Report on the investigation of

the loss of the fishing vessel

Auriga

off Portavogie, Northern Ireland

30 June 2005

Marine Accident Investigation Branch
Carlton House
Carlton Place
Southampton
United Kingdom
SO15 2DZ

Report No 3/2006
February 2006

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 liability in mind and is not intended to be used in court for the purpose of litigation. It endeavours to identify and analyse the relevant safety issues pertaining to the specific accident, and to make recommendations aimed at preventing similar accidents in the future.

CONTENTS

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

CG	-	Coastguard
DARDNI	-	Department of Agriculture and Rural Development for Northern Ireland
DEFRA	-	Department for Environment Food and Rural Affairs
DfT	-	Department for Transport
DSC	-	Digital Selective Calling
EAW	-	Environmental Agency Wales
EPIRB	-	Emergency Position Indicating Radio Beacon
EU	-	European Community
FIFG	-	Financial Instrument for Fisheries Guidance
FISG	-	Fishing Industry Safety Group
FTAG	-	Fishermen's Training Advisory Group
fv	-	fishing vessel
GMDSS	-	Global Maritime Distress and Safety System
GRP	-	glass reinforced plastic
HRU	-	Hydrostatic Release Unit
kW	-	kiloWatt
kN	-	kiloNewton
LOA	-	Length Overall
LSA	-	Life Saving Appliances
m	-	metre
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine Guidance Notice
MRCC	-	Maritime Rescue Coordination Centre

MSA	-	Marine Safety Agency (precursor to the MCA)
MSN	-	Merchant Shipping Notice
NIFPO	-	Northern Ireland Fish Producers Organisation
OAN	-	Operational Advice Notice
ORC	-	Offshore Racing Council
RNLI	-	Royal National Lifeboat Institution
SAR	-	Search and Rescue
SEERAD	-	Scottish Executive Environment and Rural Affairs Department
SFIA	-	Sea Fish Industry Authority
SIAS	-	Ship Inspection and Survey
UTC	-	Universal Time Co-ordinated
VHF	-	Very High Frequency

Figure 1

Auriga

SYNOPSIS

On 30 June 2005, the fishing vessel *Auriga* **(Figure 1)** capsized and sank about 6 miles north-east of Portavogie, Northern Ireland. The skipper and his crewman were both rescued from the stricken vessel's liferaft. Sea conditions at the time were slight with light SSE winds.

Auriga was 3 hours into her second tow when she slowed down. It was felt that possibly a trawl door had dropped, but when attempts to rectify this showed no increase in the vessel's speed, it left the crew with little option other than to haul the gear.

As the trawl wires were hove in, it became apparent that there was an abnormal weight in, or on, the gear; this was indicated by the winch showing signs of strain as the hydraulic pressure relief valve lifted. Because of the strain on the winch, it took some time to ease the doors up to the gallows but, eventually, the doors were retrieved, secured alongside and unhooked from the trawl warps. The sweeps were transferred from the warp ends and wound onto the net drum; at first the net drum was able to haul in the sweeps and the wing ends of the net fairly easily, but as the net built up, the net drum hydraulic relief valve, like the winch before it, started to lift, and hauling slowed dramatically. At that point, there was no indication of what was causing the weight in the net. The crew were able to retrieve the dog rope, which led from the wing lastridge[1] to the cod end. This allowed them to haul in this rope onto the winch drum ends by leading the dog rope up and over the gantry above the fish hopper.

Slowly, by systematically hauling on the dog rope and winding slack netting onto the drum, recovery of the net continued. Until then, the boat had been idling at dead slow ahead before the wind. To take strain off the gear, the skipper put the vessel into neutral; once in neutral the vessel started to fall off the wind and, as this happened, the weight of the net, suspended from the gantry, affected the vessel's transverse stability, resulting in a dramatic list. This was not recognised until after starboard deck edge immersion had occurred and water was building up on deck.

Recognising their perilous situation, the crew abandoned to their liferaft, without having time to transmit a distress or don lifejackets. Fortunately, *Auriga*'s EPIRB floated free as the vessel sank, and its transmissions alerted MRCC Falmouth of a possible emergency. SAR services were notified and tasked to the scene of the sinking.

After an hour in their liferaft, *Auriga*'s crew were rescued by a passing container ship, whose watchkeeper spotted their pinpoint flare. The survivors were then transferred to the Donaghadee lifeboat and returned to their home port of Portavogie. Neither of the crew were injured.

---

[1] Lastridge: the "seams" in a net joining panels together, e.g. in a trawl these would join the top panel to the bottom panel or upper wing to lower wing etc.

Auriga capsized because of a heavy weight in her net which she was hauling over the top of a high gantry. This created a capsizing lever on the vessel. The small vessel carried a lot of top weight; her deck layout included deck shelter, gantry, fish hopper, net drum and a trawl winch containing a large quantity of wire, which were all instrumental in jeopardising her stability.

The MAIB investigation identified several safety issues, including:

- After recognising that they were dealing with an unusually large weight, the crew did not consider jettisoning their gear for later retrieval.
- The combination of the abnormal weight, and the high gantry over which it was being hauled, adversely affected the vessel's stability.
- `Continuing the working practices of the previous owner, without applying a further and independent risk assessment, was instrumental in the vessel's loss.
- The ORC pack in the liferaft carried limited location aids.
- The liferaft and EPIRB carried by *Auriga* undoubtedly contributed to the saving of the crew members' lives.
- Vessels carrying four man liferafts, or smaller, should be aware that SOLAS approved weak links on HRUs may be too strong for the buoyancy of the raft, and it should be ensured that rafts are fitted with appropriate weak links.
- The crew of *Auriga* had not undertaken mandatory safety training in Sea Survival, Fire-Fighting, First-Aid or Safety Awareness.

Safety issues relating to vessel stability, risk assessment, liferafts and EPIRBs have been the subject of MAIB recommendations resulting from previous fishing vessel investigations. However, further recommendations have been made to the Maritime and Coastguard Agency (MCA), and the Fishermen's Training Advisory Group (FTAG) regarding:

- The enforcement of mandatory training for fishermen.
- The possible need for non-SOLAS type HRUs for smaller than six person liferafts.
- The safety and economic benefits of rigging gear with stone traps and flip up ropes when trawling in areas of rough or stony ground.
- The danger of lifting/hauling from high points to the detriment of vessel stability.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *AURIGA* AND ACCIDENT

Vessel details

Registered owner	:	Private
Port of registry	:	Kirkcaldy
Flag	:	UK
Type	:	Fishing Vessel (trawler)
Built	:	April 2001 by Anstruther Boat Centre
Classification society	:	None
Construction	:	GRP
Length overall	:	9.74m
Beam	:	3.9m
Design draught	:	1.4m
Actual draught	:	1.8m
Gross tonnage	:	4.42 tonnes
Engine type and power	:	Daewoo MD 136 restricted to 89.52kW
Winch	:	Hydraulic 2 tonnes core pull
Net drum	:	Hydraulic 2 tonnes core pull

Accident details

Time and date	:	1050 on 30 June 2005 (LMT)
Location of incident	:	54° 31’N, 005° 23’W, 5.5 miles NE of Portavogie
Persons on board	:	2
Injuries/fatalities	:	None
Damage	:	Total loss

1.2 PRELUDE

Auriga was a 9.73m GRP trawler operating out of Portavogie, Northern Ireland, normally fishing day trips and crewed by two brothers. *Auriga* was purchased in February 2004 from the builder, the original owner and operator of the boat. Her new owners made no modifications; they operated the boat in the same fashion as the previous owner.

Auriga sailed early on the morning of 29 June, to fish with only her clean ground net onboard. This net was torn during the second tow. Rather than lay over and repair it, it was decided to return to port and take onboard a rockhopper net (a net better suited to hard/rough ground), leaving the clean net ashore to mend at a later date. Because the rockhopper net had not been used before, *Auriga* went out for a short trial haul that afternoon to see if it was fishing satisfactorily. The skipper, pleased with the trial haul, decided they should go ashore for a rest and come out late in the evening to try and make up for lost time.

1.3 NARRATIVE OF EVENTS

All times are UTC+1 hour unless otherwise stated.

1.3.1 Capsize and sinking

Auriga sailed at 2300 on 29 June, hoping to make up for lost time incurred the previous day. The weather conditions were light south-south-easterly winds of between 10 and 15 miles per hour, with moderate to poor visibility.

The first haul of the day, trawling for prawns[2] in almost 70 fathoms of water, gave a good catch. At 0830, some 3 hours into the second tow, the boat slowed down. Initially it was felt that a trawl door might have dropped and caused the speed reduction. Engine power was increased to try to rectify this, but to no avail, so the skipper decided to haul.

As the trawl warps were hove onto the winch, it became apparent that there was a heavy weight in, or on, the gear. With less than half of the 200 fathoms of warp recovered, the winch began to strain as the wire built up on the drums. By applying power ahead, the skipper was able to bring the gear towards the surface. When the engine was slowed, he quickly wound in on the winch, preventing the gear from falling at the stern. Eventually the trawl doors were eased up to the hanging blocks of the gallows, where they were secured, unhooked and the sweeps transferred to the net drum on the aft deck.

With the boat idling ahead slowly before the light wind, the empty net drum initially wound in the rubber leg sweeps quite easily but, like the winch before it, the net drum started to labour as the net girth built up. The net was gradually

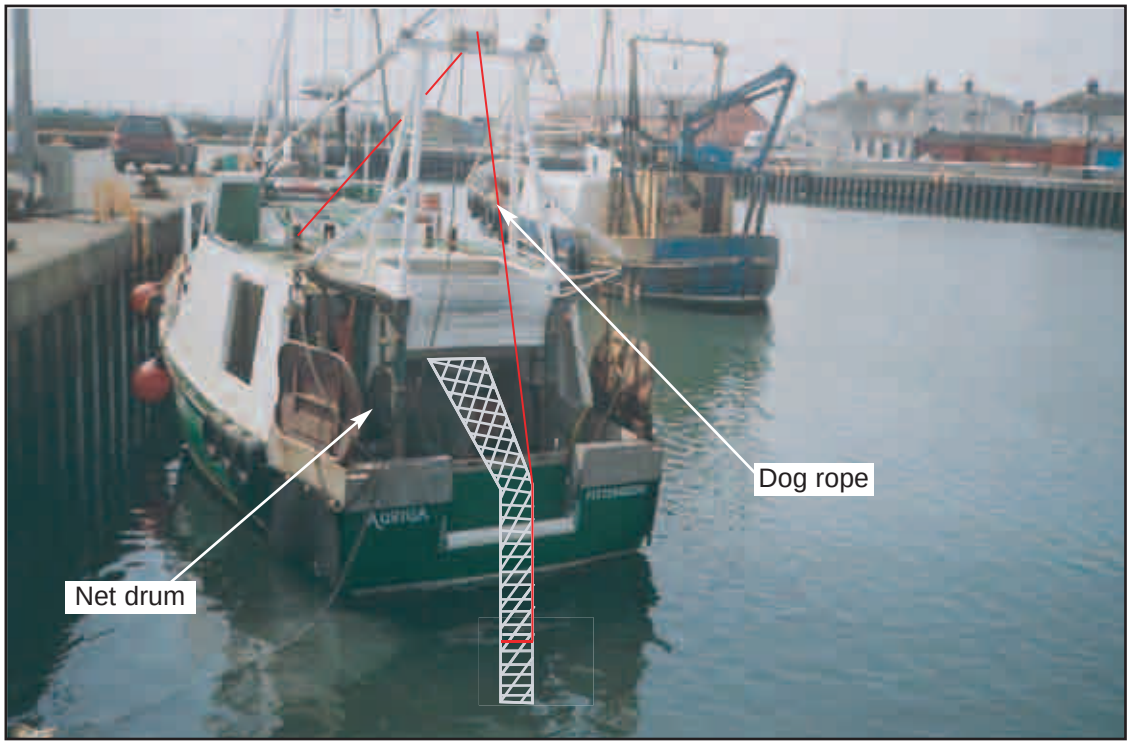
[2] Prawns: proper name, *Nephrops Norvegicus;* colloquial names include langoustine, Dublin bay prawn, Norway Lobster and prawn.

eased onto the drum, in a way similar to that of the door retrieval, until the bosom of the net was recovered; at this point the pressure relief valve on the net drum was lifting and no more net could be hauled in.

Recovering the gear had been a laborious process. It had taken well over an hour to reach this stage; normally it took 30 minutes to haul *and* shoot the gear. At no time were the men able to identify the weight in the net; there were no visible signs of mud or sand on the gear, and no indication of wreckage or damage to the net. The weight was heavier than any weight the crew had encountered before. On previous occasions, boulders in excess of 100 kilos had been taken onboard *Auriga*, without problem.

The crew unfastened the dog rope[3] from the mouth of the net, and led this to the winch whipping drum, their aim being to heave up the cod end and remove the weight. They did this by attaching the dog rope to the gilson rope, and hauling over the gilson roller on top of the "A" frame gantry, above the fish hopper aft – about 5m above the waterline **(Figure 2)**. This in turn allowed the net drum to wind in the slack net, gained by taking the strain on the dog rope. After winding in all possible slack net, the gilson was released to take a fresh hold on the dog rope and repeat the process. At one point, the lifting strop at the top of the cod end was seen under the water, but there was no indication of what the weight was in the cod end.

Figure 2



Photograph of *Auriga* and illustration of net being retrieved

[3] Dog rope: a rope attached to the cod end leading to an accessible position at the mouth of the net. This rope is used to haul the cod end alongside to enable lifting from the sea. The dog rope is invaluable when heavy weights are in the cod end. Other colloquial names include: dicky rope; lifeline and lazy deckie.

To take the strain off the dog rope, the skipper put *Auriga's* engine in neutral. Once out of gear, *Auriga* was no longer directly before the wind, instead, the wind now sought the starboard quarter, causing the net to lead slightly to starboard. Prior to putting the vessel in neutral, the weight was acting directly over the stern, and therefore predominantly acting on the boat's longitudinal stability. With the heavy net now leading slightly to starboard, and the weight acting directly at the "A" frame top, the vessel's transverse stability was reduced significantly.

The weight acting athwartships on the high "A" frame created a large capsizing moment on the small vessel and, as the two men laboured to retrieve the net, they were unaware of the perilous situation developing on board. The crew first realised that something was wrong when the boat's starboard deck edge became immersed. After that, *Auriga* began to sink rapidly by her starboard quarter, allowing the crew no time to don lifejackets or alert the rescue services before they abandoned the vessel. There was no indication of downflooding or water below decks at any time.

