The Good Practice Guide for Demersal Fishermen

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1 Introduction

1.1 Background

This booklet has been produced for fishermen who are engaged in the capture of demersal species from fisheries around the UK and the EU. The booklet is intended as a guide for the demersal catching sector, regarding applicable UK and EU regulations concerning food safety.

It has been compiled in accordance with the recommendations as prescribed in Regulation 852/2004/EC on the Hygiene of Foodstuffs (Articles 7 and 8) which provide for the development of national guides to good hygiene practice. Primarily fishermen, but also food businesses and industry stakeholders, can use these guides as an aid to compliance with food safety regulations.

In terms of food safety, white fish is generally considered a low risk product. However, high standards of food safety are important to ensure public confidence in fish as a safe and wholesome food remains high. The food safety risks most often associated with white fish and fishery products are physical contamination, chemical contamination, or infestation of the product. Bacterial spoilage will affect the eating quality.

Beyond the basic requirements for hygiene standards that ensure food safety, high standards of care are necessary when handling fish, which is of a delicate and perishable nature, in order to achieve a level of product quality that will provide for customer satisfaction. Good care of the catch will also reduce waste and help to secure a better return from a finite and regulated resource.

1.2 Purpose and Scope

The purpose of the guide is to help fishermen to comply with food safety law and to secure the best return for their products by meeting the needs of the market in terms of product specification and supply. It sets out means by which the demersal fisherman can comply with Regulation 852/2004/EC on the Hygiene of Foodstuffs, and Regulation 853/2004/EC laying down specific rules for food of animal origin. Only the requirements applicable to the demersal catching sector of the fishing industry will be covered in this guide. This guide also provides advice to demersal fishermen on achieving the principles of 'best practice' concerning the quality of fish caught and landed from their fishing activity.

Advice is given on the legal responsibilities of owners and skippers, vessel and equipment design and on working practices. It covers the operations from capture to landing of fresh demersal fish. It does not cover the operations concerning the freezing or onboard processing of fishery products or any operations concerning live products.

The guidelines take due account of the recommended International Code of Practice, General Principles of Food Hygiene, of Codex Alimentarius and the proposed Code of Practice of Fish and Fishery Products.

The document is not intended to be used as a training manual and does not specify detailed prescriptive procedures to be undertaken that cover all trawling, netting and line fishing operations. It does not cover Health and Safety or Fisheries Control Regulations.

The guidelines were produced by Seafish in collaboration with representatives of the trade and official bodies.

1.3 Summary of Legal Requirements

The legal requirements that apply to the operation of a fishing vessel cover basic issues of food safety, fish marketing, fishery controls and health and safety, most of which meet requirements set by the European Union. Although it could be argued that all of these in some way have an effect on fish quality, it is the food safety regulations that are the most relevant to the handling of fish on board a fishing vessel. It is the interpretation of these regulations and procedures of best practice which are the focus of this guide.

The Food Safety Act, 1990 is the central Act of Food Safety. It establishes the essential principles of food safety, gives powers to the Food Authorities to enforce food safety and provides a means of enacting subsidiary Regulations on more detailed aspects of food safety. All persons in the food industry, including fishermen are subject to the Food Safety Act 1990. This Act establishes the basic requirements not to carry out any act which will render food injurious to health and to trade only in food satisfying food safety requirements.

The Food Safety (Fishery Products and Live Shellfish) (Hygiene) Regulations 1998 Is the current enabling regulation covering all aspects of fish handling and processing from capture up to retail sale. It gives general hygiene requirements for all fishing vessels. In addition, the Regulations establish hygiene requirements for the landing, inspection, storage and transport of fish ashore.They also establish basic standards for the minimum quality of fishery products.

These Regulations and its requirements do not apply to a fisherman who sells all his catch directly to the final consumer or retailer within the UK up to a maximum of 25 tonnes per year. However, in this case, the requirements of the Food Safety (General Food Hygiene) Regulations 1995 apply. These establish basic hygiene requirements but are less detailed than the Fishery Products and Live Shellfish Regulations.

EC Regulation No. 178/2002 on the General Principles of Food Law which came into force on the 1st January 2005. This is enforced by the Food Safety Act 1990 (amendment) Regulations 2004 and the General Food Regulations 2004 which introduce new requirements for traceability and product recall.

EC Regulation No.852/2004 on the Hygiene of Foodstuffs is scheduled to come into force on 1st January 2006. It will establish basic hygiene rules for all food businesses and includes a specific set of hygiene rules for primary production that includes training requirements. The general rules include the registration of food businesses and the implementation of HACCP principles by food operators, although HACCP will not initially be required for primary production. It encourages the development and use of officially approved guides to good practice, particularly for primary production. These guides will take account of HACCP principles.

EC Regulation No.853/2004 laying down specific hygiene rules for food of animal origin is also scheduled for implementation in 2006. It will establish additional, more detailed sets of hygiene rules for specific foods including fishery products. It is similar to, and will replace, the current fishery products and live shellfish (hygiene) regulations.

Draft Food Hygiene (England) Regulations 2005 and the corresponding regulations for Scotland, Wales and Northern Ireland are to be introduced to enforce the above Regulations and set penalties for offences. It also contains national legislation which member states are required or allowed to make. These new regulations are scheduled to come into force on the 1st January 2006.

