

Report on the investigation of the injury to
a member of the crew on board the fishing vessel

Sian Elizabeth

3 miles north of Kings Lynn

14 September 2006

Marine Accident Investigation Branch
Carlton House
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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 AND ACRONYMS

EC	-	European Commission
ESFJC	-	Eastern Sea Fisheries Joint Committee
kW	-	kilowatt
LOA	-	Length overall
m	-	metres
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine Guidance Note
MSA	-	Marine Safety Agency
MSIS 27	-	Instructions issued by the MCA for the guidance of its surveyors and inspectors for the purpose of ensuring compliance with the various Statutory Instruments covering fishing vessels.
Seafish	-	The Sea Fish Industry Authority works across all sectors of the UK seafood industry to promote good quality, sustainable seafood.
Sector manager	-	Maritime and Coastguard Agency sector manager
SFTA	-	Seafish Training Association
Shear traps	-	The risk of personal injury from trapping body parts between adjacent shearing components.
SIAS	-	MCA Ship Inspection and Survey record.
Surveyor	-	As used in this report, an MCA official trained as either a general marine surveyor or a Marine Surveyor (Fishing Vessels).
UTC	-	Universal Co-ordinated Time

SYNOPSIS



The 14m fishing vessel *Sian Elizabeth* departed from the Fisher Fleet in Kings Lynn at 1100 on 14 September 2006 in fine weather, having landed the previous catch. The vessel sailed, with three crew on board, to return to the cockle beds west of Hunstanton.

A 17 year old, untrained crewman had joined *Sian Elizabeth* the previous day, this being his first job since leaving school.

Shortly after the start of dredging, the untrained crewman started to clear the cockles from the chute into the hold as he had the previous day. As he was scraping the cockles down the chute with his right hand, he placed his left hand on the riddle frame assuming there was enough space to grip between the supporting frame and the rotating drum.

The unguarded riddle construction formed a shear trap that caught the crewman's left thumb and pulled his left arm into the riddle, causing serious injury.

The investigation found that:

- The construction and location of the riddle created a significant shear trap risk to crew routinely working in close proximity to the unguarded machinery.
- The risk of personal injury from routine working close to the riddle had not been effectively assessed.
- The specific requirement to assess the risk to young persons working on board *Sian Elizabeth* was not considered by either the owner or the skipper.
- The owner's delegation of responsibility for his vessels to individual skippers did not ensure compliance with the Code of Practice for the Safety of Small Fishing Vessels.
- The skipper and crew had not attended the required short training courses for fishermen. The skipper was not aware of the obligation of the inexperienced crew to attend a Basic Sea Survival course prior to starting his first job as a fisherman.
- The skipper took on a new crewman who was unfamiliar with the risks faced on board a small fishing vessel.
- The owner and skipper were unaware of the regulations governing employment of young persons.
- The familiarization provided to the new crewman was not sufficient to prevent the accident; he received no effective guidance on safe working prior to, or during, his time on board.
- The vessel did not comply with the Code. The deficiencies identified on board *Sian Elizabeth* during the MAIB investigation showed that a risk assessment had not been completed, annual self certification of the vessel had not been carried out, and the crew had not completed the required training.

John Lake (Shellfish) Limited is recommended to:

- Comply with the requirements of the Code, and specifically:
 - o Complete, or arrange completion of, an assessment of the health and safety risks arising in the normal course of work activities or duties of the vessel.
 - o Certify annual compliance with the Code, by declaring that the safety equipment has been properly maintained and surveyed and that up to date health and safety risk assessment has been completed.
- Ensure all skippers and crew are trained as required by statute.
- Ensure that young persons are familiarised, trained and assessed with consideration given to their age prior to working on board.
- Ensure that the riddle arrangement on board *Sian Elizabeth* complies with The Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations (PUWER) 2006.

The Maritime and Coastguard Agency is recommended to:

- Ensure the effective inspection and survey of under 15m fishing vessels to ensure compliance with the Code.
- Verify that fishing vessel owners are compliant with The Merchant Shipping and Fishing vessels (Health and Safety at Work) (Employment of Young Persons) Regulations 1998.
- Implement The Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006 and amalgamate the provisions of the regulations into guidance for fishing vessel inspectors and surveyors.