The liferaft, which had only been onboard *Auriga* for a month, was launched by the crewman as the vessel capsized. As the crewman launched the liferaft, the skipper dashed to the wheelhouse of the (rapidly listing) vessel, to retrieve a mobile telephone for emergency communication. While in the wheelhouse, the skipper did not hear the bilge alarm sounding, which would have indicated flooding in the engine room. The wheelhouse door slid shut and the starboard windows were almost submerged. In order to escape, the skipper had to push the door with all his might. He took his mobile telephone and joined his brother on the port side of the hull as *Auriga* finally rolled over. While attempting to board the liferaft, the phone was lost and both men ended up in the water. The two men sat astride the keel of the upturned vessel and, worried that the liferaft might be pulled down with the sinking vessel, succeeded in untying the painter at the raft end, unaware that the liferaft contained a knife for cutting the painter. *Auriga* finally sank 10 minutes after the brothers boarded the raft.

1.3.2 Search and rescue

Fortunately, but unknown to the men in the raft, *Auriga's* EPIRB, which had also only been fitted to the vessel a month before the accident, floated free and started to transmit. At 1056, Falmouth MRCC received the transmission from the EPIRB and alerted the rescue services. A search and rescue operation was immediately initiated involving coastguards, RNLI lifeboat, SAR helicopter and a Nimrod maritime patrol aircraft that was on exercise at the time.

Once onboard the raft, the two crew opened up and inspected the survival kit. They set about drying out the raft, and set off one of the three pinpoint flares to see if they worked. Although the sea state was moderate, the visibility was less than 2 miles, and there were no potential rescuers in the immediate vicinity to see the flare. After drying out the raft, the brothers closed it down to try and

warm themselves up after their immersion in the sea. They kept a lookout by looking from the door every 10 minutes or so. After being in the raft for about an hour, they spotted a ship and set off another flare. This was seen by the crew of *North Sea Trader,* a container ship on passage from Rotterdam.

At 1214, *Auriga*'s crew were rescued from their liferaft by *North Sea Trader*. Soon after, they were transferred from *North Sea Trader* to the Donaghadee lifeboat, where they were checked over by a paramedic from the SAR helicopter, prior to being landed at Portavogie. The survivors suffered no physical injuries from their ordeal.

1.3.3 Owner and crew training and experience

The men involved in this accident were experienced fishermen.

The owner of *Auriga* had 13 years' fishing experience. He had worked on, and owned, various larger vessels before purchasing *Auriga* in February 2004. He normally skippered *Auriga*, but was on holiday at the time of the accident.

Vessels the size of *Auriga* do not require a certificated skipper. However, all fishermen are required to attend four mandatory safety courses: Sea Survival, Fire-Fighting, First-Aid and Safety Awareness. *Auriga'*s owner did not hold a Fire Fighting Certificate, but he had completed the other courses.

Auriga was skippered by the owner's brother when she sank. Although he had sailed on the vessel previously, this was his first time as skipper of *Auriga*. He had 15 years' experience as deckhand and skipper of larger boats. He had passed all the written examinations for a Class 2 Certificate of Competency, but had not completed final requirements for his ticket; among those outstanding requirements were the four mandatory safety courses.

The deckhand on *Auriga* was the brother of the skipper and owner, with 7 years' fishing experience on larger vessels. He joined *Auriga* in February 2005, and he, too, was not in possession of any of the mandatory safety certificates required for fishermen.

1.3.4 Vessel description

Auriga was one of a class of three Holton 32 type vessels produced by this builder. The vessel was outfitted to the builder's specification for his own use as a trawler.

The vessel did not undergo either stability inclining or a roll test on commissioning (there was no legal requirement to do so). Ballast was simply added by the builder until the boat "felt right." Between 4 and 5 tonnes of ballast were added to *Auriga*, giving the vessel a displacement of 19 tonnes when lifted by crane. The designed draught for the vessel was 1.4m, giving a freeboard of 0.7m; actual draught for *Auriga* was approximately 1.8m with a freeboard at the transom of approximately 38.1cm.

No general arrangement plan is available for *Auriga*, and the builder kept no records of equipment/outfitting weights. A description of the vessel is given in **Figure 3**.

Auriga had a conventional small stern trawler arrangement, with whaleback and wheelhouse forward, and the working deck aft of the wheelhouse. Her hull, deckhouse and shelter deck were built from GRP, while her gallows and "A" frame gantry were of mild steel, with the fish hopper and fore mast being made of aluminium.

The hull was sub-divided into accommodation, engine room, fish room and small steering flat. The only watertight bulkhead was situated between the accommodation and engine room. The wheelhouse was placed above the engine room, access to which was provided via a non- watertight hatch in the floor. The wheelhouse was accessed from the deck through a non-watertight sliding door; two steps inside this door made the wheelhouse floor 46cm higher than the outside deck. The fish room was accessed from a hatch on the main deck, which sat on top of a 46cm high coaming; the steering flat, aft of the fish room, was entered through a non-watertight hatch between the two spaces.

The engine was a keel cooled Daewoo MD136, capable of delivering 118kW, but which had been de-rated to 89.5kW. As well as propulsion, the engine provided hydraulic power for the winch and the net drum. Aside from the stern gland, the only penetration through the vessel's hull was the sea inlet for the deck wash pump. Two electric bilge pumps served the various spaces below deck.

The wheelhouse was comprehensively fitted out with radar, track plotter, GPS, echo sounder, DSC VHF and autopilot. The autopilot had a remote station aft by the vessel's net drum, which allowed the operators to adjust the helm to ensure she ran directly before wind and sea while hauling. Although the autopilot could be partially controlled from this aft station, the engine controls could not. This after station also held the controls for the net drum, and a remote control for the winch sited just aft of the wheelhouse.

The hydraulic winch delivered a 2 tonne core pull and had a capacity of 275 fathoms of 10mm warp wire. The net drum delivered a 2 tonne core pull controlled by an on/off lever.

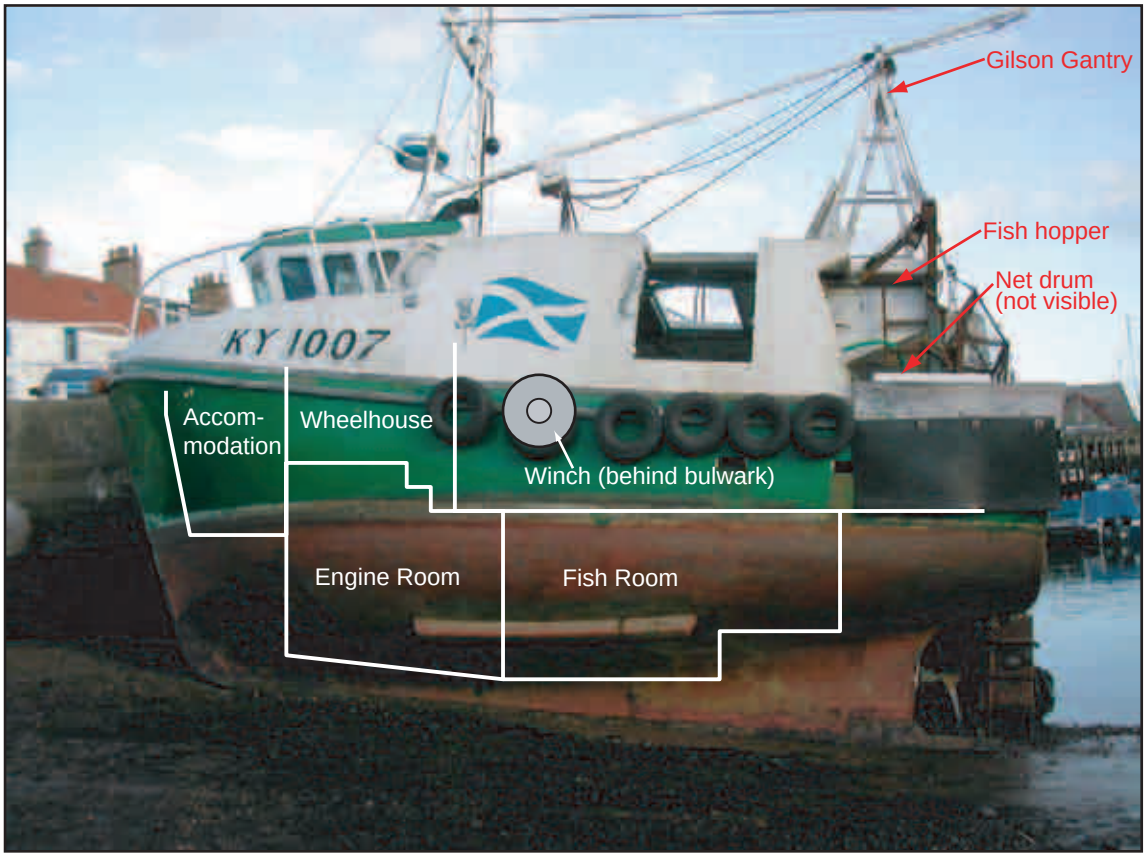
Auriga was designed for two-man operation. The trawl winch sat directly behind the wheelhouse door, the net drum was positioned on the stern with the fish hopper above it. The usual hauling procedure was to keep the boat idling dead slow ahead, while hauling the net over the stern through a removable bulwark section onto the drum **(Figure 3)**. The remote autopilot control helped ensure the vessel was before the wind at all times and leading the net straight onto the drum. Once hauled, the cod end was also taken directly over the stern by way of a gilson "A" frame gantry, and emptied into the fish hopper sited above the

net drum. The tapered bottom of the hopper sat 0.76m above the deck, while the main holding area was about 1.5m above deck level. The catch then gravity fed from this hopper to a sorting bench between the fish room hatch and the hopper.

The method used to haul the dog rope over the top of the gantry was the same as that used by *Auriga*'s previous owner. There were no suitable leads to the winch whipping drums at bulwark height, which are more usually fitted to fishing vessels to aid taking weights in the net up to the boat's side. Hauling weights over a stern gantry, in this manner, is a procedure similar to that adopted on much larger stern trawlers, whose physical size and inherent stability allow such practices to be conducted safely.

Prior to purchasing *Auriga* in February 2004, the new owner had a pre-purchase condition survey carried out. This survey indicated that the vessel was well found and in good condition. However, the survey did not verify the stability of the vessel or specify whether it was fit for the intended employment. This was because these checks were not specifically requested by the new owner.

Figure 3



1.3.5 Safety equipment

On 27 April 2005, *Auriga* was inspected by the MCA as part of a targeted inspection programme. Some deficiencies were found, but these had all been rectified, or were being addressed by the time of the vessel's loss. The checklist of requirements for vessels of *Auriga's* size is shown at **Annex 1**. It can be seen from the checklist that there was no requirement for *Auriga* to carry liferafts, EPIRBs or flotation suits, although she carried all these on board.

The Northern Ireland Fish Producers' Organisation (NIFPO) provided *Auriga* with her liferaft, EPIRB, inflatable lifejackets and flotation suits. The NIFPO, in turn, received grant assistance through the Northern Ireland Programme for Building Sustainable Prosperity - an initiative wholly funded by the Department of Agriculture and Rural Development for Northern Ireland (DARDNI) through the Financial Instrument for Fisheries Guidance (FIFG) and National Government. This initiative was instrumental in providing non statutory safety equipment to under 12 metre vessels throughout Northern Ireland, and targeted fishermen who otherwise might not have been able to afford such equipment.

The equipment provided by DARDNI included:

- Ocean Safety Standard Four Person Liferaft with ORC pack and HRU.
- McMurdo E3 400 MHz EPIRB with HRU
- Two Ocean Safety Standard 150N Auto-inflating lifejackets
- Two Fladen 845BG Flotation Suits.

The Ocean Standard liferaft is a light duty raft designed for the leisure industry. The ORC pack contained in this raft is a basic survival kit with less stringent equipment requirements than either SOLAS "A" or "B" packs which are fitted to fishing vessels required to carry liferafts. *Auriga's* liferaft was stowed on top of the wheelhouse roof, and was fitted with a standard Hammer HRU which is approved for SOLAS liferafts designed to carry six persons or more. As the liferaft was launched manually, there was no indication that the HRU was inappropriate for a raft of this size. However, there have been fears that smaller rafts of this type may not have sufficient buoyancy to break the weak link of the standard Hammar HRU, and it is recommended that they should now be fitted with the green Hammar HRU, which has an appropriate weak link. See **Annex 2**.

The EPIRB was stowed appropriately and functioned as required.

The automatic inflation lifejackets and flotation suits, which were kept in the accommodation forward, were not worn during abandonment.

1.3.6 Fishing gear

Auriga's 2 tonne core pull winch had 275 fathoms of 10mm wire on each drum, which would have allowed her to fish in up to 90 fathoms of water. The weight of this wire, plus her 10 fathom sweeps, would have been approximately 500kg. Between her warps and sweeps was a set of 1.5m Dunbar "V" trawl doors weighing about 128kg each. Her trawl net weighed approximately 300kg, giving a total weight in excess of a tonne, all sited higher than deck level when stowed on board.

On the day of the accident, *Auriga* was towing a 10 fathom rockhopper trawl – a net designed for hard ground, or areas where stones and rocks may be encountered. It was only the second tow using this net, and it is possible that it still required some "fine tuning" to ensure optimum performance with relation to ground contact. This style of net is popular with vessels of *Auriga'*s size, and is frequently used by more powerful vessels coupled together in twin rig systems. The net being used was borrowed from another skipper, and it did not actually belong to *Auriga*.

The bottom panel of *Auriga'*s 80mm mesh size cod end was made from 4mm braided polyethylene twine, and the strengthening cover was of double 5mm braided polyethylene. This was not unlike the gear used by similar vessels.

1.3.7 Current regulations

Regulations governing the safety of small fishing vessels, include *The Fishing Vessels (Code of Practice for the Safety of Small Fishing Vessels) Regulations 2001* (hereafter referred to as "The Code"), which came into force on 1 April 2001, and *The Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997*, which came into force in April 1998. MSN 1756 (F) and MGN 20 (M+F) contain the relevant guidance for these regulations, in particular, safety requirements for small vessels and how to conduct risk assessments **(Annex 1 and Annex 5)**.

The Code was developed in collaboration with the fishing industry and, when initially issued, was applicable only to vessels under 12m registered length. However, it has since been expanded to cover vessels under 15m length overall. The Code requires that vessels carry safety equipment as detailed in a checklist particular to vessel length and type (i.e. decked or open vessel). It also requires that owners complete a health and safety risk assessment for risks arising in the normal course of work activities or duties, as detailed in MGN 20 (M+F). However, MGN 20 (M+F) indicates that hazards which imperil the vessel (such as capsize when lifting heavy weights) do not have to be considered when conducting the risk assessment as, according to the regulation, 'these aspects are covered by other regulations'. This statement may be true for larger

vessels, but not for under 12m vessels. Vessel owners are required to annually self certify that vessels comply with The Code, and have the certificate available for inspection if requested.

The Code further requires that the hulls of vessels whose keels are laid after 1 April 2001, undergo certification by SFIA, or some other classification society. However, as *Auriga* was first registered on 24 April 2001, her keel was laid well before The Code's inception, so all that was required was compliance with the checklist requirements of The Code, **(Annex 1)**. Although the builder was unaware of The Code*, Auriga* did comply with the safety equipment checks when she was targeted for a spot inspection by the MCA soon after her launch.