1.4 Acknowledgements

In the production of this guide acknowledgements and thanks must be made to the numerous contributors who have assisted in its formation.

It is further acknowledged that this guide was part funded by EU FIFG (Financial Instrument for Fisheries Guidance), delivered through the Scottish Executive and administered by Seafood Scotland.

Acknowledgement is given to the following industry stakeholders who have participated in reviewing this guide through its development.

2 Structure of the Guide

This Guide is laid out in a three column format – see example below:

- The first or left hand column details the current legal requirement. The 'Part' or 'Schedule' number is detailed as well as the part or paragraph number. The actual wording in legislation is given in *italics.*
- The second or middle column provides interpretation of the legal requirement using specific language of what must be complied with by demersal fishermen.
- The third or right hand column details advice on good or best practice, which if undertaken will exceed the minimum requirement of the law.

To use this guide, consult the appropriate stage of the fishing operation you wish information on – a detailed breakdown appears in the Contents page. If an interpretation of the law is required, consult the middle column, or if advice on best practice is required, consult the right hand column.

Example:

3.3 Supply of Ice

Legal Requirement	Interpretation	Recommended 'best practice'
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Requirements for all vessels Schedule 4 Part 1 6. *Ice used for the chilling of products must be made from potable water or clean seawater.*	Ice must be made from potable water or clean seawater.	Ice should be bought from an approved source or made on board using an uncontaminated water source. Harbour or mooring water is not acceptable.

For more detailed information on specific topics concerning best practice please refer to the appropriate appendix.

3 Compliance with Specific Requirements for Demersal Fishing

The requirements laid out in the following tables are detailed for all demersal fishing vessels. Additionally there are conditions which apply to fishing vessels which are designed and equipped to hold their catch at sea for a duration of 24 hours or more. These are referred to as article 1.2 fishing vessels as defined in The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998.

3.1 Construction and Layout of the Vessel, and Fish Handling and Storage Areas

Legal Requirement	Interpretation	Recommended 'best practice'
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 4 Part I Requirements for all vessels		
1. … sections of vessels or the containers reserved for the storage of fishery products must not contain objects or products liable to transmit harmful properties or abnormal characteristics to the foodstuffs. These sections or containers must be so designed as to allow them to be cleaned easily and to ensure that melt water cannot remain in contact with the fishery products.	Vessels must be designed and constructed to prevent contamination of product by bilge water, sewage, waste fish products, smoke, fuel, oil, grease or other substances harmful to human health. The areas where fish are handled and stored should be designed and constructed to be easy to clean and be well drained. The design should be simple to avoid the lodging of debris, and the harboring of vermin. Bait carried by line boats must be held separate from the catch and in such a manner that it cannot contaminate the catch.	A supply of clean seawater is required for washing fish and cleaning down surfaces. The intake should be positioned so as to be clear of engine cooling, bilge and waste systems. Construction of the vessel should utilise marine grade stainless-steel, aluminium and food-grade plastics in fish handling and storage areas. Deck hoses should easily reach all areas that require cleaning and should have sufficient water pressure for effective wash down. Containers used for bait should be clearly marked as such and not used for any other purpose.

Legal Requirement	Interpretation	Recommended 'best practice'
Schedule 4 Part II Vessels holding their catch at sea for more than 24 hours		
1. Fishing vessels must be equipped with holds, tanks or containers for the storage of refrigerated or frozen fishery products at the temperature laid down by these Regulations.	Vessels must have a hold, tank or be supplied with specific containers in which to store fish in a chilled condition. The regulations state that fresh fish products must be held at a temperature approaching that of melting ice.	Chilled fish rooms should be fitted with a temperature recording device, ideally linked to a computer in the wheelhouse for continuous monitoring. This also ensures that a print-out can be obtained as required.
These holds shall be separated from the machinery space and the quarters reserved for the crew by partitions which are sufficiently impervious to prevent any contamination of the stored fishery products.	Holds must be separated from engine compartments and crew quarters by suitable partitions and/or bulkheads which protect the fish from any possible source of contamination.	Fishrooms should be adequately insulated to prevent heat from the engine compartment, ambient deck conditions and the surrounding sea warming-up fish.
Schedule 3 Chapter VIII *1. (a) …. Must be kept at a temperature approaching that of melting ice.*		Refrigerated fish rooms should use bulkhead and/or ceiling coils or plates to achieve the required level of chilling.
2. The inside surface of the holds, tanks or containers shall be waterproof and easy to wash and disinfect. It shall consist of a smooth material or, failing that, smooth paint maintained in good condition, not being capable of transmitting to the fishery products substances harmful to human health.	Containers and equipment that come into contact with fish must be made of, or coated in, a material that is waterproof, resistant to decay, smooth and easy to clean and disinfect. They should be designed and constructed to avoid dirt traps and to facilitate drainage.	A dedicated chute for the collection and/or disposal of offal should be incorporated in the handling system.
	Painted surfaces must not be in a blistered or flaking condition which constitutes a contamination hazard.	Non-corrosive metal finishes of any structure or equipment on which the fish come into contact should not be painted.