Sian Elizabeth

SECTION 1- FACTUAL INFORMATION

1.1 PARTICULARS OF *SIAN ELIZABETH* AND ACCIDENT

Vessel details

Registered owner	:	John Lake (Shellfish) Limited
Port of registry	:	Kings Lynn
Flag	:	British
Type	:	Fishing Vessel
Built	:	1995
Construction	:	Steel
Length overall	:	13.86m
Gross tonnage	:	13.69
Engine power	:	179kW

Accident details

Time and date	:	Between 1350 and 1400 on 14 September 2006
Location of incident	:	5 miles north of Kings Lynn Lat: 52° 53.8' N Long: 000° 25.3' E
Persons on board	:	Three
Injuries/fatalities	:	One injury
Damage	:	None

1.2 BACKGROUND

All times are UTC +1.

Sian Elizabeth was one of seven fishing vessels owned by John Lake (Shellfish) Limited of Kings Lynn. The vessel was designed for beam trawling for shellfish and suction dredging for cockles. The port of Kings Lynn is tidal and the fish port, the Fisher Fleet, dries at low water. Therefore the boats are tidally constrained but, in addition, the boats' schedules were coordinated to supply the company's cook house, situated close to the quay, at the required times.

1.3 JOHN LAKE (SHELLFISH) LIMITED VESSELS

John Lake (Shellfish) Limited had developed over the last 30 years, with the current fleet of 7 boats existing for the last 5 years. The owner gave the skipper full responsibility for the operation of the vessel, and a verbal agreement existed between them whereby they shared the proceeds from the catch after voyage costs - such as fuel - had been deducted. The skipper was entirely responsible for the operation and manning of the boat. Major capital costs would be paid by the owner with running costs generally met by the skipper and crew.

1.4 THE CREW

The boat was usually manned by a skipper and one crewman. However, for periods of cockle dredging during the summer months in The Wash, the skipper took on a third person to assist due to the increased workload.

1.4.1 The skipper

The skipper had 26 years fishing experience, mostly as a skipper, and had previously owned his own boat. He had attended the Sea Fish Industry Authority Approved Training Courses in First-Aid and Basic Sea Survival in 2000. The skipper joined *Sian Elizabeth* in December 2005.

1.4.2 The senior crewman

The senior crewman had 22 years experience on fishing boats and had worked extensively with the skipper. He had not attended the required Approved Training Courses.

1.4.3 The temporary crewman

This was the 17 year old temporary crewman's first job since leaving school the previous summer. He had not been on board a fishing vessel before he joined *Sian Elizabeth* on the day before the accident. He had not attended the required Basic Sea Survival course.

1.5 VESSEL DESCRIPTION

Built in 1995, *Sian Elizabeth* was a purpose-built shellfish fishing vessel capable of beam trawling for shrimp, mussels and scallops, and suction dredging for cockles. She was fitted with an auxiliary engine, of similar power to the main engine, which provided power to the dredging pump and hydraulic power for the deck machinery. The deck piping arrangement could be removed ashore if required, when the vessel was rigged for beam trawling.

In her cockle dredging configuration, *Sian Elizabeth* was fitted with a suction arm and associated pumping arrangement which scoured the cockles from the sea bed. A hydraulically powered drum, termed a riddle, sieved the water, mud and undersized cockles from the catch (**Figure 1**). With the exception of the riddle arrangement, the vessel had not been significantly modified from her original design and construction.

1.6 DESIGN AND OPERATION OF THE RIDDLE ARRANGEMENT

Riddle arrangements vary from vessel to vessel depending on the deck and hatch layout. On *Sian Elizabeth*, the riddle was permanently fitted on legs on the port side, allowing the water, mud and small cockles to wash directly overboard as they progressed through the riddle (**Figure 2**). The sorted cockles then slid down a chute to bags in the hold or into baskets for transfer to larger bags stowed on deck. The chute tended to become obstructed with mud and cockles and required frequent clearing by hand to ensure the cockles could run freely. The hydraulically driven riddle drum rotated at constant speed regardless of the quantity of cockles being processed.

The riddle arrangement on *Sian Elizabeth* was a new configuration for the 2006 cockling season. Previously, the riddle had been portable and had been rigged over the side at the start of each dredging run. The permanent fixing was seen as an improvement, avoiding the need to rig and de-rig the equipment during the cockling operation.

1.7 ENVIRONMENTAL CONDITIONS

On the day of the accident, wind conditions were light with a NNE Force 2. The weather was partly cloudy with good visibility. High water at Hunstanton occurred at 1123.

1.8 NARRATIVE OF EVENTS

The skipper's first choice of temporary crew had decided not to take the job offered to him and, at short notice, the skipper took on the 17 year old son of a crewman working on board another of the boats owned by John Lake (Shellfish) Limited. He was employed on a trial basis to see if he would like the job before being offered the work permanently.

The new crewman joined *Sian Elizabeth* shortly before the vessel was due to depart on the evening of 13 September 2006; he was briefed on his job by the skipper and issued with wet weather gear and gloves.