The MCA, which is responsible for regulation enforcement, has experienced great difficulty in tracking down many owners of small vessels in order to carry out the inspections required by The Code. Frequently, its correspondence to vessel owners goes unheeded, and the boats themselves may often be stored ashore, many miles away from an operational port. Since the introduction of The Code, about two thirds of the 6000 strong small vessel fleet had been inspected up until August 2005; the MCA is hoping to cover the remainder before the target deadline of March 2006.

The Code does not stipulate any stability requirements for under 12m fishing vessels. No stability checks were carried out on *Auriga* either at build or in operation.

Auriga's owner was aware of The Code, but not for the need to conduct a risk assessment.

The Code is currently under revision, and is expected to be finalised by April 2006. It is understood that this revision is to include vessel outfitting to SFIA standards on new buildings.

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 GEAR RECOVERY

Auriga capsized when attempting to retrieve her trawl gear, which had a heavy weight in the cod end. The weight in the cod end was not identified, but it is highly likely that it was due to rocks or boulders trawled from the seabed. Regardless of what caused the weight in the net, the outcome would have been the same, unless the gear had been jettisoned for later retrieval by a more able vessel, or towed onto hard ground to remove the weight by destroying the bottom of the trawl.

Given that the rockhopper trawl net had been borrowed from another skipper, and that *Auriga*'s own clean net was laying on the pier, already torn, the crew's determination to recover the net, rather than cut it adrift to release the weight, is understandable.

Warnings were given that the net contained an unusually heavy weight; the winch relief valve was lifting when 100 fathoms of wire remained to be hove in. The net drum relief valve was also lifting as the net was taken onto the drum. The fact that it took over 2 hours, from the start of hauling, to ease the net on to the drum, should have alerted the crew to the excessive weight. The operation of hauling and shooting usually took just 30 minutes.

2.3 STABILITY

The normal method of hauling in trawl gear was to keep *Auriga* idling slowly ahead, directly before the wind. This allowed the net to wind evenly on to the net drum, minimised rolling and prevented the cod end from swinging dangerously as it was being hoisted up between the legs of the "A" frame gilson. This is an accepted method of gear recovery in stern trawlers; reduced rolling at this time greatly enhances crew and vessel safety, provided the weights being lifted are not excessive.

While *Auriga* was hauling directly before the wind and sea, the primary effect of the trawl gear acted on her longitudinal stability. After the engine was put in neutral gear, the vessel started to fall beam on to the wind, and her transverse stability became severely impaired. Additionally, as the centre of gravity rose, due to the weight being applied at the "A" frame top, the upthrust from buoyancy below the waterline spaces helped create a capsizing moment, which led to deck edge immersion and the ensuing capsize.

Achieving and maintaining adequate stability in under 12m fishing vessels, is largely governed by the operator's outfitting of the vessel, and personal judgment while working it. Small vessel operators should, ideally, be fully cognisant of the dangers of capsize, as this class of vessel does not have the protection provided by stability regulations governing larger vessels. However, as many skippers of small vessels do not hold formal qualifications, their training in stability awareness is often minimal.

Previous MAIB reports on the loss of small fishing vessels have resulted in recommendations to the MCA, on stability, freeboard and loading standards. As a result, the MCA commissioned a research project to establish whether a simplified stability requirement could be applied to small fishing vessels. This work was thought necessary because the option of applying the existing stability requirements for larger fishing vessels was considered to be impractical. Requirements for over 12 metre vessels include extensive stability calculations, production of stability books and regular stability tests, etc, all of which were thought too onerous to apply to small vessels.

The research project is well underway, and it is understood that the work completed so far has indicated that a stability standard, based solely on the type of vessel and its freeboard, is possible. It is envisaged that small fishing vessels will, in future, have to meet minimum freeboard requirements, as is currently the case with workboats. The application of a freeboard requirement should substantially increase the stability of small fishing vessels. The research project should be progressed and brought into force as soon as possible, as currently there is nothing to stop small fishing vessels being built with inadequate freeboard and doubtful stability characteristics.

2.4 THE VESSEL

The Holton 32 is a round bilge, displacement vessel which has been in existence in various shapes and forms since the 1980s. Many hulls were produced for their owners to fit out to their own specifications. As vessel general arrangements evolved over the years, the modifications invariably got bigger, heavier and higher above deck level.

Auriga was no exception. Whereas her design draught was 1.4m, her actual draught was 1.8m, giving her a freeboard of 0.3m instead of 0.7m. The increased draught and reduced freeboard of *Auriga,* when compared with her design condition, is attributable to the increased weight of her equipment and trawl gear, such as the winches, plus some compensating bottom weight in the form of ballast. Fishing in deep water required that the vessel carried sufficient length of trawl wire. Longer wire again meant additional weight above the vessel's centre of gravity.

From discussions with leading small vessel builders, and an overview of the small vessel fleet, it is deduced that *Auriga's* 120 horsepower engine was not seen as being overly large for a vessel of this type, but would have been nearing the upper limits. Her 2 tonne core pull winch and net drum would also have been at the upper limits for a vessel of this type

2.5 DOWNFLOODING

It is unlikely that downflooding contributed to the factors that led to the capsize. There were no deck openings to allow downflooding, other than the fish room hatch and the wheelhouse door. The central position and height of coaming of the fish room hatch gave a reasonable margin of safety in this respect. The only underwater hull penetrations were the stern shaft and one deck wash sea inlet. *Auriga* was a dry vessel, and the bilge alarm was known to be working. Although the overboard discharges did not have non-return valves in the line, their exit points were high up by the bulwark rail on the starboard side; once severely listed, water would have come back in through these, but by that time the vessel would have been past the point of no return.

2.6 REGULATION

Evaluation of existing regulations shows that there is currently inadequate regulatory protection covering stability and safety equipment issues for vessels such as *Auriga.* Following previous accident recommendations, the MCA has gone some way to address this inadequacy.

Although diminished stability might not have been readily apparent to the operators, *Auriga's* owner had been aware that there was insufficient safety equipment onboard the vessel, and took steps to ensure that she was equipped with much more than just the basic minimum requirements as specified in MSN 1756 **(Annex1)**.

MSN 1756 requires that the vessel owner should annually, by means of self-certification, ensure that the vessel complies with The Code, and that an appropriate, up to date health and safety risk assessment is completed. Although aware of The Code, *Auriga's* owner was not aware of the need to conduct a risk assessment, and had not done so. Given that the vessel was subject to an MCA inspection 5 weeks before her loss, the need for the skipper to self-certify his vessel had not yet become a requirement.

The guidance on risk assessment contained in MGN 20 **(Annex 5)** states there is no requirement to extend the assessment to cover consequential peril of the vessel resulting from work activity or to external hazards. Since activities which may harm workers are often intrinsically connected to the protection of the vessel, it does not seem logical to separate the two; imperilling the ship imperils the workers. In the case of under 12m vessels, these aspects are not covered anywhere else. Previous MAIB accident reports have highlighted this issue (loss of vessels *Kirsteen Anne,* Report No 19/2003 and *Amber,* Report No 25/2003).

2.7 FISHING GEAR

Auriga was towing a 10 fathom “rockhopper trawl.” It was the first time that she had used this particular net. New gear often requires “fine tuning” over several tows for optimum performance: too much ground contact damages gear and catches rocks; too little ground contact allows fish to escape.

*Auriga’*s rockhopper trawl had a middle section of 30cm rubber discs. When fine tuned, this should enable the foot rope of the net to “bounce” over boulders and rough terrain. These discs are not infallible against picking up boulders; additional measures such as “flip up ropes” have proved effective in reducing catches and damage from boulders, see **Annex 3**. Other measures that can be taken to prevent boulder damage to cod ends are “stone traps” positioned behind the belly section, see **Annex 4**. These stone traps are effectively a pocket of sacrificial netting which entraps boulders and rocks, and scours out, preventing damage to the cod end and loss of catch already contained there. *Auriga* had neither flip up ropes nor stone traps in her net.

EU fisheries conservation legislation sets minimum mesh sizes to allow immature fish to escape. Unfortunately, many vessels fishing for prawns have found it difficult to catch prawns with the mesh size required by the legislation (80mm). In an attempt to overcome prawn losses from these relatively large mesh sizes, many fishermen have used thicker twines which restrict mesh opening and thus reduce prawn escape. These thicker, stronger twines also go some way to preventing rocks and boulders, inadvertently caught, from scouring their way out of the nets. The bottom panel of *Auriga’*s 80mm mesh size cod end was made from 4mm braided polyethylene twine, while the strengthening cover was of double 5mm braided polyethylene. Although quite legal, this was heavy gear for a small vessel to be towing, but not unlike that used by similar vessels.

Before 2001, many prawn fishermen opted for thinner twines, relative to the size of their vessels, and their smaller meshed nets. By increasing mesh sizes, and regulating the width of twine, the legislation actually focussed many fishermen to use thicker twine, often much thicker than they had used previously. In the case of vessels trawling up rubble, rocks, etc. thicker twined cod ends take longer to scour out than thinner twined cod ends, and therefore have more potential to endanger vessels. Thicker twines are now the norm, even for small trawlers.

2.8 WEIGHT IN THE NET

It is impossible to determine with certainty what had become trapped in the net to cause the additional weight. However, it is possible to eliminate items such as wreckage, mud or sand.

Frequently, if wreckage is caught, it is evidenced by abrasion damage to sweeps, and tear damage to the net. Additionally, wreckage seldom finds its way into the cod end, because metal protrusions become entangled in the net and prevent it from making its way down to the net. *Auriga*'s crew saw no evidence of this. Likewise, mud and sand often display telltale signs on the net and ground gear; again the crew saw no signs of mud or sand in the net. It is highly probable that the weight in the cod end was either boulders or rocks; both had been picked up in this fishing area before.

2.9 VESSEL FAMILIARITY

Familiarisation with any new vessel is something that only comes with experience, and it can often take several weeks, if not months, for operators to become totally familiar with the characteristics of any craft. It was the first time the skipper had served in this capacity on board *Auriga*; most of his previous experience was on much larger vessels, where hauling heavy weights would have been carried out in much greater safety.

It is not unreasonable for new operators to continue the working methods of previous operators. However, for this to be effective, not only the vessel, but her gear, fishing grounds and work patterns would also have to be the same; of course, in practice this would be most unlikely. In the case of *Auriga,* the method of hauling the dog rope was the same as that employed by the previous owner. However, the potential consequences and corrective action required if a heavy weight became caught in the cod end had not been thought through by the new owner or the crew.

2.10 TRAINING

All fishermen are required to attend four mandatory safety courses: Sea Survival, Fire-Fighting, First-Aid and Safety Awareness. These are all 1-day courses run by various training associations and colleges, which are in place purely to enhance the safety of fishermen. Failure to attend these courses almost cost the lives of the two crewmen.

The Sea Survival course, in particular, covers many of the issues pertinent to *Auriga*'s abandonment, such as procedures and actions to be taken following abandonment, liferaft equipment and means of attracting attention.

When the crew abandoned *Auriga*, they did not know that there was a knife in the liferaft to cut the painter free. Instead of getting into the raft and cutting the securing painter, they wasted precious time and effort untying the painter from the raft while sitting astride the upturned vessel's keel. Had she sunk more quickly, she could have taken the raft to the seabed with her.

Setting off one of the three pinpoint flares as a 'trial', when there was no one in the vicinity, reduced their primary means of location by a third. The use of pyrotechnics is fully covered in the Sea Survival safety course.

Self-inflating lifejackets, suitable for daily use, were not worn, but instead were stowed forward in the cabin area. Evidence shows that, as a result of attending the mandatory Sea Survival and Safety Awareness training courses, many fishermen are now wearing such items as a matter of routine.

A 1-day Stability Awareness course for fishermen is currently being devised as a result of previous MAIB recommendations to FISG, and this is expected to be ready for delivery at the start of 2006. On completion of this course, attendees should have a better understanding of the stability issues which played a large part in the loss of *Auriga*.

2.11 SAFETY EQUIPMENT

Fortunately, *Auriga*'s owner took advantage of DARDNI's Programme for Building Sustainable Prosperity, through NIFPO, and obtained LSA beyond that required of The Code. Without this equipment, it is highly probable that the crew of *Auriga* would not have survived.

The Environmental Agency Wales (EAW) also runs an initiative, the Sustainable Fisheries Programme, which helps fund small vessel operators acquire safety equipment. It is understood that DEFRA and SEERAD now run similar grant assisted initiatives for English and Scottish fishermen.

Auriga's liferaft, however, was one produced for the leisure industry and, although it did its job well in this instance, it did not meet the more stringent requirements that are applicable to SOLAS type rafts. Non-SOLAS type liferafts do not afford the same levels of protection, or equipment, as found in type approved systems. The Ocean Safety four man liferaft carried on *Auriga* contained an ORC survival pack, which had minimal location aids and no food or water. Given that improved survival kits would involve additional costs, operators would benefit from having a "grab bag" containing essential survival aids, such as the vessel's location aids, in a convenient place on the vessel.

Auriga's liferaft was fitted with a standard Hammar HRU **(Annex 2)**, whose weak link is designed to break at 2.2kN +/- 0.4kN, and which is designed to be fitted to SOLAS type liferafts of six persons or more. There are concerns that *Auriga's* four person liferaft might not have had sufficient buoyancy to snap the weak link, had it been needed. Fortunately, the crew were able to manually launch the liferaft before *Auriga* sank, and therefore operation of the HRU was not required. Nevertheless, owners and skippers should verify that, where an HRU is fitted, it is of a type/rating which is compatible with the liferaft in use. Additionally, suppliers of liferafts and HRUs under funded programmes, such as DARDNI's Programme for Building Sustainable Prosperity, should ensure that any HRUs supplied are appropriate for the liferaft in use.

Auriga's EPIRB functioned as required. Without this vital aid, the crew's only other means of drawing attention to their plight was the two remaining flares, and a torch in the liferaft.

The automatic inflation lifejackets, which were kept in the accommodation forward, were of a type suitable for daily wear, but in this case they were not worn by the crew. The Ocean Standard lifejacket is a lightweight jacket, mostly worn by the leisure industry.

The flotation suits were also kept in the accommodation. It is recognised that these suits are cumbersome, can restrict movement and are not always appropriate for daily wear.

2.12 PRE-PURCHASE SURVEY

Before purchasing *Auriga* in February 2004, the owner had a pre-purchase condition survey carried out. This survey indicated that the vessel was well found and in good condition. As it was not requested, nor required, the condition survey did not include a check on the vessel's stability, or fitness for purpose. Further, no supporting stability data, such as cross curves of stability, was available (or required), rendering any such check futile.

SECTION 3 - CONCLUSIONS

Auriga capsized and sank while attempting to retrieve her trawl net which contained a heavy weight in the cod end. The capsize was initiated by the weight being lifted from a high gantry, which created a large capsizing lever/moment.