Legal Requirement	Interpretation	Recommended 'best practice'
3. The holds shall be designed to ensure that melt water cannot remain in contact with the fishery products.	Fish holds and containers used for storage of catch must allow for efficient drainage and removal of melt-water and drip loss. The drainage system should allow melt water to drain away into a sump from where it can be pumped overboard.	Melt-water is full of bacteria, and if it remains in contact with fish, the spoilage processes will be accelerated. Care must be taken in the design and construction of the sump to ensure that it can be accessed easily and cleaned out thoroughly.

3.2 Fish Handling Equipment

Legal Requirement	Interpretation	Recommended 'best practice'
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 4 Part I Requirements for all vessels *4. The fishery products shall be handled in such a way as to prevent bruising.*	Crew handling practices, handling systems, chutes, conveyors, graders, washers etc., should be designed to prevent physical damage caused by throwing fish, long drops or by crushing.	Any chutes should be angled to ensure that fish does not suffer physical damage.
9. Equipment used for gutting, heading and the removal of fins, and containers and equipment in contact with the fishery products, must be made of or coated with a material which is waterproof, resistant to decay, smooth and easy to clean and disinfect. When used they must be completely clean.	Fish containers, knives, cutting boards, fish washers, hoppers, tables and any other equipment coming into contact with the product must be made of materials which are waterproof, rustproof, smooth and easy to clean. Surface finishes must be durable and non-toxic. Before use surfaces must be thoroughly cleaned as prescribed in section 3.4.	Stainless steel, aluminium and food-grade plastics are recommended. The use of plastic-handled gutting knives is recommended. Wooden gutting boards and wooden boxes are not recommended. The presence of glass in product handling and holding areas should be avoided where possible; where unavoidable, it should be suitably protected against damage.

3.3 Supply of Ice

Legal Requirement	Interpretation	Recommended 'best practice'
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 4 Part I Requirements for all vessels		
6. Ice used for the chilling of products must be from potable water or clean seawater.	Ice must be made from potable water or clean seawater.	If ice is not directly available from the quayside it should be transported to the vessel under cover in clean and preferably insulated conditions.
Before use it must be stored under conditions which prevent its contamination.	When storing ice, it must be held in clean surroundings. The ice must either be covered with a clean impervious cover, such as plastic, or stored away from the elements under the shelter deck or in the hold. It must not be left open to contamination from birds and the environment on the deck, or to contamination from crew, chemicals, glass or other contaminants in the hold. Ice should be made, transported and handled under hygienic conditions to avoid its contamination.	Ice machines can be installed on board larger vessels. Ice machines should be operated in such a way to prevent contamination and be regularly cleaned. Containers and shovels used to store and dispense ice should be regularly cleaned and disinfected. Ice can be made from seawater; however, freshwater ice is preferable as the temperature of seawater ice can initially be as low as –6ºC. Its temperature may subsequently rise to 0ºC as the salt in the melt water drains away. There is a risk, however, of some of the fish becoming partially frozen.

3.4 Pre-Fishing

Legal Requirement	Interpretation	Recommended 'best practice'
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 4 Part I Requirements for all vessels *2. When used, the sections of vessels or the containers reserved for the storage of fishery products must be completely clean and, in particular, must not be capable of being contaminated by the fuel used for the propulsion of the vessel or by bilge water.*	The hygiene of the vessel and equipment, especially catch reception areas, sorting conveyors, gutting stations, fish washers, handling conveyors, fish boxes etc. must be clean. Containers for the storage of product must be stowed prior to use in an area of the vessel which is not liable to suffer contamination from fuel or bilge water. Stale or contaminated ice must be discarded and the storage area thoroughly cleaned.	Cleaning should follow a documented schedule that specifies the cleaning agents and their use. Prior to the start of any fishing trip, the skipper or a designated crew member should check the standard of hygiene for all fish handling and storage areas. Contaminated ice can increase the bacterial load on the fish.
5. Fishery products other than those kept alive must undergo cold treatment as soon as possible after loading.	Vessels with refrigerated holds should be suitably cold prior to product being placed in them.	Prior to the start of any fishing trip the refrigeration should be switched on, so the hold is running between 0ºC and +4°C before any product is stored in it. If colder than this, partial freezing can occur and can be detrimental to quality. Where holds are not refrigerated, a sufficient quantity of ice should be available to offset external heat gain on the fish for the length of the trip.

3.5 Fishing

Legal Requirement	Interpretation	Recommended 'best practice'
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 4 Part I Fishing operations - requirements for all vessels		The design and use of fishing gear (eg mesh size, mesh shape, twine size, escape panels, cod-end configuration etc) should be consistent with the principles of responsible fishing, that maximise target species and size grades and minimise discards. The capture of fish of known poor intrinsic quality (eg spent, worm-infested etc) or fish for which there is no or little market requirement, should be avoided where possible. Trawl tow-times should be kept as short as practical. Long tow-times result in damage and quality-loss of product. Trip duration should also be kept as short as practical. The soak times of static nets and long-lines should not be so long that fish spoil or suffer unduly from predator damage.
Schedule 4 Part II Vessels holding their catch at sea for more than 24 hours. *5. The working decks, the equipment and the holds, tanks and containers shall be cleaned each time they are used. Potable water or clean seawater shall be used for this purpose.*	Between hauls, hoppers, deck-pounds, conveyors and any equipment coming into contact with fish must be rinsed down with clean seawater. Any fish or debris trapped in the net and/or gear must be removed.	All fish should be handled and stowed before taking the next haul on-board so that cleaning can take place. This is also particularly important in maintaining fish quality.