At around 1900, *Sian Elizabeth* sailed to an area of private cockle beds in The Wash, west of Hunstanton. The first evening's cockle dredging was carried out as expected, with the new crewman working on deck and being shown his job by the experienced crewman.

At 2300, the vessel finished dredging and anchored in The Wash to await the next tide in order to return to the Fisher Fleet in Kings Lynn.

The crew rested overnight, with the skipper and senior crewman sleeping in the two bunks in the forward accommodation while the new crewman slept in the wheelhouse chair.

Sian Elizabeth weighed anchor and headed back to the Fisher Fleet in Kings Lynn on a rising tide during the morning of 14 September, arriving alongside her berth at around 0830. The cockles were then discharged onto the quay using the boat's own crane.

Figure 1



The riddle - plan view

Figure 2



The riddle - seen from aft

Normally, *Sian Elizabeth* would conduct one cockle fishing trip per day. However, on this occasion the decision was made to sail on the same tide and return to the fishing grounds for a second trip. Usually, the vessel remained alongside for a full tide unless, due to the changing tide times, an additional trip to the cockle beds was possible the same day.

At 1100, *Sian Elizabeth* left Kings Lynn, arriving at the cockle grounds at around 1330 when the dredge gear was lowered to the sea bed and dredging commenced.

The skipper manoeuvred the vessel from the wheelhouse, turning the vessel in tight circles once a patch of cockles was found. The two men on deck initially directed the cockles from the end of the riddle, via a chute, into two bags stowed in the hold (**Figure 3**).

Figure 3



Clearing the chute by hand

As the senior crewman directed the cockles from the end of the chute into the bags in the hold, the new crewman would ensure the cockles ran freely from the end of the riddle by scraping the chute by hand. The top of the chute at the end of the rotating riddle was susceptible to blockage with mud and cockles and required clearing, particularly when the hold was being filled. This was a right handed job and the new crewman's recollection was that he had been told that, if necessary, he could rest his left hand on the hydraulic motor which drove the riddle (**Figure 4**).

Figure 4



Just before 1400, as the new crewman was scraping the cockles from the chute with his right hand, he moved his left hand to the structural cross member of the riddle, believing there was enough space for his hand to grip the support and be clear of the rotating inner drum (**Figure 5**). The rotating drum of the riddle caught his thumb, fracturing his wrist and pulling his arm into the riddle arrangement before fracturing his left elbow. The abrasion of the cross member also removed the skin from his inner left elbow.

In the wheelhouse, the skipper heard a shout, and when he saw the injured crewman on deck he quickly stopped the hydraulic power using the stop button on the control panel on the aft bulkhead of the wheelhouse (**Figure 6**).

The skipper and the senior crewman released the injured man from the riddle and the skipper contacted the local coastguard by VHF radio for assistance.

At 1410, the RNLI inshore lifeboat from Hunstanton arrived on scene and transferred the injured crewman from *Sian Elizabeth* to the lifeboat. He was then returned to Hunstanton where he was transferred to a waiting ambulance that took him to the local hospital for treatment. The crewman was subsequently transferred to Norfolk General Hospital where skin grafts were applied to his inner elbow.

Figure 5



Sequence showing how the crewman's arm was caught in the shear trap





Hydraulic Control Panel

1.9 THE FISHING AREAS OF THE WASH

The Eastern Sea Fisheries Joint Committee (ESFJC) is responsible for the protection of inshore fish stocks along the East Anglian Coast for the benefit of local fishing communities that rely on those fish stocks for their livelihoods. The Wash is divided into both private and publicly owned areas, with limits set on the quantity of shellfish available for fishing each year by the ESFJC. The ESFJC monitors and assesses shellfish stock levels in order to balance fishing effort with stock availability in an overall manner by means of regulation if necessary. Its aim is to regulate, protect and develop the fisheries within the committee's district in a manner that ensures sustainable viability for the foreseeable future and compliance with the committee's environmental responsibilities.

The ESFJC has no responsibility for the safety of fishing vessels operating within its area.

1.10 REGULATION

The following regulations specific to this accident were relevant to *Sian Elizabeth* at the time it occurred:

- S.I. 2001 No. 9 – The Fishing Vessels (Code of Practice for the Safety of Small Fishing Vessels) Regulations 2001 applies to United Kingdom fishing vessels under 12m in length. From 23 November 2002, the Code was applied to all United Kingdom registered vessels with a length overall of less than 15 metres. The Small Fishing Vessel Code is contained in the Merchant Shipping Notice MSN 1756(F). The amended MSN 1756(F) is at **Annex A**.
- The Merchant Shipping and Fishing Vessel (Health and Safety at Work) Regulations 1997, which came into force on 31 March 1998 to implement EC Directive 89/391. They introduced measures to encourage improvements in the health and safety of workers by requiring owners to conduct suitable and sufficient risk assessments to the risks relating to health and safety issues in the normal course of their activities or duties.