3.1 RELATED SAFETY ISSUES

The following safety issues are identified as a result of the MAIB investigation. They are not presented in any order of priority:

1. After recognising that they were dealing with an abnormal weight, *Auriga*'s crew did not jettison their gear for retrieval by a more able vessel, or tow it onto hard ground in an attempt to scour out the bottom of the cod end. [2.2]

2. The weight being hauled over her gantry was inappropriate for *Auriga'*s stability. [2.3]

3. *Auriga'*s configuration as a stern trawler with shelterdeck, after gantry and hopper follows an increasing trend of small vessels emulating their larger counterparts. However, vessels of 12 metres and over are required to meet stringent stability standards, whereas smaller vessels are not. Smaller vessels are particularly limited for deck space and, all too often, additions create extra top weights which impinge on vessel stability. It must be recognised that there is only a certain amount of top weight that can be added to a vessel before she becomes unstable. [2.4.3]

4. Accepting and continuing working practices of the previous owner, without applying an independent assessment of risk, was instrumental in the vessel's loss. [2.6]

5. The fishing gear was not appropriately rigged for rough/hard ground working. [2.7]

6. The crew had not undertaken mandatory training courses in Sea Survival, Fire-Fighting, First-Aid or Safety Awareness. [2.10]

7. The crew's chances of survival were limited because appropriate daily working lifejackets were not worn but were stowed forward in the accommodation. [2.10]

8. Although not required to carry a liferaft, the ORC pack in the raft gave limited location aids. Given that improved survival kits would involve additional costs, operators would benefit from having a "grab bag" containing essential survival aids, such as the vessel's location aids, in a convenient place on the vessel. [2.10] [2.11]

9. The liferaft and EPIRB carried by *Auriga* undoubtedly saved these men's lives. The owner and NIFPO are to be commended for taking advantage of the DARDNI Building Sustainable Prosperity initiative. [2.11]

10. *Auriga's* EPIRB alerted rescue services to their predicament and was instrumental in their quick rescue. [2.11]

11. Vessels carrying four man capacity liferafts, or smaller, should be aware that SOLAS approved weak links on HRUs may be too strong and should ensure that their raft is fitted with an appropriate weak link arrangement. [2.11]

SECTION 4 - ACTIONS TAKEN AS A RESULT OF PREVIOUS ACCIDENT INVESTIGATIONS

The Maritime and Coastguard Agency is progressing a number of MAIB recommendations from previous small fishing vessel related investigations. These include:

- Working with DEFRA, SEERAD and DARDNI to make government funding for the provision of non-mandatory LSA more easily available.
- On change of ownership of vessels, to provide new owners with information regarding the relevant Code of Practice and other key regulations to be followed.
- To ensure the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations apply to all vessels regardless of the contractual arrangements of the crew, and to ensure that the hazards which imperil a vessel are included in risk assessments (qualified acceptance).
- Raising stability awareness among the owners and crew of under 15m fishing vessels.
- Developing a simple, but accurate method of assessing the stability, including freeboard, of small fishing vessels and issuing guidance accordingly.
- Reviewing instructions for safety inspections of under 15m Fishing Vessels – Quality Management Systems Documentation Procedures – MCA 901 dated February 2003.
- A review by the FISG of The Code of Practice for the Safety of Small Fishing Vessels of less than 15m length overall.
- Promulgating OAN 398 – Enforcement of the Fishing Vessels (Safety Training) Regulations dated January 2005. An instruction which provides guidance on the action to be taken where crew are found to be non-compliant with mandatory safety training.

A previous recommendation to FISG:

To:

“agree, develop and implement measures to ensure <15m Code fishing vessels are fit for purpose. Measures should, as a minimum, take due cognisance of, and define appropriate limits on: Areas of operation; stability; mode of operation; outfit & equipment; periodic owners checks;”

is currently being addressed by a working group of the FISG Small Vessel Code Group.

SECTION 5 - RECOMMENDATIONS

The Maritime and Coastguard Agency is recommended to:

2006/117 Expedite the enforcement of mandatory training for fishermen, and thereby raise safety awareness within the fishing industry.

2006/118 Provide guidance to the fishing industry, and organisations supplying liferafts, of the importance of ensuring HRU operating range is compatible with the liferafts carried.

The Fishermen's Training Advisory Group is recommended to:

2006/119 Promulgate to the fishing industry and training establishments, where appropriate: the need for suitable rigging of trawl nets (stone traps/flip up ropes); and the options of jettisoning gear or towing over hard ground when heavy weights are encountered in the cod end.

2006/120 Highlight to the fishing industry the dangers of lifting/hauling from high points to the detriment of vessel stability, by ensuring that such information is included in stability awareness training.

Marine Accident Investigation Branch
February 2006

ANNEX 1

Marine Safety Notice 1756

MERCHANT SHIPPING NOTICE

MSN 1756(F)

The Fishing Vessels Code of Practice for the Safety of Small Fishing Vessels under 12 metres in length

Notice to Designers, Builders, Owners, Employers, Skippers and Crew of Fishing Vessels

This Notice should be read in conjunction with the Fishing Vessels (Code of Practice for the Safety of Small Fishing Vessels) Regulations SI 2001 No.9 and the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997 (Note 1) *, as amended.*

Summary

This notice draws attention to the Fishing Vessels (Code of Practice for the Safety of Small Fishing Vessels) Regulations 2001 and incorporates the full text of the Code of Practice for the Safety of Small Fishing Vessels with a registered length of less than 12 metres.

1. This Merchant Shipping Notice is associated with The Fishing Vessels (Code of Practice for the Safety of Small Fishing Vessels) Regulations 2001. It sets out the full text of the Code of Practice for the Safety of Small Fishing Vessels.

2. The Regulations give statutory force to the Code of Practice for the Safety of Small Fishing Vessels and replace the requirements of the Fishing Vessels (Safety Provisions) Rules 1975 and the Fishing Vessels (Life Saving Appliance) Regulations 1988 as they apply to fishing vessels with a registered length less than 12 metres.

3. The Regulations and the Code have been introduced following consultation with the industry and other interested bodies. Their introduction represents part of a wider review of the Fishing Vessels (Safety Provisions) Rules 1975 to update existing requirements in order to increase the safety of fishing vessels in foreseeable operating conditions, and the survival of the crew in the event of an accident.

4. To comply with the Code of Practice for the Safety of Small Fishing Vessels, a vessel owner will be required:

- to carry safety equipment on the vessel appropriate to its length and construction;
- to 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 on the vessel in accordance with the provisions of the Merchant Shipping and Fishing Vessel (Health and Safety at Work) Regulations 1997
- to certify annually that the vessel complies with the Code, by declaring that the safety equipment has been properly maintained and serviced in accordance with manufacturers' recommendations and that an appropriate and up to date health and safety risk assessment has been completed; and
- to present the vessel for inspection by the MCA in accordance with the provisions of the Code.

5. Additionally, the owner of a new vessel should ensure that the vessel is constructed in accordance with the Construction Standards issued by the Seafish Industry Authority (SIFA or Seafish) or an equivalent standard recognised by the MCA.

_____

MSPP1b
Maritime and Coastguard Agency,
Spring Place,
105 Commercial Road,
Southampton SO15 1EG.

Tel: 023 8032 9150
Fax: 023 8032 9161

March 2001

File ref. MS 088/001/0291

Maritime and Coastguard Agency

THE CODE OF PRACTICE FOR THE SAFETY OF SMALL FISHING VESSELS

The Maritime and Coastguard Agency
Spring Place
105 Commercial Road
Southampton SO15 1EG

Telephone: 023 8032 9150
Facsimile: 023 8032 9161

Effective from 1 April 2001

1. Foreword

1.1 The aim of this Code of Practice is to improve safety in the under 12 metre sector of the fishing industry and to raise the safety awareness of all those involved with the construction, operation and maintenance of fishing vessels with a registered length of less than 12 metres.

2. Development

2.1 In 1992 the National Audit Office, in its report entitled "Department of Transport: Ship Safety" noted an increase in the fishing vessel accident rate in the period 1978 to 1989 due in part to an increase in the numbers of smaller vessels, and it observed the absence, until 1990, of any programme of inspection of fishing vessels with a registered length of less than 12 metres. At about the same time a House of Lords Select Committee on Science & Technology recommended that fishing vessels down to 7m in length should be brought within the licensing, crew certification and structural safety regimes for fishing vessels.

2.2 In response, the Surveyor General's Organisation of the Department of Transport (now the Maritime & Coastguard Agency (MCA)), in consultation with industry members of the Fishing Industry Safety Group (FISG), decided to develop a Code of Practice for fishing vessels with a registered length of less than 12 metres as part of a wider review of fishing vessel safety regulations.

2.3 This Code has been developed by the MCA. The content of the Code has been the subject of extensive discussion with representatives of the under 12 metre sector of the fishing industry within a Steering Committee set up by FISG to oversee the Code's development.

2.4 If the Code needs to be up-dated at any time to take account of new statutory requirements that apply to vessels operating under the Code, the organisations involved in the development of the Code will be consulted. Code requirements, including inspection arrangements, will in any event be reviewed not more than 2 years after the Code comes into force, and thereafter at no more than five-yearly intervals, by a Committee comprising of representatives of those organisations involved in the development of the Code, to take into account experience gained from its application.

3. Application

3.1 The Code will apply from 1 April 2001 to all United Kingdom registered fishing vessels with a registered length of less than 12 metres.

4. Code Requirements

4.1 To comply with the Code a vessel owner will be required:

4.1.1 To carry safety equipment on the vessel appropriate to its length and construction (i.e. decked or open). Checklists are at ANNEX 1.1 to 1.4.

4.1.2 To 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). Paragraphs 4.4 to 4.7 below describe the process of risk assessment and current best practice.

4.1.3 To certify annually (using the declaration at ANNEX 2) that the vessel complies with the Code, by declaring that the safety equipment has been properly maintained and serviced in accordance with 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.

4.1.4 To present the vessel for inspection either voluntarily or as requested by the MCA in accordance with the provisions of section 5.

4.2 Additionally, the owner of a new vessel should ensure that the vessel is properly constructed in accordance with the provisions of section 5(1) and the equipment detailed in this Code is properly maintained.

4.3 It is the owner's/skipper's responsibility to ensure that the vessel is operated in accordance with the Code and other relevant regulations at all times.

Risk Assessment

4.4 The Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997 came into force on 31 March 1998. Under those regulations employers are required to make a suitable and sufficient assessment of the risks to the health and safety of workers arising in the normal course of their activities or duties. Guidance on these regulations and on the principles of risk assessment is contained in a Marine Guidance Note (currently MGN 20 M + F).

4.5 A risk assessment is intended to be a careful examination of what, in the nature of operations, could cause harm, so that decisions can be made as to whether enough precautions have been taken or whether more should be done.

4.6 The assessment should first identify the hazards that are present and then establish whether a hazard is significant and whether it is already covered by satisfactory precautions to control the risk, including consideration of the likelihood of the failure of those precautions that are in place.

4.7 It is not a requirement of the Merchant Shipping and Fishing Vessels (Health and Safety at Work Regulations) 1997 that risk assessments be written. **Nevertheless, the MCA strongly recommends that such assessments be written.** An example of a suitable standard of written risk assessment is included in the Fishing Vessel Safety Folder developed by and available from Seafish, which also provides pro-forma guidance on fishing vessel risk assessment, both generally and in relation to particular modes of fishing.

5. Compliance Procedures and Inspections

New Vessels

5.1 New fishing vessels, with a registered length of less than 12 metres, (defined as those for which a keel was laid or construction or lay-up was started after 1 April 2001) must comply with the Construction Standards issued by Seafish or an equivalent standard recognised by MCA prior to commencement of construction. A certificate showing compliance with the Seafish standards or an equivalent standard must be issued by the construction standard authority.

5.2 To operate a new vessel under the Code the owner must complete a health and safety risk assessment, the vessel must have been inspected by MCA and an Inspection Form issued, and a compliance certificate must have been issued by the construction standard's authority. Thereafter, the vessel must maintain compliance with The Code.

Existing Vessels

5.3 The owner of every existing fishing vessel with a registered length of less than 12 metres must ensure that the vessel complies with the checklist of requirements appropriate to the length and construction of the vessel, that a health and safety risk assessment has been completed, and that a self-certification declaration has been completed.

5.4 One month before the Code comes into effect the MCA will write to owners of all existing fishing vessels with a registered length of less than 12 metres explaining the

action to be taken on entry into force of the Code.

All Vessels

Inspections

5.5 A vessel may be inspected by the MCA at any time to check compliance with Code requirements. On satisfactory completion of the inspection an Inspection Form will be issued. If deficiencies are found which necessitate follow-up visits, fees will be charged to the owner in accordance with the MCA fee regulations applicable at the time of the follow-up visit.

Annual Self-Certification

5.6 Within 1 month of the anniversary of the vessel's registration, the owner (or other competent person employed by the owner) must inspect the vessel to confirm that the safety equipment carried on board the vessel has been suitably maintained, that the safety and other specified equipment continues to comply with the checklist of safety equipment appropriate to the length and construction of the vessel. The health and safety risk assessment must also be checked to ensure that it remains appropriate to the vessel's fishing method and operation. If there has been a change of fishing method or of operational practice since the previous health and safety risk assessment was completed, the assessment should be revised accordingly.

5.7 On completion of these annual checks, the owner should sign a self-certification declaration confirming that the vessel complies with the Code, and retain the declaration for inspection purposes.

Change of ownership

5.8 Risk assessments of the vessel are particular to each employer. When a vessel is sold, the new owner must complete, or arrange the completion of, a new risk assessment and self-assessment in accordance with paragraph 5.6.

Penalties

5.9 A vessel that is found, in the course of inspection, not to have been equipped, the safety equipment properly maintained, assessed and self-certificated in accordance with the Code will be liable to detention by the MCA. An owner whose vessel fails to comply with the Code or who makes a false declaration may be liable to prosecution. A skipper who fails to operate the vessel in accordance with the Code may be liable to prosecution.

Appeal Procedures

5.10 If an owner is dissatisfied with an inspection and agreement cannot be reached with the person who carried out the inspection, the owner may refer the matter to the Principal Marine Surveyor (Fishing Vessels) in the Region where the vessel was inspected.

5.11 Should the above procedure fail to resolve the disagreement, the owner may refer the matter to the Head of Maritime Operations at MCA headquarters, and, if necessary, to the MCA Chief Executive who will ensure the complaint is looked into thoroughly.

5.12 If an owner is still not content with the way in which the complaint has been handled by the MCA, a request may be made for it to be referred to an adjudicator who is independent of the MCA.