3.6 Bringing Onboard

All activities under this section occur at sea. With this in mind all legal interpretation of water use will be taken to mean the use of clean seawater.

Legal Requirement	**Interpretation**	**Recommended 'best practice'**
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 4 Part I Requirements for all vessels *3. As soon as they are taken onboard, the fishery products must be protected from contamination and from the effects of the sun or any other source of heat.*	Once taken onboard all fish on deck must be protected from temperature rises, the drying effects of wind and other potential sources of heat and contamination.	The use of spray bars and/or the application of ice to the catch is recommended to help keep it cool and moist.

3.7 Onboard Handling

All activities under this section occur at sea, with this in mind all legal interpretation of water use will be taken to mean the use of clean seawater.

Legal Requirement	**Interpretation**	**Recommended 'best practice'**
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 4 Part I Requirements for all vessels		
3. …When they are washed, the water used must be either fresh water or clean seawater, so as not to impair their quality or wholesomeness.	Fishwashers and/or deck hoses must be supplied with clean seawater which is used exclusively for the washing of the catch.	Fishwashers themselves must be kept clean.
4. The fishery products shall be handled in such a way as to prevent bruising.	Crew handling practices must minimise the potential of physical damage caused by throwing fish, long drops or by crushing.	Handling, sorting and stowage of the catch should be commenced and completed as soon as practically possible after taking the fish onboard.
The use of spiked instruments shall be tolerated for the moving of large fish which might injure the handler, provided the flesh of these products is not damaged.	Hooks, gaffs, forks or any other such sharp instruments should not be used to handle fish, other than large species which present a safety hazard for the crew.	Such tools should only be used in the head of the fish so as not to damage the flesh.

Legal Requirement	Interpretation	Recommended 'best practice'
8. Where fish is headed and /or gutted on board, such operations must be carried out hygienically…washed immediately and thoroughly…	Once gutted, fish must be washed without delay. Washing must ensure that all remaining viscera, blood and seabed debris is removed.	Gutting and bleeding should take place as soon as possible to ensure the blood drains freely from the fish. Ideally, gutting and bleeding should be undertaken within one hour of the fish being brought onboard.
	Gutting stations and knives must be kept clean throughout the duration of the fishing trip.	The belly cavity should be opened with a single cut and all internal organs, including the heart and all traces of kidney and liver tissue removed.
	Crew members handling fish must take particular care to maintain clean hands, gloves and clothing. Smoking is not permitted in the fish-room or fish handling areas.	When opening the fish for gutting, damage to the fillet should be avoided. Knives used for gutting should be kept sharp and be regularly rinsed during use.
The viscera and parts which may pose a threat to public health must be removed and set apart from products intended for human consumption.	All gutting activity must ensure that fish offal and other waste products are separated from the catch and are disposed of in such a way so as not to come back into contact with the washed and gutted fish.	Where gutting machines are used, they should be rinsed intermittently during long periods of use. Blades should be kept sharp at all times. Brushes should be checked and replaced when worn.
Livers and roes intended for human consumption must be refrigerated or frozen.	If livers and roes are to be selected and kept, then they must be stored chilled, iced or frozen.	Washing should be carried out with a good flow of continuously running clean seawater. The quantity of fish in the washer must be regulated to avoid overloading and fish should be washed for a suitable time to ensure they are fully cleaned.

3.8 Onboard Storage

All activities under this section occur at sea, with this in mind all legal interpretation of water use will be taken to mean the use of clean seawater.

Legal Requirement	**Interpretation**	**Recommended 'best practice'**
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 4 Part I Requirements for all vessels		
5. Fishery products…must undergo cold treatment as soon as possible after loading.	The catch must be cooled immediately after deck handling using ice and/or chilling methods.	On un-decked boats, or boats without fishrooms, the use of insulated containers or covers is recommended to maintain chill temperatures.
However, in the case of fishing vessels where cooling is not possible from a practical point of view, the fishery products must not be kept onboard for more than 8 hours.	Vessels which do not carry ice or have no facilities to chill fish must not hold fish on board for more than 8 hours.	

Legal Requirement	Interpretation	Recommended 'best practice'
Schedule 4 Part II *Vessels handling their catch at sea for more than 24 hours* *4. Containers used for the storage of products must ensure their preservation under satisfactory conditions of hygiene and, in particular, allow drainage of melt water. When used they must be completely clean.*	Containers used for storing fish must be 'fit for the purpose' of holding product hygienically, chilled and capable of being maintained in a clean condition. They should be constructed with an adequate number of drain holes of a large enough size to allow the free drainage of melt water from the fish.	Boxes and bins used for fish storage should have a layer of ice placed in the bottom of the container before fish is added. Layers of fish then ice should be placed into the box or bin to fill it. Place a final layer of ice on the top of the container. The top level of ice should not be proud of the upper rim of the box or bin, to prevent crushing of the product. The volume of ice should be sufficient to maintain the product at a temperature of between 0ºC to +3°C. Fish should be placed into the box or bin with the cut belly cavity downwards to aid drainage and prevent melt water accumulating inside the belly cavity. Fish should also be aligned in the same direction, to prevent distortion, twisting and crushing of the product. The use of 'fish papers' is not advised - they can prevent the fish from cooling properly, they restrict the direct contact of ice with the fish and the ice melt water dispersing throughout the contents and inhibit cooling of the product. Where the volume and species mix is such that no serious detrimental effect will be experienced to the catch; fish species may be size graded at sea to an acceptable standard for the market requirement.