- S.I. 1989 No.0126 – The Fishing Vessels (Safety Training) Regulations, amended by S.I. 2004 No.2169 sets out the approved training courses that fishermen working on UK registered fishing vessels are required to undertake. These are:
 - o Basic Sea Survival
 - o Basic Fire-Fighting and Prevention
 - o Basic First-Aid, and
 - o Basic Health and Safety – New Entrant.

In taking account of the drop-out rate among new entrants to the fishing industry, the MCA only requires that all new fishermen attend a 1-day Basic Sea Survival course prior to going to sea for the first time. The remaining three courses must be completed within three months of the entrant's start date.

Additionally, a fisherman who has more than 2 years service working on board fishing vessels is required to undergo an Approved Training Course in Safety Awareness which provides instruction on accident prevention and risk assessment.

- The Merchant Shipping and Fishing Vessels (Health and Safety at Work) (Employment of Young Persons) Regulations 1998 contains guidance on specific risks to young persons which may arise from their work on board ship. Further advice on this is contained in MGN 88 (M&F).

Although not in force at the time of the accident, the following relevant regulation has subsequently been introduced:

- The Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006 were made on 8 August 2006 and came into force on 24 November 2006. The guidance and interpretation of these regulations is given in MGN 331(M+F).

1.11 MSN 1756 (F) – THE FISHING VESSELS CODE OF PRACTICE FOR THE SAFETY OF SMALL FISHING VESSELS UNDER 12 METRES IN LENGTH, AS AMENDED

1.11.1 Code requirements

S.I. 2001 No.9 provides that a vessel shall not proceed on any voyage unless the vessel complies with the requirements of the Code. Specifically, a vessel owner will be required to:

- Carry safety equipment on the vessel appropriate to its length and construction.
- Complete, or arrange for the completion of, an assessment of the health and safety risks arising in the normal course of work activities or duties of the vessel. While there is no mandatory requirement that the assessment is recorded, the MCA strongly recommends that it is documented.
- Certify annually, using the provided declaration, that the vessel complies with the Code, by declaring that the safety equipment has been properly maintained and serviced in accordance with the manufacturers' recommendations and that an appropriate, up to date health and safety risk assessment has been completed. This document should be retained by the vessel owner and produced when requested by the MCA.

1.11.2 Non-compliance

Where a vessel does not comply with the Code, the owner and skipper shall each be guilty of an offence, and the vessel is liable to be detained under Section 284 of the Merchant Shipping Act 1995.

- Improvement Notices may be issued where there is a breach of statutory provisions by a person, with improvement required within 21 days of the notice being served.
- Prohibition Notices may be issued to immediately stop or prohibit an activity if that activity involves, or is likely to involve, a serious risk of personal injury or pollution.
- Detention Notices may be issued in circumstances where a fishing vessel has deficiencies which would be clearly hazardous to safety, health or the environment should it proceed to sea.

1.12 APPROVED TRAINING COURSES

Training for the Kings Lynn area is provided by the Eastern Seafish Training Association, supported by the Seafish Industry Authority. In 2006, a total of 70 Safety Awareness courses and 80 courses in First-Aid, Fire-Fighting and Sea Survival were scheduled in the Eastern Seafish Area.

1.13 EMPLOYMENT OF YOUNG PERSONS REGULATIONS

MGN 88(M+F) gives advice on The Merchant Shipping and Fishing Vessels (Health and Safety at Work) (Employment of Young Persons) Regulations 1998.

Young workers (those under 18 years of age) are seen as being particularly at risk because of their possible lack of awareness of risks, their immaturity and inexperience. The MGN provides advice on employers' responsibilities in relation to those workers, and how to comply with the regulations. The regulations place duties on employers or, if the employer is not "in control of the matter", extend the duty to any person who does have control.

Employers are required to ensure that young persons are not engaged in "*work involving the risk of accidents which it may be assumed cannot be recognised or avoided by young persons owing to their insufficient attention to safety or lack of experience or training*".