CODE OF PRACTICE FOR THE SAFETY OF SMALL FISHING VESSELS: CHECK LIST OF REQUIREMENTS

DECKED Vessels 10m and above Registered Length to less than 12m Registered Length

ITEM	Remarks/compliance	Expiry/Service Date
Lifejackets - 1 per person		
Liferafts		
2 Lifebuoys (1 with 18m buoyant line attached) or 1 Lifebuoy (fitted with 18m buoyant line) + 1 Buoyant Rescue Quoit		
3 Parachute flares		
2 Hand-held flares		
1 Smoke Signal (buoyant or handheld)		
1 Fire bucket + Lanyard		
1 Multi-purpose Fire Extinguisher (fire rating 5A/34B)		
1 Fire Blanket (light duty) in galley or cooking area (if applicable)		
1 Fire Pump + Hose or 1 Fire Bucket + 1 Multi-purpose Fire Extinguisher (fire rating 5A/34B) + 1 fixed Fire Extinguishing system for the machinery space		
1 Multi-purpose Fire Extinguisher for oil fires (fire rating 13A/113B)		
VHF Radio - fixed or hand held		
Bilge Pump		
Bilge Alarm		
Navigation Lights & Sound Signals		
Compass		
Waterproof Torch		
Medical Kit		

Notes:

(i) Equipment need not be MCA approved provided it is fit for its intended purpose.
(ii) "Decked vessels" means a vessel with a continuous watertight weather deck that extends from stem to stern and has positive freeboard throughout, in any condition of loading the vessel.
(iii) VHF using DSC is highly recommended in view of cessation of the Coastguard's Channel 16 dedicated headset watch on 1st February 2005.

CODE OF PRACTICE FOR THE SAFETY OF SMALL FISHING VESSELS: CHECK LIST OF REQUIREMENTS

ALL DECKED Vessels up to 10m Registered Length

Item	Remarks/compliance	Expiry/Service Date
Lifejackets - 1 per person		
2 Lifebuoys (1 with 18m buoyant line attached) or 1 Lifebuoy (fitted with 18m buoyancy line) + 1 Buoyant Rescue Quoit		
3 Parachute Flares		
2 Hand-held Flares		
1 Smoke Signal (buoyant or hand held)		
1 Fire Bucket + Lanyard		
1 Multi-purpose Fire Extinguisher (fire rating 5A/34B)		
1 Fire Blanket (light duty) in galley or cooking area (if applicable)		
1 Fire Pump + Hose or 1 Fire Bucket		
1 Multi-purpose Fire Extinguisher for oil fires (fire rating 13A/113B)		
VHF Radio – fixed or hand held		
Bilge Pump		
Bilge Alarm		
Navigation Lights & Sound Signals		
Compass		
Waterproof Torch		
Medical Kit		

Notes:
(i) Equipment need not be MCA approved provided it is fit for its intended purpose.
(ii) "Decked vessels" means a vessel with a continuous watertight weather deck that extends from stem to stern and has positive freeboard throughout, in any condition of loading the vessel.
(iii) VHF using Digital Selective Calling (DSC) is highly recommended in view of cessation of the Coastguard's Channel 16 dedicated headset watch on 1st February 2005.

CODE OF PRACTICE FOR THE SAFETY OF SMALL FISHING VESSELS: CHECK LIST OF REQUIREMENTS

OPEN Vessels 7m and above to less than 12m Registered Length

Item	Remarks/compliance	Expiry/Service Date
Lifejackets - 1 per person		
2 Lifebuoys (1 with 18m buoyant line attached) or 1 Lifebuoy (with 18m buoyant line) + 1 Buoyant Rescue Quoit		
3 Parachute Flares		
2 Hand-held Flares		
1 Smoke Signal (buoyant or hand held		
1 Fire Bucket + Lanyard		
1 Multi-purpose Fire Extinguisher (fire rating 5A/34B)		
1 Fire Blanket (light duty) in galley or cooking area (if applicable)		
1 Fire Pump + Hose or 1 Fire Bucket		
1 Multi-purpose Fire Extinguisher for oil fires (fire rating 13A/113B)		
VHF Radio – fixed or hand held		
Bilge Pump		
Navigation Lights & Sound Signals		
Compass		
Waterproof Torch		
Medical Kit		

Notes:

(i) Equipment need not be MCA approved provided it is fit for its intended purpose.
(ii) VHF using Digital Selective Calling (DSC) is highly recommended in view of cessation of the Coastguard's Channel 16 dedicated headset watch on Ist February 2005.

CODE OF PRACTICE FOR THE SAFETY OF SMALL FISHING VESSELS: CHECK LIST OF REQUIREMENTS

OPEN Vessels less than 7m Registered Length

Item	Remarks/compliance	Expiry/Service Date
Lifejackets – 1 per person		
1 Lifebuoy (with 18m buoyant line attached)		
2 Parachute Flares		
2 Hand-held Flares		
1 Smoke Signal, buoyant or hand held		
1 Fire Bucket + Lanyard		
1 Multi-purpose Fire Extinguisher (fire rating 5A/34B) - if vessel has in- board engine		
1 Fire Blanket (light duty) if vessel has galley or cooking area		
VHF Radio – fixed or hand held		
Bailer		
Navigation Lights & Sound Signals		
Compass		
Waterproof Torch		
Medical Kit		

Notes:

(i) Equipment need not be MCA approved provided it is fit for its intended purpose.
(ii) VHF using Digital Selective Calling (DSC) is highly recommended in view of cessation of the Coastguard's Channel 16 dedicated headset watch on Ist February 2005.

THE FISHING VESSELS (CODE OF PRACTICE FOR THE SAFETY OF SMALL FISHING VESSELS)
REGULATIONS 2001

ANNUAL SELF CERTIFICATION (Owner to verify and sign in spaces below that vessel complies)

Name of Owner .....

Address of Owner .....

.....

.....

Name of Vessel.....

RSS No..... Length Overall .....

Registered Length ..... Date of Registration .....

Hull Identification No..... Mode(s) of Fishing .....

Port letters and number.....

I HEREBY CERTIFY, in respect of the above named vessel, that:

i. The safety and other specified equipment have been checked in accordance with the attached checklist;

ii. Such safety and other specified equipment carried are in accordance with the requirements of the Code;

iii. Such safety and other specified equipment has been properly maintained and serviced in accordance with manufacturers' recommendations;

iv. Where applicable a risk assessment* of work activities and duties has been completed in accordance with the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997;

*The health and safety risk assessment is written - Yes/No (delete as appropriate)

1st Signature of Owner ..... Date.....

2nd Signature of Owner ..... Date.....

3rd Signature of Owner ..... Date.....

4th Signature of Owner ..... Date.....

5th Signature of Owner …….. Date……

Lifejackets should be of the solid-filled type, or should comply with BS EN 396 or BS EN 399, with automatic gas inflation and at least 150 Newtons buoyancy. One lifejacket per person carried, fitted with light, whistle and reflective tape.

Liferafts should either be float free, fitted with an hydrostatic release unit (HRU), or stowed in a position where it is accessible for deployment in an emergency. It/they should have a capacity sufficient for the total number of persons on board.

Lifebuoys should be marked with the vessel name and port of registry or fishing vessel number and fitted with reflective tape and may be circular or horseshoe in shape.

Flares and smoke signals should be of an acceptable type and within their expiry date.

Fire buckets should be heavy duty with a Lanyard.

Fire extinguishers should where practical comply with the stated fire ratings. However existing extinguishers of equivalent capacity, provided they have been maintained and serviced are acceptable. All extinguishers should be inspected and serviced annually by a competent person.

Fire blankets for the galley or cooking appliance should be of light duty to BS 7944 (this standard has superceded 6575) or a recognised equivalent BS EN 1869

Fire pumps can be a hand pump or any other pump that supplies water from the sea onto the deck with a hose suitable for fire fighting purposes.

Fixed fire-fighting systems should be an approved system or a fixed fire extinguisher of sufficient capacity arranged to discharge directly into the machinery space.

Navigation lights and sound signals:

1. Any vessel that operates between sunset and sunrise or in times of restricted visibility must exhibit the navigation and fishing lights prescribed in the Collision Regulations.
2. A masthead light or all round white light of 2-mile range, is to be 1 metre higher than sidelights.
3. Sidelights of 1 mile range at a height above the uppermost continuous deck not greater than three-quarters the height of the masthead light.
4. A Stern light of 2-mile range if the masthead light (number 2) is carried.
5. An all-round white light of 2 mile range when trawling or fishing as referred to in number 7 below (that may also on its own be used as an anchor light). An all-round white anchor light is required if anchored in or near a narrow channel, fairway or anchorage, or where other vessels normally navigate.
6. The all-round white light (number 5) to be more than 2 metres above the gunwales and above the sidelights (number 3) at more than twice the distance between the vertical lights (numbers 5 and 7).
7. An all-round light (green if trawling, red if fishing other than trawling) at least 1metre above the all-round white light (number 5) and of 2 mile range.
8. Alternatively, a vessel under 7 metres, with speed less than 7 knots may instead of the above lights exhibit one all-round white light of 2 mile range and if practical, sidelights or a combination lantern.
9. Additionally for vessels of greater than 12 metres overall length, a bell is required and the range of the masthead light is extended to 3 miles.

ANNEX 2

Hydrostatic Release Units

HRU for liferafts of four or less persons

HRU for SOLAS type liferafts of six or more persons

ANNEX 3

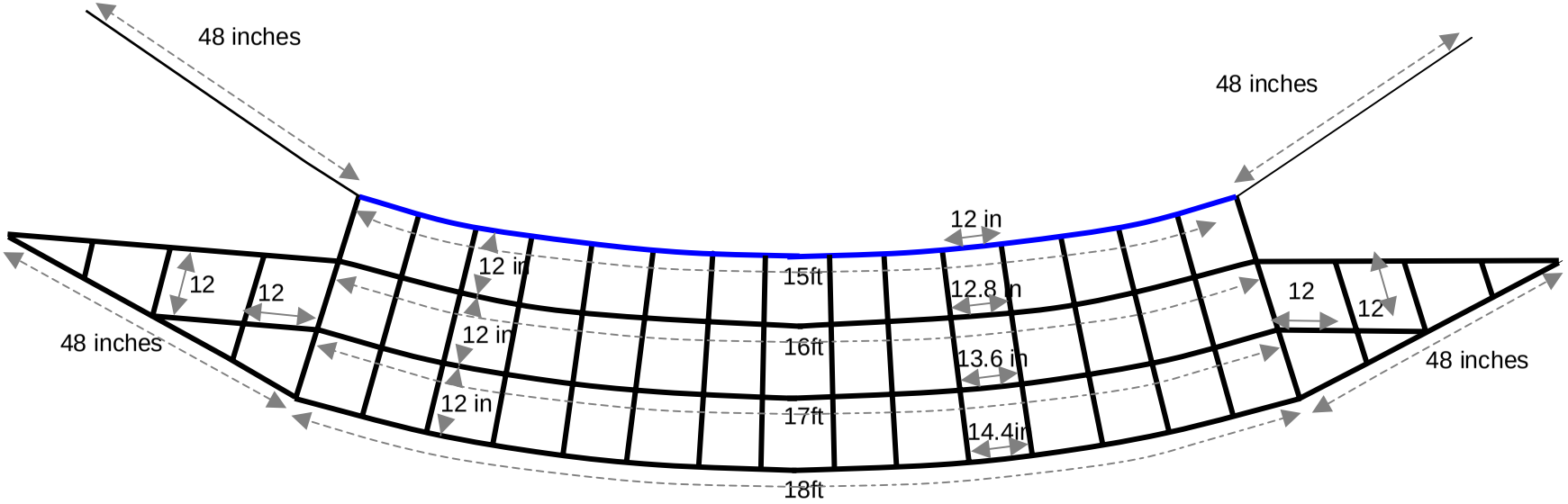
Flip-up Ropes

FLIP UP ROPES FOR OTTER TRAWLS

Flume Tank

DIMENSIONS FOR 18FT BY 3FT FLIP-UP ROPE

This gives a flip up rope of three feet in height.



TOP ROPE LENGTH 15FT.
Vertical ropes at 12 inch spaces

THIRD ROPE LENGTH 16 FEET
Vertical ropes at 12.8 inch spaces

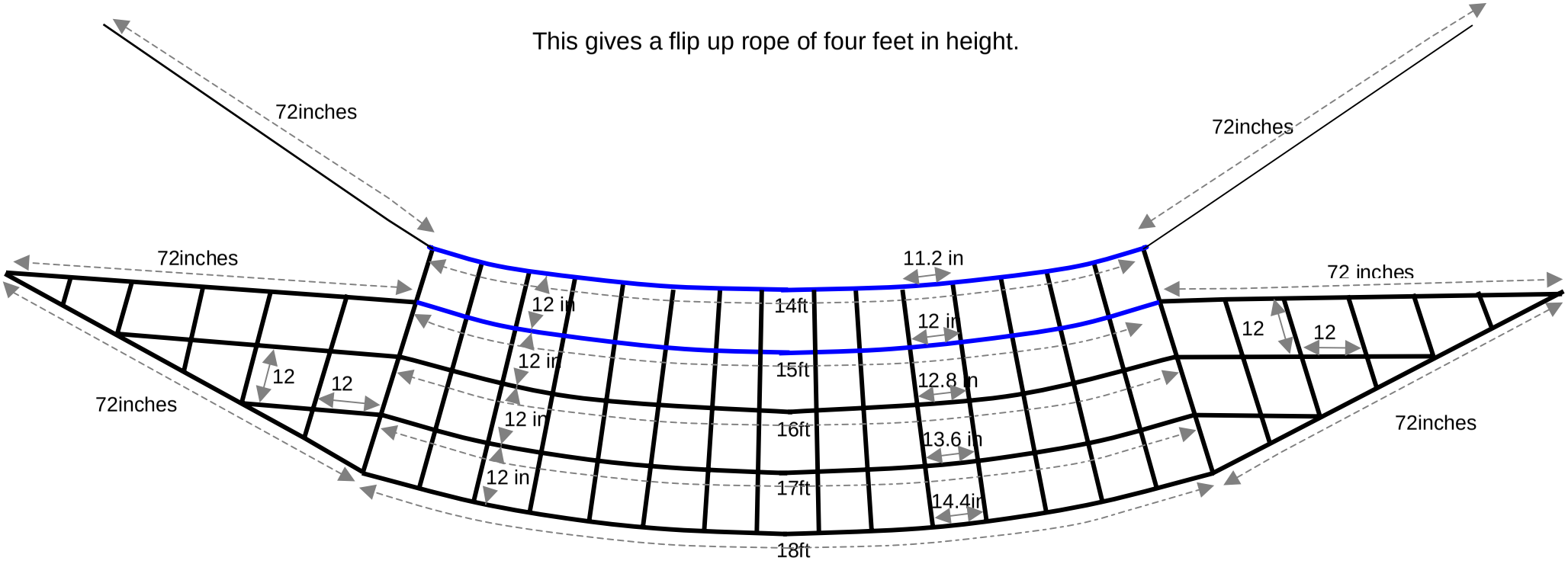
SECOND ROPE LENGTH 17 FEET
Vertical ropes at 13.6 inch spaces

BOTTOM ROPE LENGTH 18 FEET
Vertical ropes at 14.4 inch spaces

Vertical ropes 3feet long approx.

DIMENSIONS FOR 18FT BY 4FT FLIP-UP ROPE

This gives a flip up rope of four feet in height.