		Where volumes of fish caught are sufficient and the size of the vessel allows, weighing and boxing of fish at sea is recommended – refer to appendix 4.1.

3.9 Post-Fishing

Legal Requirement	**Interpretation**	**Recommended 'best practice'**
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 4 Part I Requirements for all vessels *7. After the fishery products have been unloaded, the containers, equipment, and sections of the vessels which are directly in contact with the fishery products must be cleaned with potable water or clean seawater.*	At the end of each fishing trip and after landing of the catch, all fish handling and stowage areas, equipment and boxes etc, must be thoroughly cleaned.	Food-safe detergents and sanitisers should be used for cleaning operations. The use of marine degreasants is not recommended for fish contact surfaces. It is recommended that gloves, oilskin jacket and trousers are cleaned and sanitized at least daily after use.
Schedule 4 Part II *Vessels handling their catch at sea for more than 24 hours* *5. …Disinfection, the removal of insects or rat extermination shall be carried out whenever necessary.*	At the end of each fishing trip and after landing of the catch, all fish handling and stowage areas, equipment and boxes etc., must be thoroughly cleaned and disinfected. Effective measures must be taken to protect	For a detailed guide to best practice please refer to appendix 4.4.

	the fishing vessel from infestation of any pests. If evidence of their presence is noted, appropriate action must be taken.	
6. Cleaning products, disinfectants, insecticides and all potentially toxic substances shall be stored in locked premises or cupboards. Their use must not present any risk of contamination of fishery products.	A lockable facility must be provided for the secure storage of cleaning products and potentially toxic substances separate from fish handling and storage areas.	The crew should be fully trained in the correct storage and use of all cleaning chemicals carried on board the vessel. Crew should be familiar with, and follow instructions in, the cleaning schedule.

3.10 Landing

Legal Requirement	**Interpretation**	**Recommended 'best practice'**
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 3 Chapter II Requirements for all vessels		
2. *During… landing, contamination of fishery products must be avoided. It must… be ensured that*	During landing operations every reasonable measure must be taken to protect the catch from contamination .	Do not leave the catch on the open quayside unattended for any length of time.
- unloading and landing operations proceed rapidly	Landing of the catch must be carried out as quickly as possible.	Any delays at this stage can lead to the fish warming up.
-fishery products are placed without unnecessary delay in a protected environment at the temperature required on the basis of the nature of the product and, where necessary, in ice in transport, storage or market facilities, or in an establishment	Once off the vessel, the catch must be transferred to a place of storage which will maintain the product at a chilled temperature, such as a covered lorry, a market, or other premises where fishery products are handled.	

	If the place of storage is not refrigerated then adequate ice must be used on the product to ensure it remains at a temperature approaching that of melting ice.	Re-ice all fish as necessary, especially if the place of storage is not refrigerated.
- equipment and handling practices that cause unnecessary damage to the edible parts of the fishery products are not authorised.	No tools or implements which cause damage to the fish flesh during landing are to be used.	All manual handling must also be carried out carefully so as not to damage the fish, as this can reduce its market value.

3.11 Displaying for Sale

Legal Requirement	Interpretation	Recommended 'best practice'
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Part III - 36 Placing fishery products on the market. (1) Subject to paragraph (2), no person shall place on the market for human consumption any fishery products, unless- (1)(g) *they have been appropriately packaged in accordance with Chapter VI of Schedule 3.*	Where fish is repacked and/or graded ashore, these operations must be carried out under hygienic conditions, to prevent any contamination of the fish.	Where regional market conditions prefer, size grading, weighing and boxing of fish at sea may be carried out as it eliminates the need for de-icing, grading and weighing before sale. This risks potential temperature gain and damage which may be caused by additional handling.
	Packaging materials must not taint or transfer toxic substances to the fish and must be strong enough to protect the fish from damage and contamination.	As an aid to compliance with traceability regulations, it is strongly recommended that containers of fish are labelled at sea. For a detailed guide to best practice please refer to appendix 4.1.
	Re-usable packaging containers must be made of smooth, impervious and corrosion-resistant materials which are easy to clean and disinfect.	Where species selection, size grading and other handling activities take place before sale, such work should be carried out in hygienic conditions without delay, and care taken to minimise physical damage.
	Packaging containers used to hold fresh fish under ice must allow for adequate drainage of melt water.	Boxes should not be stacked on top of each other if ice is proud of the box. Boxes should not be walked on. All fish should be re-iced once fully presented for sale. Meltwater in contact with fish will increase the bacterial load on the fish.