1.14 VESSEL SURVEY AND INSPECTIONS

1.14.1 Background

The programme for inspections of fishing vessels under 12m in length commenced in 1990, at which time inspections were the responsibility of the Surveyor General's Organization which was part of the Department of Transport. Marine Surveyors (Fishing Vessels) usually undertook the inspections, but were occasionally supported by general marine surveyors. Both were located at local Marine Offices. The inspections were conducted in accordance with the "General Exemptions from the Fishing Vessel (Safety Provisions) Rules 1975, as amended".

Fishing vessel inspections continued in the same vein when the Surveyors General Organization became the Marine Safety Agency (MSA) in 1994. The MSA amalgamated with the Coastguard Agency in 1998 to form the current Maritime and Coastguard Agency (MCA), and in 1999 responsibility for the inspection of under 12m fishing vessels was transferred to Coastguard sector managers.

1.14.2 Coastguard sector managers

The primary role of the Coastguard sector manager is the management, training and coordination of the Coastguard's Rescue Service within the sector. In addition, the sector manager is responsible for the inspection of selected fishing vessels and representing the MCA and, in particular, HMCG in the local community. To prepare for their role of inspecting fishing vessels, sector managers undergo MCA training courses and on-the-job training. Sector managers become authorised to conduct solo inspections following the issue of a warrant card as a "departmental officer". Sector managers trained as inspectors have the authority to issue Improvement and Prohibition Notices, but not to detain vessels.

1.14.3 MCA surveyors

Normally a surveyor will attend a vessel only if an inspecting officer (sector manager) identifies concerns over the material condition, stability or seaworthiness of a vessel during an inspection. Surveyors have broader experience and also are guided that, where an unsafe situation occurs which is not specifically covered by maritime legislation, enforcement action can be taken through the application of the Health and Safety at Work Regulations 1997. Surveyors have the power to detain a vessel.

1.14.4 Guidance on inspecting fishing vessels

Inspections of under 15m LOA fishing vessels are conducted according to the instructions and guidance for inspectors contained in MSIS 27. This states that if a sector manager finds defects that affect the seaworthiness of the vessel, then a surveyor should be contacted immediately for advice. Further, if any deficiency is required to be rectified before the vessel sails, and the inspector considers that the owner may not correct the deficiency before sailing, a surveyor should be contacted and the vessel detained.

1.14.5 Five yearly and annual inspections

In accordance with MSN 1756, fishing vessels under 15m LOA are subject to an inspection regime, operated by MCA coastguard sector managers. Following a successful inspection, the inspecting officer will issue a certificate, valid for 5 years, which is required to be displayed in the wheelhouse window. These inspections are free of charge, although a charge is made for re-inspections where these are required following the issue of improvement, prohibition or detention notices. Inspections are recorded on MCA forms which are entered into SIAS, the central database of MCA records for fishing vessels. SIAS records are updated following routine and follow up inspections by MCA surveyors and inspectors. Sector managers may request previous inspection records of fishing vessels from their local MCA marine office when required.

In between 5-yearly inspections, owners are required to conduct an Annual Self-Certification, in accordance with a checklist contained in MSN 1756(F), and sign to the effect that their vessels comply with the Code.

1.14.6 *Sian Elizabeth's* inspection history

MCA SIAS records indicate that *Sian Elizabeth* was inspected in February 2001, where nine actions were required to be completed, including that evidence of training in first-aid, survival at sea and fire-fighting was to be provided at the next inspection.

A general inspection, by a surveyor, was carried out on 5 September 2003 in Lowestoft (Oulton Broad), when 23 deficiencies were noted (**Annex B**) and the vessel was detained by an MCA surveyor (**Annex C**). The actions required included the “*completion of MSN 1765(F)*”, the annual checklist for the vessel’s compliance with the Code, and “*the Seafish risk assessment to consider and develop*”.

On 9 September 2003, the inspecting surveyor wrote to *Sian Elizabeth*’s owner explaining the actions required (**Figure 7**). In particular, the letter explained that although a written risk assessment was not required, the owner, skipper and crew should be able to “*talk confidently about their work and the risks they encounter*”.

The vessel was released on 19 September 2003 following a satisfactory re-inspection (**Annex D**).

Sian Elizabeth was last inspected by the MCA on 10 June 2005, and an inspection certificate was issued with an expiry date of 2010. No actions were required to be taken by the vessel.

1.15 SIMILAR ACCIDENTS

Two personal injuries involving riddles have been recorded by the MAIB.

In 2003, a fisherman broke his arm on board a twin beam trawler fishing for queen scallops. His arm was pulled into a rotary riddle when his sleeve became caught in the mechanism and pulled his arm into the supporting frame. The fisherman was airlifted to hospital.