TOP ROPE LENGTH 14 FEET
Vertical ropes at11.2 inch spaces

FOURTH ROPE LENGTH 15FT.
Vertical ropes at 12 inch spaces

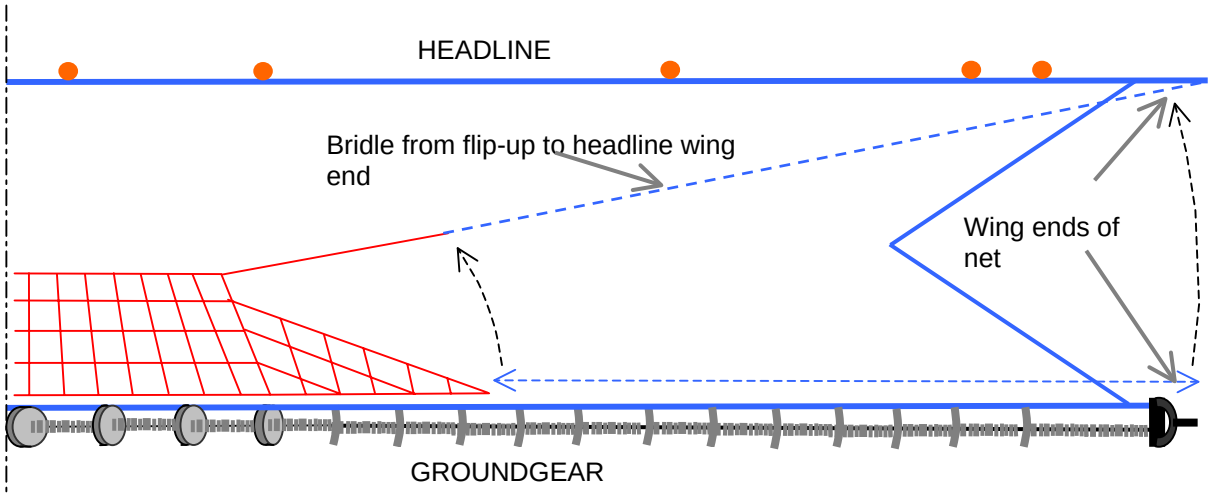
THIRD ROPE LENGTH 16 FEET
Vertical ropes at 12.8 inch spaces

SECOND ROPE LENGTH 17 FEET
Vertical ropes at 13.6 inch spaces

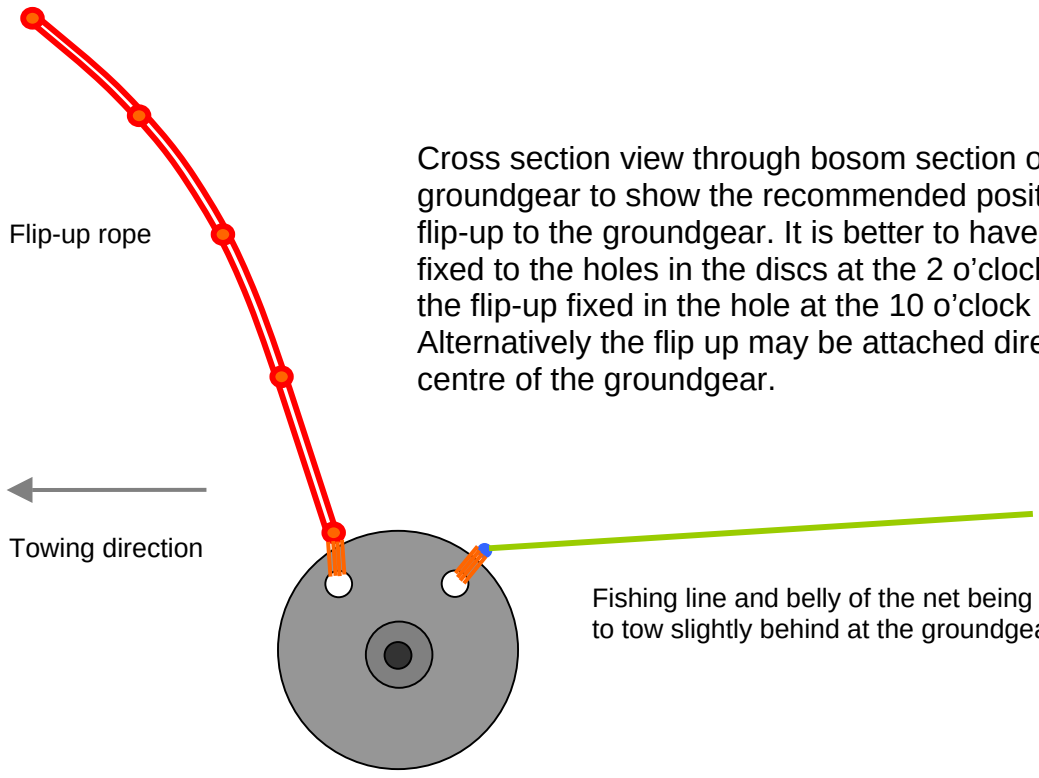
FIRST ROPE LENGTH 18 FEET
Vertical ropes at 14.4 inch spaces

Vertical ropes 4FT 2IN long approx.

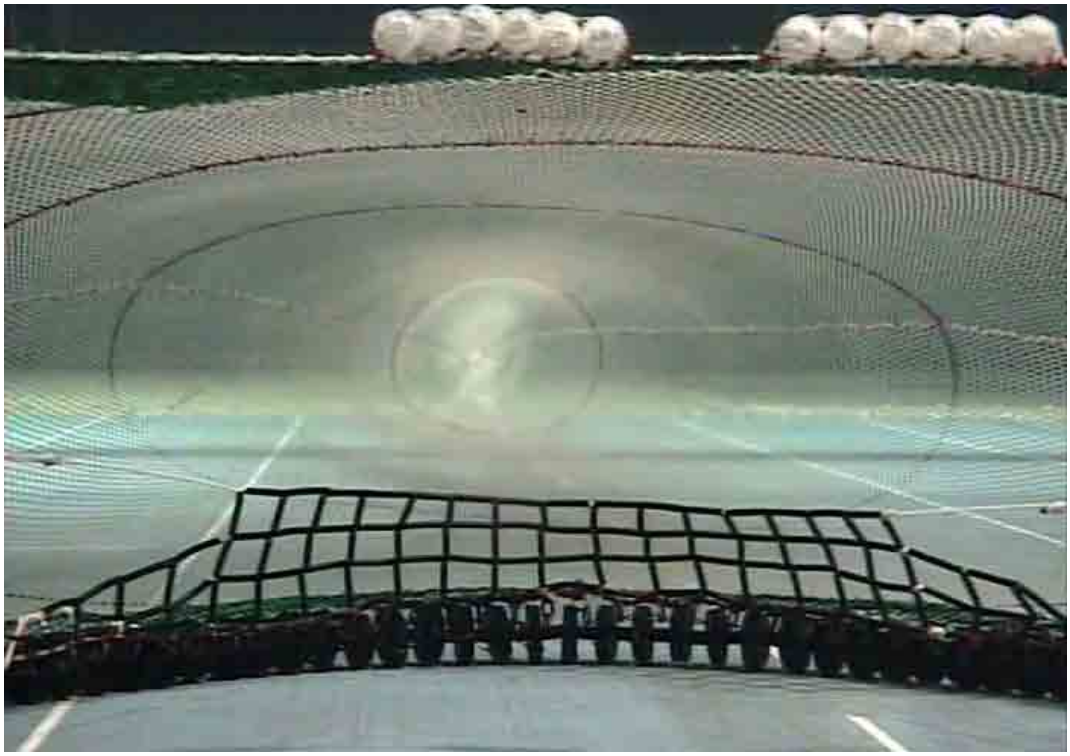
DIAGRAM OF ONE WING OF NET TO SHOW TOWING ARRANGEMENT FOR A FLIP-UP ROPE.



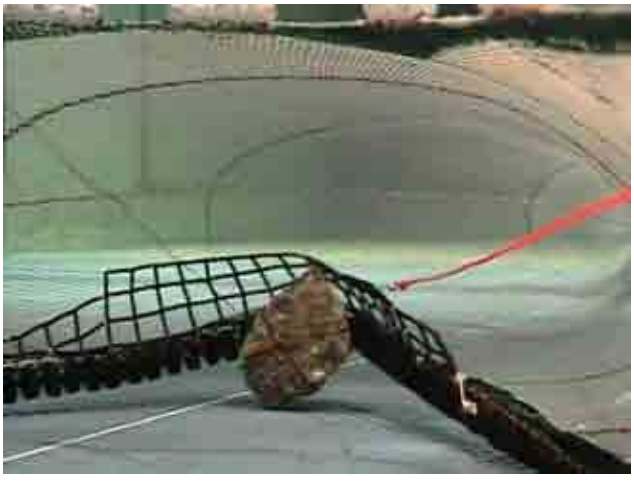
The length of the bridle from the top of the flip-up to the headline wing end should be the same length as from the end of the bottom rope of the flip-up out to the end of the ground gear. It is advisable to reduce this length by one foot and add two feet of light chain to the end to allow for adjustment and trimming of the angle of the flip-up rope. If the net to be fitted with a flip up is of the long winged scraper style, instead of taking the bridle rope to the wing end, it can be taken up to a point on the headline approximately thirty to forty feet from the quarter on each side.

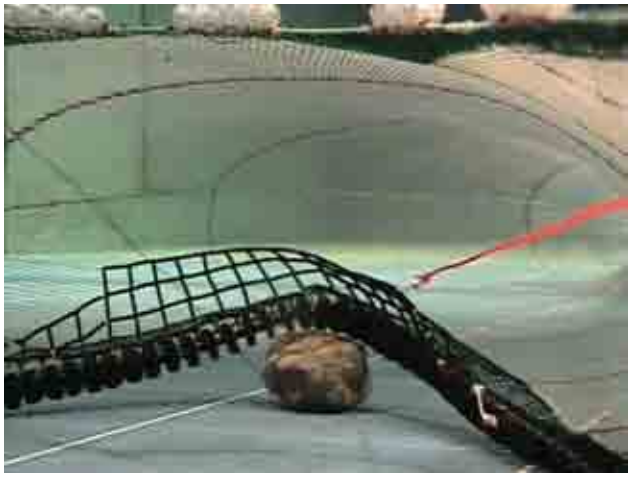


Cross section view through bosom section of the net and groundgear to show the recommended position for attaching flip-up to the groundgear. It is better to have the fishing line fixed to the holes in the discs at the 2 o'clock position and the flip-up fixed in the hole at the 10 o'clock position. Alternatively the flip up may be attached directly to the centre of the groundgear.



A flip up rope fitted to a model trawl in the Seafish Flume Tank





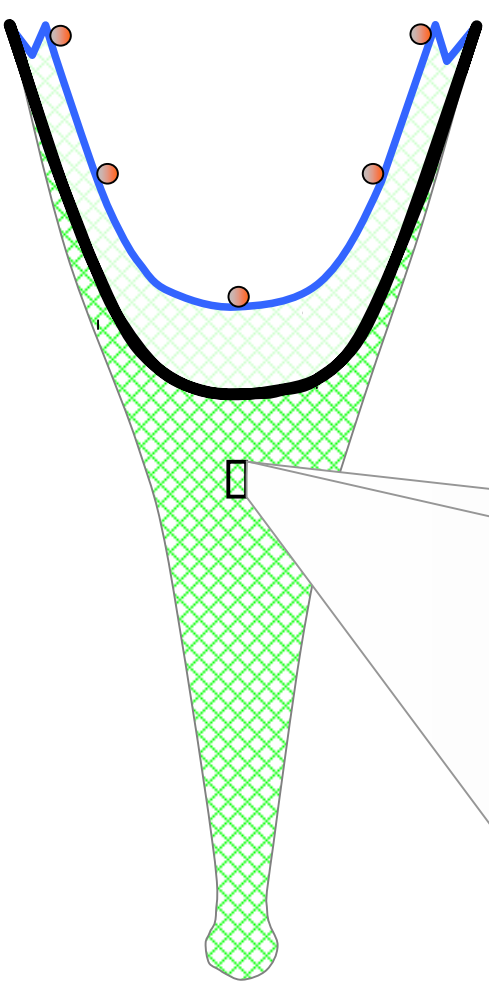
A 4 foot diameter boulder hits the flip up rope and gets directed beneath the groundgear

ANNEX 4

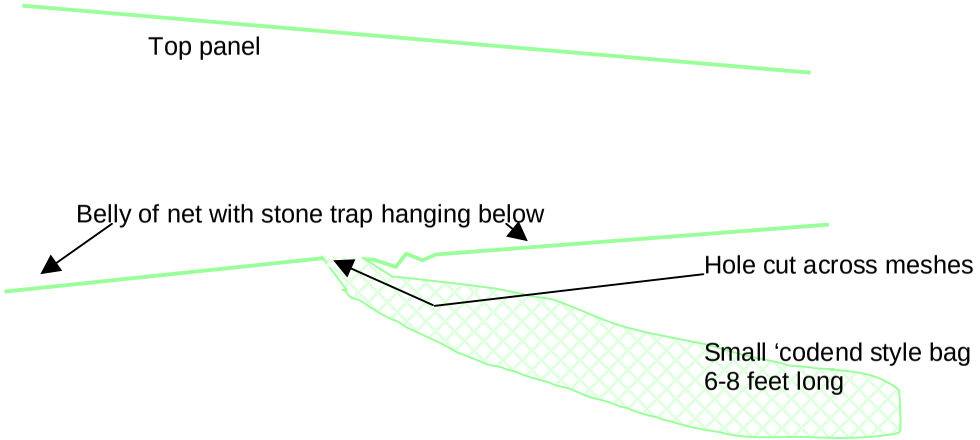
Stone Traps

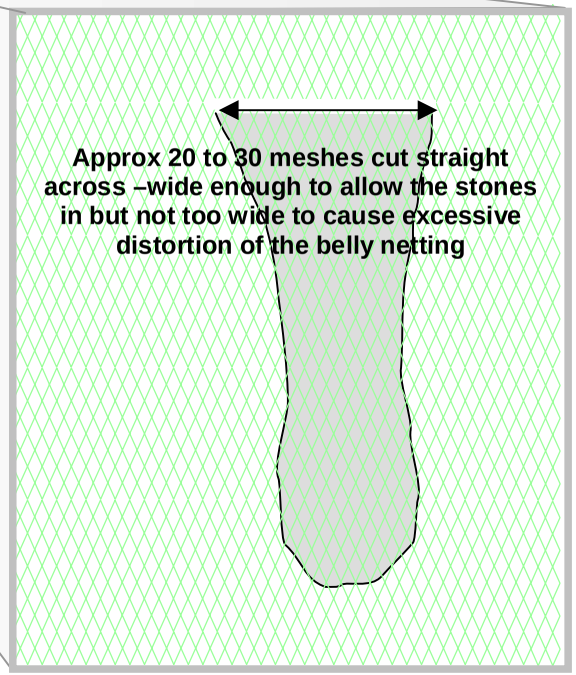
FITTING OF A STONE TRAP (METHOD 1)

Fisheries Development Centre



Position of stone trap in the belly of the net. At least 10 ft behind the fishing line to save distorting the net. More than one trap can be fitted, one behind the other with at least 10 feet between them.





