Decreasing cooling due to additional insulation against the cold, reduced need to exercise and fewer periods of head immersion.
- Decreasing cardiac workload due to reduced need to exercise.
- Increasing detection and enabling more effective means of recovery from the water.

In accordance with the analysis provided by Professor Tipton **(Annex D)**, the wearing of a lifejacket by Stefan Tamas would have significantly improved his survivability.

In its Analysis of UK Fishing Vessel Safety 1992 to 2006, the MAIB highlighted the high number of fatalities lost overboard and recommended the MCA to review international safety initiatives with reference to the use of personal flotation devices and transfer best practice to the UK fishing industry **(Annex E)**. This recommendation was accepted by the MCA, which intends to conduct a research project with a view to presenting an analysis of international lifejacket initiatives in May 2011 and to incorporate any changes to UK mandatory requirements by 2015. In view of the clear safety benefits that the routine wearing of lifejackets by fishermen will realise, such work should be given the highest priority.

2.6 METHOD OF OPERATION

Before the modifications were carried out on board *Maggie Ann* in 2006, the dredge beams could be lowered directly onto the deck. Deckhands were therefore afforded the protection of the bulwark as they leant over the gunwale to snare a dredge bag lifting becket and were able to remain standing on the deck while they assisted in emptying the bags.

Following the modifications, the increased height of the bulwark, together with the added protection against movement of the dredge beam provided by the crutches, improved the crew's safety. However, the new arrangement resulted in exposing the crew to new hazards because they were required to stand on an elevated beam to snare the lifting becket and empty the dredge bags. The risks of falling off the beam and of falling overboard also increased significantly when the beam was not lowered into the crutches and instead remained suspended, almost level with the gunwale.

These risks could have been mitigated by pulling the beam down into the crutches, a practice discontinued by the current skipper, or by wearing a safety harness, as recommended by MGN 311 (F). Alternatively, a 'tipping' bar, commonly used on scallop dredgers **(Figure 12)**, could have been fitted. This would have enabled all the dredge bags to be inverted at the same time and have avoided the need for deckhands to step onto the dredge beam or to lean over the gunwale.

Figure 12

Fitted 'tipping bar' arrangement

2.7 RISK ASSESSMENTS AND SAFETY AWARENESS

Risk assessment requires a clear distinction between two concepts: the probability of an event and the degree of harm associated with it, in order to obtain a risk factor to instigate control measures. The risk assessments that the skipper completed indicated a lack of understanding of this concept; the assessments for the bag lifting/dredge discharge activity had been incorrectly calculated and specified no control measures for what should have been identified as a high risk of falling overboard.

The skipper had attended a safety awareness course in 2002, which included a module on risk assessment. However, without a course assessment to confirm understanding, and without any form of refresher training, the skipper had inadequate knowledge and skills with which to comply properly with risk assessment requirements. It seems that he had difficulty in putting theory into practice. For example, the risk assessment for falling overboard while reaching outboard to hook onto a lifting becket was recorded as requiring no control measures; yet he interpreted the risk to be sufficiently high as to instruct the deckhands to maintain a secure hold of a suspension chain while attending to the dredge bags.

Contrary to The Fishing Vessels (Safety Training) Regulations 1989, as amended, neither Stefan nor the other deckhands had attended a safety awareness course and, consequently, they were unlikely to have had an adequate understanding of risk assessments.

The investigation determined that despite attending safety awareness courses, many fishermen see written risk assessment as a task necessary only to satisfy a requirement, not as an important tool to help identify and reduce risks to safety in a dangerous working environment. This requires a change in attitude. The MCA initiative in the north-east of Scotland has demonstrated the success of not only engaging the skipper but also of engaging the crew. The 2004 research project confirms that this does indeed change attitudes and raises safety awareness.

In its Analysis of UK Fishing Vessel Safety 1992 to 2006, the MAIB recommended that the MCA and Seafish review the current requirements for safety training with particular reference to training assessment and refresher training. This recommendation was accepted and Seafish intends to develop and introduce practical and knowledge based assessments for attendees, and to apply for funding from the European Fisheries Fund to facilitate refresher training.

2.8 MAINTENANCE REGIME

If the lifting becket on the dredge bag had not failed, the accident would not have happened. The failure was due to the wear at the point of attachment to a metal ring on the dredge. Such wear is inevitable given that rope (rather

than steel wire or chain) is employed. A robust inspection and maintenance regime might have prevented the failure. The inspection regime on *Maggie Ann* was reported by the crew to have been effectively continuous during the dredging operations in line with the Fishermen's Safety Guide checklist **(Annex B)** and was certainly informal, i.e. there was no prescribed list of checks to be completed before sailing or during operations.

It is possible, but not certain, that the wear might have been detectable on the previous haul or on inspection before sailing. Inadequate maintenance was, therefore, a possible contributory factor. The accident provides an object lesson in the need for a robust inspection and maintenance regime of working gear.

2.9 EMERGENCY RESPONSE AND PREPAREDNESS

2.9.1 *Maggie Ann*'s response

The skipper and the crew can be commended on their swift reactions to the manoverboard by putting the engine astern, throwing a lifebuoy and keeping the casualty in sight.