In 2001, a fisherman lost part of his thumb in a riddle on a twin beam trawler fishing for shrimps; the fisherman stated that he placed his thumb into the riddle during a momentary lapse of concentration.

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To: John Lake Shellfish Ltd Fax: 01553 769175 Date: 09 September 20003 No of pages (including this one): 1	From: Fishing Vessel Surveyor TEL : 01493 841300 Fax : 01493 841333 Ref: SIAN ELIZABETH
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Sir

I spoke to the skipper and attempted to explain the requirements of MSN 1756 (F) with regard to Merchant Shipping and Fishing Vessel (Health and Safety at Work) Regulations 1997:

Risk Assessment (RA), while a written RA is not required the verbal RA is. The owner/Skipper/Crew should be able to talk confidently about their work and the risks they encounter. The MCA Strongly advises that a written RA is developed and carried as a living document onboard the vessel.

Part of the RA should be the knowledge of stresses and strains on the standing and running gear. I would encourage your Company to take advice from a reputable Company on the SWL of standing and running gear associated with your trade. Fitting Certified equipment throughout, a record may be kept with dates of inspection, renewal and repairs. In the case of incidents it would provide a valuable record of the Companies attention to safe working practices.

I was asked if I would release the vessel to have work done at King's Lynn, this may not be a cheap option. The release would have to be charged for at Lowestoft, then re-detained at King's Lynn then released on completion of the defects. A bill of several hundred pounds would be run up without the charges for administration.

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 THE ACCIDENT

The investigation found that the accident was a consequence of the unguarded rotating riddle drum creating a shear trap risk close to the operating crew when sorting the shellfish on deck. The injured crewman was a young, untrained and inexperienced fisherman who was unaware of the dangers posed by the unguarded riddle. A number of factors have been identified which allowed this situation to exist.

2.3 RIDDLE CONSTRUCTION

The riddle was welded into position on the port side of *Sian Elizabeth* prior to the 2006 cockle season. This semi-permanent location meant that the riddle did not need to be rigged outboard prior to the start of each dredging operation. The change of the riddle's position required a modification in the way cockles were channelled from the end of the riddle into the hold or baskets by the addition of a chute.

The chute was ineffective and prone to becoming blocked with mud and cockles, which required clearing by hand. While the semi-permanent fixing of the riddle reduced the overall workload of the crew, the repeated clearing of the chute and the creation of the shear trap risk close to the working area increased the likelihood of an accident. The increased risk was not recognised by the skipper or crew. Had it been recognised, the risk could have been eliminated by effective guarding of the machinery or redesigning the equipment to remove the risk.

No "emergency stop" control was sited by the riddle's end as the risk to crew was not identified. It was fortuitous that the operation of cockle dredging required the skipper to remain vigilant in the wheelhouse close to the riddle operating controls.

Many of the cockling vessels operating from the Fisher Fleet had off-the-shelf riddles which were delivered already fitted with appropriate safety guards and emergency/local stop controls. On some vessels the riddle fed cockles into a hopper, which then fed the hold. However, *Sian Elizabeth*'s riddle had been manufactured locally to the skipper's specifications and did not include such features. Although the manufacturer would not necessarily have known how the riddle was to be fitted onboard, the unguarded shear trap should have been identified during design and manufacture. The Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006, which came into force during this investigation on 24 November 2006, now make quite clear that responsibility lies with the owner and skipper to ensure that work equipment is safe to operate.

2.4 RISK ASSESSMENT

A requirement of the Small Fishing Vessel Code for vessels of *Sian Elizabeth*'s size is that a vessel's owner must complete, or arrange completion of, an assessment of the health and safety risks arising in the normal course of work activities or duties on the vessel, in accordance with the provisions of the Merchant Shipping and Fishing

vessels (Health and Safety at Work) Regulations 1997 and MGN 20 (M+F). It is not a requirement that risk assessments be written, nevertheless, the MCA strongly recommends that they are. An example of a suitable standard of written risk assessment is included in the Fishing Vessel Safety Folder, developed and available from the Sea Fish Industry Authority (Seafish). The folder also provides general pro-forma guidance on fishing vessel risk assessment, and specific guidance for particular modes of fishing.

In addition, a specific assessment of risk is required when a young person below the age of 18 is employed, as detailed in section 1.13. This assessment must consider the work which the young person is being requested to do, and ensure that the person's training, experience, physical and psychological development are sufficient to enable them to carry out the work safely.

Sian Elizabeth's skipper was aware of the requirement to assess work-related risks, but was unable to take an objective view of the risks faced on board a vessel with which he was completely familiar. As such, he was oblivious to the risk of personal injury faced by the new, young and inexperienced crewman. There was no evidence of any risk assessment having been conducted either by the skipper or the owner on board *Sian Elizabeth*.