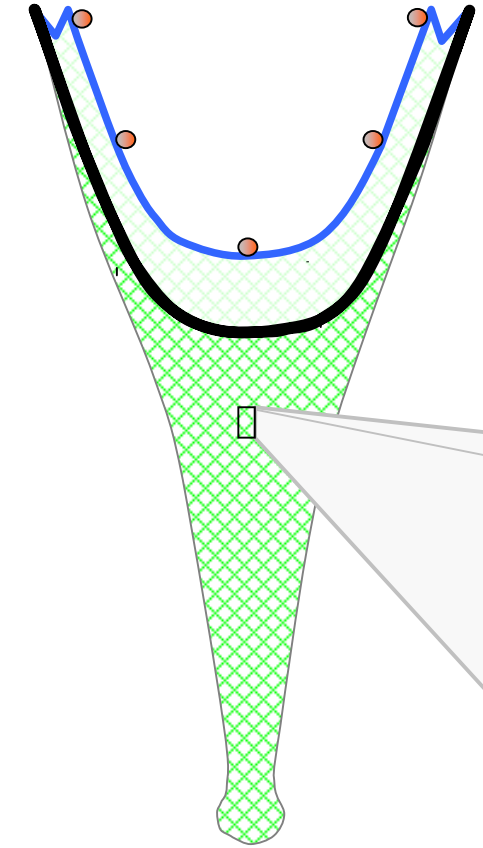
Approximately 20 to 30 meshes cut straight across. A small *'codend'* is mended on to this 'hole'. The lower panel of the *'codend'* is fixed, mesh for mesh, to the front edge of the hole and the top panel to the after edge. This small *'codend'* bag is to catch the stones and any fish that may go into the trap. It is better to be made out of light 'sacrificial' netting to allow large stones to chafe through the netting and be released. It is not essential to have this 'codend'. The idea of it is to give an indication that the trap is working and the stones are being directed into it. It will also hold any fish that may go into the trap.

In a wide opening net, like a sole net, it may need to be fitted further down the belly.

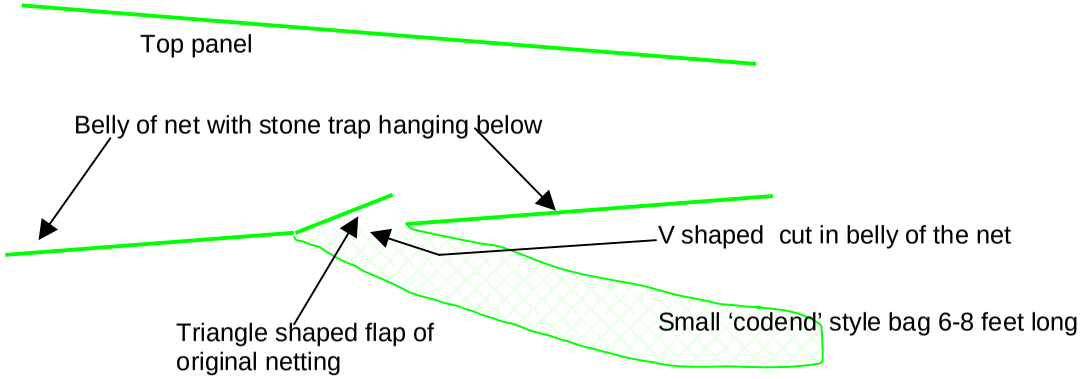
FITTING OF A STONE TRAP (METHOD 2)

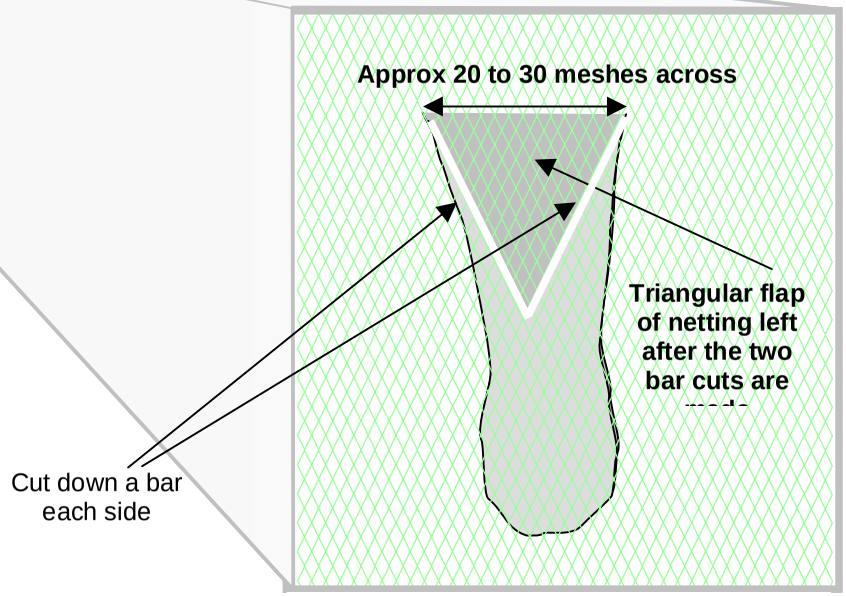
Fisheries Development Centre

Although this method is a little more complicated it tends to keep the net in better shape and spread the strain of the stone trap across the belly of the net, thereby helping to prevent damage.



Position of stone trap in the belly of the net. At least 10 ft behind the fishing line to save distorting the net. More than one trap can be fitted, one behind the other with at least 10 feet between them.





Count across 20 to 30 meshes, then cut down a bar from each side towards the codend until the two cuts come together. This should leave a triangle shaped flap of net. Make a small bag of netting, like a small codend, about 6 to 8 feet long, to fit across the 20 to 30 meshes. Lace the bottom panel across the 30 meshes. In the top panel of this bag, cut down a bar from each selvidge into the bag to cut out a triangle piece of netting. This top panel should now match the bar cuts in the belly of the net. The two are then laced together. The triangular flap of netting is left as a flap to cover the stone trap. This will allow stones to enter the trap but help to prevent fish going into it. This flap can be cut larger than required and two or three rows of heavier guard meshes mended on around the edge of the cut meshes in the belly of the net

ANNEX 5

MGN20 - Merchant Shipping and Fishing Vessels
(Health and Safety at Work) Regulations 1997

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

Notice to Shipowners, Ship Operators and Managers, Masters, Officers and Ratings of Merchant Vessels, and Skippers and Crew on Fishing Vessels.

This Notice supersedes Notice 1398

Summary

This Marine Guidance Note announces new regulations governing occupational health and safety on board merchant and fishing vessels, and gives guidance on the application of the Regulations.

Key points:

The Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations come into force on 31 March 1998.

They supersede the Merchant Shipping (Health and Safety: General Duties) Regulations 1984 and the Merchant Shipping (Safety Officials and Reporting of Accidents and Dangerous Occurrences) Regulations 1982.

The main new requirements for employers under the regulations are risk assessment and health surveillance - the annexes to this Marine Guidance Note contain advice on those two duties.

1. The Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997 (S.I. 1997/2962) will come into force on 31 March 1998. They implement Council Directive 89/391/EC on the introduction of measures to encourage improvements in safety and health of workers at work (the "Framework Directive"). The Regulations apply to United Kingdom ships and to other ships when they are in United Kingdom waters, except where the Management of Health and Safety at Work Regulations 1992 apply. The Code of Safe Working Practices for Merchant Seamen is currently being revised to reflect the new regulations and the new edition will be published by the Stationery Office later this year.

2. Copies of the Regulations are available from The Stationery Office Publications Centre, PO Box 276, London, SW8 5DT. Tel (orders) 0171 873 9090; (enquiries) 0171 873 0011. Fax (orders) 0171 873 8200. Copies may also be ordered through the Stationery Office's bookshops, its accredited agents (see Yellow Pages) or from any good bookseller.

MSOS(A)
Marine Safety Agency
Spring Place, 105 Commercial Road
Southampton
SO15 1EG

Tel: 01703 329390
Fax 01703 329251

MS 122/6/54

DETR
ENVIRONMENT
TRANSPORT
REGIONS

An executive agency of the Department of the Enviroment, Transport and the Regions

Introduction

1. The Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997 replace the Merchant Shipping (Health and Safety: General Duties) Regulations. They have a wider scope than the regulations that they replace, in that they place duties on all "employers" and "workers" on board ships, and there are no exemptions for types of ship. "Employers" and "workers" are defined as follows:

   "employer" means a person by whom a worker is employed under a contract of employment;

   "worker" means any person employed by an employer under a contract of employment, including trainees or apprentices;

   "contract of employment" means a contract of employment, whether express or implied, and if express, whether oral or in writing.

   Those attending training courses on sail training vessels are excluded from the scope of the Regulations.

2. Under the Regulations, it is the duty of employers to protect the health and safety of workers and others affected by their activities so far as is reasonably practicable. The principles for ensuring health and safety are:

   (a) the avoidance of risks, which among other things includes the combating of risks at source and the replacement of dangerous practices, substances or equipment by non-dangerous or less dangerous practices, substances or equipment;

   (b) the evaluation of unavoidable risks and the taking of action to reduce them;

   (c) adoption of work patterns and procedures which take account of the capacity of the individual, especially in respect of the design of the workplace and the choice of work equipment, with a view in particular to alleviating monotonous work and to reducing any consequent adverse effect on workers' health and safety;

   (d) adaptation of procedures to take account of new technology and other changes in working practices, equipment, the working environment and any other factors which may affect health and safety;

   (e) adoption of a coherent approach to management of the vessel or undertaking, taking account of health and safety at every level of the organisation;

   (f) giving collective protective measures priority over individual protective measures; and

   (g) the provision of appropriate and relevant information and instruction for workers.

Duty holders under the Health and Safety at Work Regulations

3. It is important that those on whom duties are placed are in a position to carry them out. Employment relationships on board ship can be complex - for example the master may not be employed by the owner or operator of the ship, or by the same employer as the crew. There may also be people working on board such as contractors and sub-contractors, stevedoring companies and those under franchising arrangements (eg in retail or service outlets) whose employer has no direct responsibility for the safety of the ship. There is therefore no single "person" on whom it is appropriate to place the entire "employment" responsibility for health and safety on board.

4. The regulations therefore recognise two levels of "employment" responsibility. The regulations use the terms "Company" and "employer". The "Company" may have duties as an "employer".

   "Company" means the owner of a ship or any other organisation or person such as the manager, or bareboat charterer, who has assumed the responsibility for operation of the ship from the owner;

5. Many aspects of the safety of the ship as a workplace (eg the structural soundness of the vessel, the provision of adequate lighting and ventilation, provision of life-saving appliances, and fire-fighting equipment) are under the control of the Company, either directly, or through contractual arrangements with the owner.

6. Each employer, which may include franchise companies operating catering facilities or retail outlets, has control over the occupational health and safety training of the staff employed, and over everyday working practices.

7. The duties for each are explained below.

Duties of employers

8. All employers have a duty to ensure so far as is reasonably practicable the health and safety of workers and others affected by their activities in accordance with the principles set out in paragraph 2 above. The basis of all safety measures should be an assessment by the employer of any risks to workers' health and safety from their work activities.

9. The measures taken must not involve cost to workers and are required to include the provision of:

    - safe working places and environment;
    - safe plant, machinery and equipment;
    - health and safety training, instruction, supervision and information;
    - any necessary protective clothing and equipment where risks cannot be removed by other means;
    - a health and safety policy;
    - information for workers about the findings of their risk assessment;
    - health surveillance of workers as appropriate;
    - information on the special occupational qualifications required to any employment business supplying them with temporary workers;
    - information about their activities and staff to the Company;
    - consultation with their workers or elected representatives on health and safety matters.

Competent person; "protective and preventive services"

10. The employer must appoint a competent person to take responsibility for health and safety, who will advise the employer on compliance with the regulations. If there is no-one competent among existing workers, a competent person may be employed from outside the company, or the employer may "appoint" himself.

New and expectant mothers

11. A new duty introduced by these regulations is that of assessing whether their duties or hours of work could place in jeopardy the health of new or expectant mothers or that of their unborn child (or if they are breastfeeding, their baby) . If so, their hours or conditions of work should be changed or alternative work found, or, if that is not possible, they should be suspended, subject to their statutory rights.

Duties of the Company

12. In so far as the Company is an employer on board ship, it has a duty to assess the risks to workers and others affected by its activities. The Company's activity is the operation of the ship, and so it is responsible for co-ordinating the control measures identified in the risk assessments of all other relevant employers on board, as appropriate.

13. **"The Company",** in addition to its duties as an employer, is required to:

    - consult other employers on board about the health and safety of workers;
    - co-ordinate health and safety measures between all the employers on board;
    - provide information to workers about the ship safety systems;
    - appoint a safety officer (see paragraphs 14 and 15 below);
    - organise the election of safety representatives and safety committee (see paragraphs 14 and 15 below).

Safety Officials/Consultation with workers:

14. These Regulations also supersede the Safety Officials and Reporting of Dangerous Occurrences Regulations 1982. Regulations 15 to 17 deal with the appointment of safety officers, the election of safety representatives and safety committees.

15. These regulations apply, as before, to merchant vessels on which more than 5 workers are employed. The regulations are supported by guidance in the Code of Safe Working Practices for Merchant Seamen.

16. In addition, there is provision for consultation with workers where the election of safety representatives does not apply (ie fishing vessels, and merchant vessels on which less than 5 workers are employed). No rules are laid down for consultation in these circumstances, as this will best be decided in the light of the operating patterns and crewing arrangements on the vessel. In many cases, informal discussion will be the most practicable solution.

Duties of Workers

17. **Workers** are required to:

- take reasonable care for their own health and safety and that of others on board who may be affected by their acts or omissions;
- co-operate with anyone else carrying out health and safety duties - including compliance with control measures identified during the employer's or Company's evaluation of risk;
- report any identified serious hazards or deficiencies immediately to the appropriate officer or other authorised person;
- make proper use of plant and machinery, and treat any hazard to health or safety (such as a dangerous substance) with due caution.

18. Under the Regulations, it is also an offence for **any** person intentionally or recklessly to interfere with or misuse any thing provided in the interests of health and safety.

ANNEX 1

RISK ASSESSMENT

1 Introduction

1.1 Under the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997, employers are required to ensure the health and safety of workers and other persons so far as is reasonably practicable, by the application of certain principles. These principles include the avoidance of risks, and the evaluation of unavoidable risks and the taking of action to reduce them.

1.2 Specifically, employers are required to make a suitable and sufficient assessment of the risks to health and safety of workers arising in the normal course of their activities or duties, for the purpose of identifying:

(a) groups of workers at particular risk in the performance of their duties; and
(b) the measures to be taken to comply with the employer's duties under the Regulations;

The assessment should extend to others on board ship who may be affected by the acts or omissions of the employer.