Although the outcome may not have been different in this case, the rescue could have benefited by the following actions:

- A short round turn to port or a 'Williamson Turn' would have brought *Maggie Ann* sooner to the point of the manoverboard position. This would have also brought the bow into the wind and have given better control to the skipper as he manoeuvred the vessel to recover Stefan.
- The use of a lifebuoy with a line attached, provided in accordance with MSN 1731(M+F), would have ensured that if Stefan had managed to reach the lifebuoy, he could have been pulled alongside the vessel.
- A call to the Coastguard as soon as possible following the manoverboard would have enabled the emergency services to be activated immediately, thereby maximising the time available for SAR purposes.

2.9.2 Emergency preparedness and recovery

This accident highlights the importance of emergency preparedness and of recovering the casualty from the water as quickly as possible.

In accordance with the Code of Practice for the Construction and Use of 15 metre length overall to less than 24 metre registered length Fishing Vessels and the Seafish Fishing Vessel Safety Folder, a scramble net and lifting device (as a means of recovery) should have been available to assist in the recovery of a person overboard. Additionally, monthly emergency drills should have been carried out. However, this equipment was not on board and no emergency drills had been conducted.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT WHICH HAVE RESULTED IN RECOMMENDATIONS

1. Although the provision of a lifejacket or other personal flotation device for use by the crew is mandatory where there is a reasonably foreseeable risk of their falling overboard, the wearing of one is not. [2.5]
2. The wearing of a lifejacket by Stefan Tamas would have significantly improved his survivability. [2.5]
3. The risks of falling off the dredge beam and of falling overboard increased significantly when the beam was not lowered into the crutches and instead remained suspended, almost level with the gunwale. [2.6]
4. The fitting of a 'tipping' bar, commonly used on scallop dredgers, would have enabled all the dredge bags to be inverted at the same time and have avoided the need for deckhands to step onto the dredge beam or to lean over the gunwale. [2.6]
5. Despite attending safety awareness courses, many fishermen see written risk assessment as a task necessary only to satisfy a requirement. This requires a change in attitude. [2.7]
6. Inadequate maintenance was a possible contributory factor. The accident provides an object lesson in the need for a robust inspection and maintenance regime of working gear. [2.8]
7. No emergency drills were conducted which might have ensured that correct equipment was available and well rehearsed procedures were followed. [2.9]

3.2 SAFETY ISSUES IDENTIFIED DURING THE INVESTIGATION WHICH HAVE NOT RESULTED IN RECOMMENDATIONS BUT HAVE BEEN ADDRESSED

1. Contrary to The Fishing Vessels (Safety Training) Regulations 1989, as amended, neither Stefan nor the other deckhands had attended a safety awareness course and, consequently, they were unlikely to have had an adequate understanding of risk assessments. [2.7]
2. The risk assessments for the bag lifting/dredge discharge activity had been incorrectly calculated and specified no control measures for what should have been identified as a high risk of falling overboard. [2.7]
3. Despite attending a safety awareness course, without a course assessment to confirm understanding, and without any form of refresher training, the skipper had inadequate knowledge and skills with which to comply properly with risk assessment requirements. [2.7]
4. No means for recovering a person overboard were provided contrary to the Code of Practice for the Construction and Use of 15 metre length overall to less than 24 metre registered length Fishing Vessels. [2.9]

SECTION 4 - ACTION TAKEN

4.1 AGR Fishing Company Limited

Has taken a number of actions which include:

- Supplying all the crew with inflatable lifejackets.
- Reviewing the risk assessments on board *Maggie Ann*.
- Providing the vessel with a means of recovering a man overboard.
- Sending its foreign crew on a safety awareness course.
- Fitting a Lalizas life-link manoverboard rescue system on the port and starboard sides of the main deck.

4.2 The **Marine Accident investigation Branch**

The MAIB has issued a flyer to the fishing industry **(Annex F)** highlighting the lessons learned from this tragic accident.

SECTION 5 - RECOMMENDATIONS

The **Maritime and Coastguard Agency** is recommended to:

2009/158 As part of its efforts to realise improved safety within the fishing industry:

- Expedite its current work on the use of personal flotation devices and personal locator beacons in the UK fishing industry (MAIB Recommendation 2008/173 refers).
- Ensure emergency drills, including manoverboard drills, plus instruction and guidance on how to conduct risk assessment and improve safety awareness are undertaken to a consistent standard by surveyors and inspectors of fishing vessels throughout the UK.
- Incorporate guidance into its revision of MGN 265 (F) designed to preclude the need for scallop fishermen to lean outboard of the bulwark during tipping operations.

AGR Fishing Company Limited is recommended to:

2009/159 Improve the safe operation of its vessel by:

- Modifying working procedures as necessary to preclude the need for crew to lean outboard of the bulwark during tipping operations.
- Ensuring that the skipper conducts regular emergency drills.
- Implementing a robust inspection and maintenance regime for all working equipment.

The **Scallop Association** is recommended to:

2009/160 Endorse and promulgate, through its membership, the fishing accident flyer published by the MAIB which highlights the safety lessons learned from this tragic accident.

Marine Accident Investigation Branch
September 2009