3.12 Hygiene of the Crew

Legal Requirement	Interpretation	Recommended 'best practice'
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 4 Part I Requirements for all vessels *10. Staff assigned to the handling of fishery products shall be required to maintain a high standard of cleanliness for themselves and their clothes.*	Crew clothing must be kept clean, and oilskins should be washed down after each haul is cleared. Crew must wash their hands and gloves prior to any fish handling activity, particularly after going to the toilet. Smoking or spitting in the fish handling or storage areas is not permitted. Wounds on hands or exposed parts of the body must be covered with waterproof dressings.	All crew members should be trained in Introductory Food Hygiene and have a clear understanding of the importance of high standards of cleanliness and the means of achieving them. Crew members should also be trained in care of the catch and quality procedures. Blue waterproof plasters are the preferred choice wherever possible. Skippers should familiarise themselves with the concept and use of hazard analysis to help minimize the risk of catch contamination. For a detailed guide to best practice please refer to appendix 4.7.

4 Appendices

4.1 Guidelines for Weighing, Labelling and Boxing at Sea

- It is recommended that the fish are weighed and labelled in the fish hold. If this is not possible, then the scales should be located on deck.
- Ensure the scales are correctly tared for the container used to weigh the fish.
- Keep a calibration weight onboard and check the scales daily for accuracy. If possible, record details of each calibration check.
- Allow fish to stand for a suitable time before weighing to allow excess wash-water to drain off.
- The crew must be instructed, or the weighing equipment set, to ensure that a minimum target weight of fish is achieved before a box is labelled and packed.
- Target weights must include a drip loss allowance to help ensure a minimum weight of fish at landing.
- The crew must be instructed not to make up boxes which are excessively heavier than the desired minimum target weight, otherwise high give-away and quality loss and weight loss due to overfilling and crushing may result.

4.1.1. Factors Affecting Drip Loss:

4.1.1.1 Factors outwith the control of the Fisherman:

- Fish species
- Condition of the fish (season)
- Ambient temperature

4.1.1.2 Factors within the control of the Fisherman:

- **Fishing Method** – The length of trawl time affects drip loss; longer tows soften and bruise the fish leading to higher drip loss and loss of quality.

- **Exposure to the elements** - Fish must not be left in the open where it is susceptible to drying and temperature fluctuations.

- **Time taken for catch to pass from cod end to the box** - Fish must be processed as quickly as is practically possible.

- **Time delay after weighing** - Fish once weighed should be boxed up as quickly as possible. Undue delays may lead to the fish warming up to ambient conditions, physical damage or distortion and a degree of drying out through air exposure.

- **Method of packing and the ratio of fish to ice:**
  - A layer of ice should be placed over the base of the box.
  - Avoid using old, solid ice.
  - The fish should be laid belly cavity downward to aid drainage. Avoid filling boxes with fish laid across one another.
  - Put ice between layers to aid rapid chilling of the fish.
  - Do not use excessive amounts of ice in each box or the pre-weighed fish will be proud of the top of the box.
  - Room must be left at the top of the box for a final layer of ice.
  - Fish correctly packed in this way will not be subject to undue crushing and compression and hence drip loss will be minimised.

- **Weight of fish in the box** - Target a suitable weight of fish per box so that overfilling is not a problem. It is pointless to weigh at sea to such a weight that crush damage is still a major cause of poor quality and high weight loss.

- **Length of the fishing trip** - Trips should be kept to the shortest practical duration.

4.1.2 Recommended Target Weights

Through a programme of data collection by Seafish it has been possible to recommend target weights for vessels to achieve a given net weight of fish when landed.

This data has been collated into two categories, whitefish and monkfish. The losses for whitefish were recorded from data collected from cod, haddock and saithe.

From this information, the following table has been drawn up to act as a guide to the weight loss that may be expected for the above species.

Typical drip weight loss of fish weighed at sea.

Days on Ice	**Whitefish**	**Monkfish**
1 – 2 Days	1.5 – 2.5 %	6 – 8%
2 – 8 Days	3 – 3.5 %	8 – 11.5 %

Recommended allowance to compensate for drip loss

Days on Ice	**Whitefish**	**Monkfish**
For the trip	3.5 %	11.5 %
Last 2 days*	3.5 %	8 %

* Optional drip loss allowance at end of trip.

4.1.3 Recommended Labelling Practice

As an aid to compliance with traceability regulations it is strongly recommended that containers of fish are labelled at sea with the following information:

- Vessel identification,
- Species of fish (Latin and common name),
- Size grade (where applicable),
- Date of capture,

- Unit weight,
- Area of capture.

Any additional information such as haul number, fish code, etc may be applied at the discretion of the individual, but is not mandatory.

Labels should be attached or displayed on each box in such a way that all information is clearly visible to the buyer on the marketplace.

4.1.4 Box Weight Declaration

It is not recommended that labelling statements give any reference to a 'guaranteed' weight. This is due to the fact that the pre-mentioned factors, which have an effect on drip loss, mean that it is not possible to predict accurately box weights 8 to 10 days in advance.

There are two methods of declaring box weights currently in use:

Method 1:

Box labels published with the actual weighed at sea weight.

Each box label displays the actual weight of fish contained in the box at the time it was weighed and packed at sea.

When displaying fish weights in this way the label must incorporate a fixed statement, which clearly indicates that: -

i) The weight relates to the weight of fish when it was weighed at sea.

ii) That it will be subject to a degree of drip loss.

Method 2:

Box labels published with the predicted weight of fish offered for sale.

The label displays the weight of fish that is estimated to be in the box after a drip loss factor has been taken into account (as illustrated above).