Neither the skipper nor the senior crewman had attended the 1-day Safety Awareness course required for experienced fishermen, which provides instruction in accident prevention and risk assessment. Had they done so, it might have increased their perception of the risks experienced by fishing crews. Specifically, they would have been alerted to the risks of the shear trap on the riddle, and increased risks to those unfamiliar with fishing vessels.

2.5 OWNER'S RESPONSIBILITY

To comply with the Small Fishing Vessel Code, the owner of a fishing vessel must: carry safety equipment on the vessel appropriate to its length and construction; complete, or arrange completion of, risk assessments; and certify annually that the vessel is compliant. It is the vessel's owner's responsibility to ensure compliance with the Code.

There were no records to show that the owner of *Sian Elizabeth* had ever conducted the annual certification of compliance with the Code. The owner was not aware who, other than the skipper, was crewing his vessel, nor did he know what training had been completed by the crew. He was also unaware that young persons were being employed on board vessels he owned.

The owner's decision to delegate full responsibility to the skipper for the operation of *Sian Elizabeth* allowed the skipper to operate the boat to his own standards without supervision. Although a very experienced fisherman, the skipper did not have the underpinning knowledge, or training, in the applicable legislation to ensure that his vessel's operation was compliant with current regulations and good practice.

While a risk assessment can be delegated to a third party, the regulations make no provision which would allow an owner to delegate his/her responsibility for ensuring a vessel's compliance with the Code to the skipper or any other person. The owner's

verbal agreement with the skipper over their relative responsibilities for running *Sian Elizabeth* was therefore inappropriate. The owner's lack of understanding over who was ultimately responsible for the safe running of the vessel had not been identified by the MCA during the Code inspections.

2.6 TRAINING

The Fishing Vessels (Safety Training) Regulations 1989 as amended in 2004 require all fishermen to complete the four mandatory training courses. The MCA's interpretation of this regulation is that new entrants should complete the 1-day Basic Sea Survival course prior to going to sea for the first time, and the remaining courses within 3 months of starting work as a fisherman. Thereafter, failure to complete the courses risks the vessel being detained by an MCA surveyor. The new crewman was a 17 year old school leaver taking his first job on board and he should, as a minimum, have attended the Basic Sea Survival course before going to sea.

The skipper had attended only two of the four mandatory courses, namely Basic Sea Survival and Basic First-Aid. The senior crewman had attended none of the required courses. Had the skipper and senior crewman attended the mandatory Safety Awareness course, their ability to carry out risk assessment would have been greatly enhanced.

All the mandatory training courses were frequently held in the Kings Lynn area. The owner and skipper of *Sian Elizabeth* saw no need for the crew on board to attend the safety courses, of which they were aware, and felt confident in operating the vessel with untrained crew. This deficiency in training had been identified during the MCA inspection in February 2001, yet it had recurred at the time of this accident in 2006.

Had the requirement to complete the mandatory training been more rigorous, it is likely that the owner would have adopted a more diligent approach to his crews completing the required courses. Had they done so, it is probable that *Sian Elizabeth's* risk assessment would have been more robust, the shear trap on the riddle identified in good time, and the new crewman's young age and inexperience properly accommodated.

2.7 FAMILIARIZATION

The new crewman was briefed as to his role on board the fishing vessel, but received no instruction on the safety equipment available or the actions to be taken in the event of an emergency on board. As an example, he was unable to identify whether the boat was equipped with a liferaft, even though *Sian Elizabeth* was fitted with one in a prominent location above the wheelhouse.

The new crewman had not attended the Basic Sea Survival course, neither had he been briefed fully on *Sian Elizabeth's* survival aids. Had there been a catastrophic accident, not only would his own survival chances have been reduced, but his ability to assist his colleagues would have been negligible. In the worst case, the permanent crew's safety chances could have been badly compromised as they tried to assist him.

2.8 FATIGUE

There is no evidence that the new crewman was seriously fatigued. However, he was working, for only the second day at sea, in an unfamiliar environment and such rest as he had achieved overnight had been in the wheelhouse chair. It is therefore probable that he was physically and mentally tired at the time of the accident.

2.9 EMPLOYMENT OF YOUNG PERSONS

The Merchant Shipping and Fishing Vessels (Health and Safety at Work) (Employment of Young Persons) Regulations 1998 require that a specific risk assessment is completed when a person below the age of 18 is employed to ensure that the person's training, experience, physical and psychological development are sufficient for the intended work. No such risk assessment was carried out by the owner or skipper of *Sian Elizabeth* prior to taking on the crewman.