1.3 Every employer and every self-employed person on board ship is required to inform the Company of any relevant risks to health and safety arising from the conduct of their business.

1.4 Employers must ensure that measures are taken to ensure an improvement in the safety and health of workers and other persons in respect of those risks identified by the assessment.

1.5 Employers must review the assessment when there is reason to believe that it is no longer valid, and make any necessary changes.

1.6 Workers must be informed of any significant findings of the assessment and measures for their protection, and of any subsequent revisions made.

1.7 The Company is also required to ensure that anyone working on the ship, whether or not they are directly employed by the Company, is aware of the findings of the Company's risk assessment and of the measures taken for their protection.

1.8 This guidance note explains the principles of risk assessment in relation to occupational health and safety and provides some advice on how the assessment and control of risks may be approached.

1.9 Regulation of occupational health and safety on board ship is of course not new. Existing safety measures may already provide a high level of safety for workers. For example, well-established procedures, inspections by safety officers and the use of "permits to work" which control safety conditions, will contribute to the identification of hazards and measures for safe working.

1.10 However, what is new is the explicit requirement in regulation for employers to adopt the risk assessment approach to occupational health and safety. This means that all work activities should be considered from a risk assessment standpoint.

1.11 Employers may adapt existing safety management systems to meet the risk assessment principles set out in section 3 and the main elements described in section 10, taking into account the nature of their operations and the type and extent of the hazards and risks to workers.

2 Key terms

2.1 Key terms, used frequently in this chapter, are defined below.

a) A hazard is a source of potential harm or damage or a situation with potential for harm or damage;

b) risk has two elements:

- the likelihood that a hazard may occur;
- the consequences of the hazardous event.

3 Principles of risk assessment

3.1 A "risk assessment" is intended to be a careful examination of what, in the nature of operations, could cause harm, so that decisions can be made as to whether enough precautions have been taken or whether more should be done to prevent harm. The aim is to minimise accidents and ill health on board ship.

3.2 The assessment should first identify the hazards that are present and then establish whether a hazard is significant and whether it is already covered by satisfactory precautions to control the risk, such as permits to work, restricted access, use of warning signs or personal protective equipment, including consideration of the likelihood of the failure of those precautions which are in place.

3.3 Any risk assessment must address risks to the health and safety of workers.

4 Risk assessment in practice

4.1 There are no fixed rules about how risk assessment should be undertaken, although section 10 gives the main elements. The assessment will depend on the type of ship, the nature of operations and the type and extent of the hazards and risks. The intention is that the process should be simple, but meaningful. The following sections give advice on good practice.

5 What should be assessed?

5.1 The assessment should cover all risks arising from the work activities of workers on the ship. The assessment is not expected to cover risks which are not reasonably foreseeable.

5.2 Employers are advised to record the significant findings of their risk assessment. Risks which are found to be trivial, and where no further precautions are required, need not be recorded.

6 Who has to carry out the assessment?

6.1 In all cases, individual employers have responsibility for assessing the risks to their workers and other persons who may be affected by their activities. The Company will be responsible for co-ordinating the risk assessments covering everyone on the ship including workers directly employed by itself, taking account of the other employers' assessments.

6.2 The process of risk assessment should be carried out by suitably experienced personnel, using specialist advice if appropriate.

7 How thorough should the assessment be?

7.1 Regulation 7(1) requires that a suitable and sufficient assessment be made of the risks to the health and safety of workers arising in the normal course of their duties. This requirement to assess risk relates only to risks which arise directly from the work activity being undertaken and which have the potential to harm the person(s) actually undertaking that work, or who may be directly affected by that work. The requirement to assess risk does not extend to any consequential peril to the ship resulting from the particular work activity, nor to any external hazards which may imperil the ship, either of which may cause harm to those on board or to others. These aspects are covered by other regulations.

7.2 The assessment of risks must be `suitable and sufficient'. The process need not be overcomplicated. This means that the amount of effort that is put into an assessment should depend on the degree of harm that may occur and whether risks are already controlled by satisfactory precautions or procedures to ensure that they are as low as reasonably practicable.

8 When to assess?

8.1 Risk assessment should be seen as a continuous process. In practice, the risks in the workplace should be assessed before work begins on any task for which no valid risk assessment exists. An assessment must be reviewed and updated as necessary, to ensure that is reflects any significant changes of equipment or procedure.

9 Risk assessment pro-forma

9.1 Employers may wish to use a simple pro-forma to record the findings of an assessment, covering, for example:

a) work activity;
b) hazard(s);
c) controls in place;
d) personnel at risk;
e) likelihood of harm;
f) severity of harm;
g) risk levels (sometimes called "risk factor");
h) action to be taken following the assessment;
i) administrative details, e.g. name of assessor, date, etc.

10 Elements of risk assessment

10.1 The main elements of the risk assessment process are :

a) classify work activities
b) identify hazards and personnel at risk
c) determine risk
d) decide if risk is tolerable
e) prepare action plan (if necessary)
f) review adequacy of action plan

10.2 Further guidance on how each element may be accomplished is in the Appendix, which is based on British Standard 8800.

APPENDIX

GUIDANCE ON MAIN ELEMENTS OF RISK ASSESSMENT

1. Classify work activities

1.1 A useful preliminary to risk assessment is to identify separate work activities, to group them in a rational and manageable way, and to gather necessary information (or collate existing information) about them. Infrequent maintenance tasks, as well as day-to-day operations, should be included. Possible ways of classifying work activities include:

a) department/location on board ship/on the dockside;
b) stages of an operation or work routine;
c) planned and unscheduled maintenance;
d) defined tasks (e.g. loading/unloading cargo).

1.2 Information required for each work activity might include:

a) tasks being carried out: their duration and frequency;
b) location(s) where the work is carried out;
c) who normally/occasionally carries out the tasks;
d) others who may be affected by the work (e.g. contractors, passengers);
e) training that personnel have received for the task.

2. Identify hazards

2.1 Asking these three questions should help to identify where there is a hazard:

- Is there a source of harm?
- Who (or what) could be harmed?
- How could harm occur?

Hazards that clearly possess negligible potential for harm should not be documented or given further consideration, provided that appropriate control measures remain in place.

2.2 To help with the process of identifying hazards it may be useful to categorise hazards in different ways, for example by topic, e.g.:

a) mechanical
b) electrical
c) physical
d) radiation
e) substances
f) fire and explosion.

2.3 A complementary approach may be to develop a prompt list such as:

During work activities could the following hazards exist?

a) slips/falls on the level;
b) falls of persons from a height;
c) falls of tools, materials, etc, from a height;
d) inadequate headroom;
e) inadequate ventilation;
f) hazards from plant and machinery associated with assembly, commissioning, operation, maintenance, modification, repair and dismantling;
g) hazards from manual handling.

The above list is not exhaustive, and employers could develop their own `prompt list' taking into account the particular circumstances.

3. Determine risk

3.1 The risk from the hazard may be determined by estimating:

- the potential severity of harm; and
- the likelihood that harm will occur.

These two components should be judged independently.

3.2 When seeking to establish potential **severity of harm**, the following should be considered:

a) part(s) of the body likely to be affected;
b) nature of the harm, ranging from slightly to extremely harmful:

i) slightly harmful, e.g.:

- superficial injuries; minor cuts and bruises; eye irritation from dust;
- nuisance and irritation (e.g. headaches); ill-health leading to temporary discomfort;

ii) harmful, e.g.:

- lacerations; burns; concussion; serious sprains; minor fractures; musculo-skeletal disorders;
- deafness; dermatitis; asthma; work related upper limb disorders; ill-health leading to permanent minor disability;

iii) extremely harmful, e.g.:

- amputations; major fractures; poisonings; multiple injuries; fatal injuries;
- occupational cancer; other severely life shortening diseases; acute fatal diseases.

3.3 In order to establish the **likelihood of harm** the adequacy of control measures already in place should be considered. Legal requirements and guidance in this Code and other safety publications are good guides to adequate control of specific hazards. The following issues should then typically be assessed:

a) number of personnel exposed;
b) frequency and duration of exposure to the hazard;
c) effects of failure of power or water supply;
d) effects of failure of plant and machinery components and safety devices;
e) exposure to the elements;
f) protection afforded by personal protective equipment and its limitations;
g) possibility of unsafe acts by persons for example, who:

i) may not know what the hazards are;
ii) may not have the knowledge, physical capacity, or skills to do the work;
iii) underestimate risks to which they are exposed;
iv) underestimate the practicality and utility of safe working methods.

The likelihood of harm can be assessed as highly unlikely, unlikely or likely.

3.4 Any given hazard is more serious if it affects a greater number of people. But some of the more serious hazards may be associated with an occasional task carried out by just one person, for example maintenance of inaccessible parts of lifting equipment.

4. Decide if risk is tolerable

4.1 Table 1 below shows one simple method for estimating risk levels and deciding whether risks are tolerable. Risks are classified according to their estimated likelihood and potential severity of harm. However, employers may wish to develop other approaches according to the nature of their operations.

Table 1.

	Slightly harmful	**Harmful**	**Extremely harmful**
Highly unlikely	**TRIVIAL RISK**	**TOLERABLE RISK**	**MODERATE RISK**
Unlikely	**TOLERABLE RISK**	**MODERATE RISK**	**SUBSTANTIAL RISK**
Likely	**MODERATE RISK**	**SUBSTANTIAL RISK**	**INTOLERABLE RISK**

Note: Tolerable here means that the risk has been reduced to the lowest level that is reasonably practicable.

5. Prepare risk control action plan

5.1 Having determined the significant risks, the next step is to decide what action should be taken to improve safety, taking account of precautions and controls already in place.

5.2 Risk categories form the basis for deciding whether improved controls are required and the timescale for action. Table 2 suggests a possible simple approach. This shows that the effort made to control risk should reflect the seriousness of that risk.

Table 2.

	ACTION AND TIMESCALE
TRIVIAL	No action is required and no documentary records need be kept
TOLERABLE	No additional controls are required. Consideration may be given to a more cost effective solution or improvement that imposes no additional cost burden. Monitoring is required to ensure that the controls are maintained.
MODERATE	Efforts should be made to reduce the risk, but the costs of prevention should be carefully measured and limited. Risk reduction measures should be implemented within a defined time period. Where the moderate risk is associated with extremely harmful consequences, further assessment may be necessary to establish more precisely the likelihood of harm as a basis for determining the need for improved control measures.
SUBSTANTIAL	Work should not be started until the risk has been reduced. Considerable resources may have to be allocated to reduce the risk. Where the risk involves work in progress, urgent action should be taken
INTOLERABLE	Work should not be *started* or *continued* until the risk has been reduced. If it is not possible to reduce the risk even with unlimited resources, work has to remain prohibited.

Note: Tolerable here means that the risk has been reduced to the lowest level that is reasonably practicable.

5.3 The outcome of a risk assessment should be an inventory of actions, in priority order, to devise, maintain or improve controls.

5.4 Controls should be chosen taking into account the following, which are in order of effectiveness:

a) if possible, eliminate hazards altogether, or combat risks at source e.g. use a safe substance instead of a dangerous one;
b) if elimination is not possible, try to reduce the risk e.g. where risk is of electrocution, by using a low voltage electrical appliance;
c) where possible adapt work to the individual, e.g. to take account of individual mental and physical capabilities;
d) take advantage of technical progress to improve controls;
e) give precedence to measures that protect everyone;
f) if necessary, use a combination of technical and procedural controls;
g) introduce or ensure the continuation of planned maintenance, for example, of machinery safeguards;
h) ensure emergency arrangements are in place;
i) adopt personal protective equipment only as a last resort, after all other control options have been considered.

5.5 In addition to emergency and evacuation plans, it may be necessary to provide emergency equipment relevant to the specific hazards.

6. Review adequacy of action plan

6.1 Any action plan should be reviewed before implementation, typically by asking;

a) will the revised controls lead to tolerable risk levels?
b) are new hazards created?
c) what do people affected think about the need for, and practicality of, the revised preventive measures?
d) will the revised controls be used in practice, and not ignored in the face of, for example, pressures to get the job done?

ANNEX 2

HEALTH SURVEILLANCE

1. Duty of employers

1.1 Employers must provide workers with such health surveillance as is appropriate taking into account the risks to their health and safety which are identified by the assessment undertaken in accordance with the regulations.

2. Purpose of health surveillance

2.1 Health surveillance is a means of identifying early signs of ill health caused by occupational hazards so that action can be taken to protect individuals at an early stage from further harm. For example:

- where a worker's exposure to a hazardous substance is approaching the agreed limit, the worker should be removed from exposure before any harm is done;

- if symptoms of minor ailments (e.g. skin rash) are detected, action should be taken to prevent them becoming major health problems.

2.2 In addition, the results of health surveillance can provide a means of:

(a) checking the effectiveness of health control measures;
(b) providing feedback on the accuracy of health risk assessment;
(c) identifying and protecting individuals at increased risk.

2.3 Health surveillance is not a substitute for measures to control risks to health and safety. Control measures should always be the first consideration to reduce risk. Nor is it the same as medical examinations which are intended to assess fitness for work (for example pre-employment, sickness resumption or periodic examinations). However, where relevant, health surveillance should be conducted, for example at pre-employment assessment, where a base-line reference can usefully be established.

3 Application

3.1 Health surveillance should be introduced where risk assessment (see Chapter 1) identifies that :

(a) a particular work activity may cause ill health;
(b) an identifiable disease or adverse health condition is related to the work;
(c) recognised testing methods are available for early detection of an occupational disease or condition - e.g. audiometry, skin inspection where dermatitis is a hazard;
(d) there is a reasonable likelihood that a disease or condition may occur in relation to particular working conditions;
(e) surveillance is likely to further the protection of workers' health.

3.2 All workers should be subject to whatever health surveillance is appropriate for the work activities they are involved in. Examples of circumstances in which it may be useful include :

- exposure to hazardous substances;
- working with vibrating tools;
- exposure to high levels of noise;
- use of substances known to cause dermatitis (e.g. solvents); and
- exposure to certain dusts (e.g. asbestos);

4 What to do

4.1 Once it is decided that health surveillance is appropriate, it should be maintained whilst the worker remains exposed to the hazard(s) in question. A worker's health surveillance records should where possible be retained, even when the worker changes employment.

4.2 Health surveillance may involve one or more of the following, as applicable:

(a) inspection of readily detectable conditions (e.g. skin damage) by a person acting within the limits of their training and experience;
(b) enquiries about symptoms;
(c) hearing checks (audiometry);
(d) medical examinations or company health checks;
(e) testing blood or urine samples.

4.3 The frequency of such checks should be determined either on the basis of suitable general guidance (e.g. skin inspection for skin damage) or on the advice of a qualified occupational health practitioner. The workers concerned could be given an explanation of the purpose of health surveillance and an opportunity to comment on the proposed frequency of such health surveillance procedures, either directly or through their safety representatives.

4.4 Where medical surveillance is required, and it is necessary to take samples or record other personal information, it is essential that confidentiality is maintained in respect of individual health records containing clinical information.