Weighing systems displaying label information in this way should incorporate a fixed statement that says that the published weight on the label is the ‘Target Weight’.

4.2 Traceability

4.2.1 The Meaning of Traceability

There are several definitions but in this context 'traceability' is effectively the ability to determine the movement of particular goods through a distribution chain. Traceability has to work both ways: it has to work back through a chain from particular end-products sold to consumers in order to determine their origins, and it has to work forward through a chain from particular raw materials to determine their end-product destinations. Also, for food and particularly for perishable food, traceability should sensibly include knowing what has happened to it in the chain, i.e. its processing history, as well as where it has been and who was responsible for it. In this context, the 'processing history' also includes conditions of storage and transport.

To achieve traceability, goods need to be labelled or otherwise identified and information recorded on their movement through the chain (and on their processing history if required). This can necessitate the generation and holding of a considerable amount of data, only some of which can feasibly be put on a label (e.g. the species and catch area).

It should be noted that traceability concerns only the ability to access this information. The information does not necessarily have to be with the goods or be generally available.

The demands for traceability are both legal and commercial, as outlined below:

4.2.2 The Legal Requirements

There are explicit legal requirements for traceability and a number of further legal requirements that relate to traceability. The explicit requirements are for reasons of product and food safety: to help identify the cause of any problem and to enable product recall if necessary.

Regulation 178/2002/EC laying down the principles and requirements of food law will require the traceability of food through all stages of production, processing and distribution. Specifically it will require food to be labelled or identified to facilitate its traceability and that food businesses will have to keep records of persons who have supplied them with food and of businesses they supply food to. Compliance with this basic 'one up, one down' traceability should be relatively straightforward. A fishermen typically puts a tally on each box to identify the vessel and supplies to an agent, the next food business, who will then bear the responsibility of recording the individual buyers of the fish. Fish processors already have to identify their products with an establishment number and, for obvious commercial reasons, already record who they receive from and supply to. However, it should be noted that the legislation also applies to intermediate food businesses such as haulage companies and cold store operators who must also record who they receive from and supply to. The Regulation does not require 'internal traceability' within each business, i.e. the

ability to trace particular products dispatched to particular raw materials received, and neither does it require records of processing history.

Further legal requirements that relate to traceability include labelling and record keeping requirements in a wide range of fisheries management, fish marketing and food legislation. They include skippers log book and reporting requirements, the system of first sale notes and the forthcoming registration of first sellers and buyers and their responsibility to keep records, the labelling of fish species, production method and catch area and the requirement for lot marking.

4.2.3 The Commercial Requirements

There is considerable pressure from the corporate food industry for traceability through their supply chains. This is to maximise their operating efficiency, to assure their product safety and quality, to support their claims in product labelling and, most importantly, to protect their brand image. The commercial consequences of a food safety or mis-labelling issue for a multiple or manufacturer's brand can be enormous. Similarly, food safety problems have at times necessitated massive product recalls and even closure of businesses when traceability has not been in place, rather than being able to identify, isolate and deal with the specific part of the business or the particular supplier causing the problem. A level of internal traceability within businesses and knowledge of production history are crucial in meeting these commercial requirements, which are well beyond the basic legal requirements.

These commercial requirements are in many instances the real drivers for change. Put in stark terms, if these increasingly important large food businesses cannot get the information they want from their suppliers, they will source elsewhere. Suppliers can view this as a threat or as an opportunity to help secure a place in the market.

The ethical aspects of food production are also becoming of increasing concern to consumers and hence to the businesses that sell to them. This means that important aspects of production history can include the sustainability of the fisheries and the use of responsible fishing techniques. Indeed, for businesses wishing to capitalise on responsible fishing, product quality or regional origin schemes, traceability is a basic requirement to support and protect their claims.

Furthermore, the general experience of businesses that have introduced effective traceability into their operations is that they have also found considerable efficiency benefits in stock control, production planning, quality assurance and their office systems, etc.

4.2.4 Traceability Developments

In an ideal world, one set of information could efficiently satisfy all the various legal and commercial needs for traceability. In reality, the distortions resulting from the EU fisheries management regime have worked against this and have discouraged traceability in much of the catching sector and in the trading

sectors handling the fish landed. This reflected immediate financial necessity for many businesses but it is counter to the sound commercial development of the industry to meet the needs of its markets. However, fisheries controls are being tightened, the tools for traceability are being put in place and they are being increasingly adopted, in the UK and abroad.

Most large food businesses have some form of internal traceability but achieving chain traceability has been a problem, particularly in the seafood industry. The EU-funded Tracefish project has addressed this problem.

For seafood, traceability has to start at sea; Tracefish-compliant systems for vessels are now produced commercially in the UK and are being increasingly adopted. These systems provide the vessels with marketing benefits and also generate the necessary fisheries control data.

Sorting at sea and the use of weighing, labelling and information systems are not considered feasible on small inshore vessels. However, for vessels making short trips to local grounds these functions can be carried out on landing, with little loss of traceability.

4.2.5 Further Sources of Information

Further information on Tracefish can be found on the Seafish website www.seafish.org - search for 'Tracefish'.

The Food Standards Agency has been preparing general guidance on traceability for the food industry and Seafish has contributed to the drafting of this. The guidance recommends best practice on traceability, not merely compliance with the limited requirements of the law. It was consulted on some time ago but has yet to be published.