2.10 EXTERNAL CERTIFICATION AND VERIFICATION

Sian Elizabeth's inspection, by the local Coastguard sector manager on 10 June 2005, resulted in the issuing of certification for a further 5 years with no deficiencies noted. During this investigation, however, it became clear that a number of the deficiencies identified during the September 2003 inspection, which resulted in the vessel being detained, were again evident. These included: "risk assessment incomplete (Verbal only)" and "Survival Certificates, not on board." In addition, the owner's annual self-certification had not been completed and the crew had not been trained as required by the regulations.

The local sector manager was not aware that the surveyor would normally only conduct an inspection following a request from the sector manager. Instead, he assumed that the surveyor routinely inspected under 15m LOA fishing vessels, in parallel with his own inspections. Had the sector manager scrutinised *Sian Elizabeth's* SIAS record, this misunderstanding would have been clarified, and he would have been alerted to her history of safety deficiencies. However, the sector manager did not have direct access to the centralised inspection records for small fishing vessels held on SIAS, and had to request copies of each fishing vessel's inspection record individually as and when he required it.

Although the role of the Coastguard sector manager is to ensure compliance with the Code, as well as to encourage best practice, the owner and skipper were able to continue to operate *Sian Elizabeth* in breach of MSIS 27 guidance, MSN 1756 and other regulations.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES

The following safety issues have been identified by the investigation. They are not listed in any order of priority.

1. The construction and location of the riddle created a significant shear trap risk to crew routinely working in close proximity to the unguarded machinery. [2.3]
2. The risk of personal injury when working close to the riddle had not been effectively assessed. [2.4]
3. The specific requirement to assess the risk to young persons working on board *Sian Elizabeth* was not considered by either the owner or the skipper. [2.9]
4. The owner's delegation of responsibility for his vessels to individual skippers did not ensure compliance with the Code of Practice for the Safety of Small Fishing Vessels. [2.5]
5. The skipper and crew had not attended the required short training courses for fishermen. The skipper did not ensure that the new, inexperienced crew had attended a Basic Sea Survival course prior to starting as fishermen. [2.6]
6. The new crewman was not familiar with the safety equipment carried on board *Sian Elizabeth*. [2.7]
7. The owner and skipper did not comply with the specific regulations for taking on a young person. [2.5, 2.6, 2.9]
8. The familiarization provided to the new crewman was not sufficient to prevent the accident; he received no effective safety information prior to, or during, his time on board. [2.7]
9. The vessel did not comply with the Code. The deficiencies in place on board *Sian Elizabeth* during the MAIB investigation showed that risk assessment was not completed, annual self-certification was not carried out, and personnel had not completed the required training. [2.10]

SECTION 4 - ACTION TAKEN

The skipper has:

Acknowledged the risks of personal injury from the routine operation of the riddle, and:

- Fitted a temporary guard over the riddle end to remove the shear trap posed by the rotating machinery (**Figure 8**).
- Fitted the riddle with a water flow from the upper end of the chute to assist in washing the cockles and remaining mud down the chute. This has reduced the frequency that cockles need to be scraped down the chute by hand.

Figure 8



Temporary guard

The MCA has:

Carried out an internal inquiry into its fishing vessel survey and inspection procedures, a finding of which acknowledged the requirement to improve the Survey, Inspection and Certification regime.

SECTION 5 - RECOMMENDATIONS

John Lake (Shellfish) Limited is recommended to:

- 2007/108 Comply with the requirements of the Code, and specifically:
- Complete, or arrange completion of, an assessment of the health and safety risks arising in the normal course of work activities or duties of the vessel.
 - Certify annual compliance with the Code, by declaring that the safety equipment has been properly maintained and surveyed and that an up to date health and safety risk assessment has been completed.
- 2007/109 Ensure all skippers and crew are trained as required by statute.
- 2007/110 Ensure that young persons are familiarised, trained and assessed, with consideration given to their age prior to working on board.
- 2007/111 Ensure that the riddle arrangement and all other equipment within its fleet comply with The Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations.

The Maritime and Coastguard Agency is recommended to:

- 2007/112 Ensure the effective inspection and survey of under 15m fishing vessels to ensure compliance with the Code.
- 2007/113 Verify that fishing vessel owners are compliant with The Merchant Shipping and Fishing Vessels (Health and Safety at Work) (Employment of Young Persons) Regulations 1998.
- 2007/114 Implement The Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006 and amalgamate the provisions of the regulations into guidance for fishing vessel inspectors and surveyors.

Marine Accident Investigation Branch
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