'Directive 2001/95/EC on general product safety' and 'Regulation EC/178/2002 on the principles and requirements of food law' can be downloaded from www.europa.eu.int/eur-lex.

Seafish Report 538 'Development of an integrated weighing, labelling and forward information system for fishing vessels'

Seafish Report 553 'An integrated traceability, marketing and back-office system for inshore ports'

4.3 Cleaning Schedules

The use of a simple cleaning schedule can act as a straightforward tool to improve and maintain a high standard of hygiene onboard any type of fishing vessel. The use of a cleaning schedule is good practice as it provides a step-by-step instruction as to the systematic cleaning of the working areas.

A good cleaning schedule will usually detail:

- What is to be cleaned,
- How often it should be cleaned,
- Any chemicals to be applied, together with their dilutions and contact time,
- The method of cleaning,
- Details of any Chemical Safety Data sheets.

4.3.1 Vessel Cleaning Guidelines

If the crew are aware of the importance of good basic hygiene practices then the overall quality of the catch should be improved. It is important to make crewmembers aware of this, as there will be no visible evidence at sea if fish has been excessively contaminated through poor hygiene standards. However, once landed, fish that has a high bacterial count will spoil more rapidly than fish that has been handled hygienically and has a lower bacterial load.

This set of guidelines explains why certain hygiene practices are important to the fisherman. If people are aware of, and have an understanding as to what can potentially spoil the catch, then they will be in a better position to prevent this occurring in the first instance.

4.3.2 Working areas

An effective ‘clean-as-you-go’ policy throughout the trip, and once fishing has been completed, will keep the areas in a suitably clean condition. Nets can be stowed, and fish can be gutted, graded and washed within an environment with minimal bacterial contamination.

4.3.3 Equipment

The variety of equipment held on board for the handling of the fish can on some vessels be quite extensive. All equipment that comes into direct contact with the fish during the handling process should be given particular attention when cleaning. Each piece of equipment is a potential source of contamination to the fish, especially if it is not maintained in a clean state.

4.3.3.1 Receiving hopper or pound, conveyors, elevators and chutes

Equipment will become coated with much fish and aquatic debris. If not kept in a good state of cleanliness such debris will build up and dry on to the equipment, making future effective cleaning that much more difficult to achieve.

4.3.3.2 Gutting tables, boards, knives, grading bins

This is the most intensive work area on the vessel, where the crew are separating the guts of the fish from the body cavity. Fish entrails and organs have high contents of bacteria and enzymes, which will rapidly contribute to fish spoilage if not removed thoroughly. Equipment too can become badly soiled.

- Tables, boards and knives should be cleaned regularly and effectively to prevent excessive build up of residues.
- It is recommended that gutting boards should be made from a non-porous, readily cleanable material such as polypropylene. Wooden boards in time become waterlogged thus harboring bacteria, and making them difficult to clean effectively. They are also prone to splintering through wear, which in turn is a potential foreign body risk to the catch; as such they should not be used.
- It is also recommended that plastic-handled knives are used for similar reasons.

4.3.3.3 Gutting machines

Some boats are equipped with small semi-automatic gutting machines. As their action is quite rigorous they will generate a greater breakdown of the entrails in the process of removing them from the fish. This offal will be contained within the guarding and covers of the machine.

- Check internal surfaces regularly and keep clean.
- Failure to do so will result in offal accumulating inside; stale offal will be harder to remove and will become an ideal breeding ground for bacteria which will ultimately contaminate the fish passing through the machine.

4.3.3.4 Fish washer

- Clean off scum and other fish residues from around the edge of the washer.

4.3.3.5 Fish baskets and scales

- Fish in these baskets will generally be un-iced. Therefore, given that there is no temperature control, it is essential that they are kept as clean as possible to minimise the effect of contact contamination.
- Boats with weighing systems onboard should not overlook the cleaning of their scales.

- If electronic scales and labelling systems are used onboard, care should be taken in ensuring that the button interface is not water- or chemically-damaged.
- Operate a ‘clean-as-you-go’ system with these items of equipment, cleaning frequently when in continuous use.

4.3.3.6 Hold

The catch may be stowed in the fishroom from anywhere between one to eight or more days at a time. The conditions under which fish are maintained in the fishroom are essential in preserving fish quality throughout the trip. The fishroom must be well insulated; it must have good drainage; all contact surfaces must be easily washable and it must be free from taints and odours.

- Ensure that the hold is thoroughly cleaned and rinsed at the end of every trip.

4.3.4 Cleaning Chemicals

It is highly recommended that the correct chemicals are used for the applications outlined above. There are a number of companies who specialise in the supply of heavy duty reagents.

Vessels are strongly advised to take professional advice when selecting chemicals, for a number of reasons:

- It can make a significant improvement to the boat’s hygiene standard, even if the effects of this are not visible.
- It should be borne in mind that some chemicals may react with certain metals such as aluminium, which may be present in equipment on board.
- The use of the wrong chemical such as an engine room degreasant does not provide any sanitising effect on work contact surfaces.
- The correct dilution rates and application methods will be advised.
- Chemicals that have a strong residual taint such as bleach will more than likely taint some fish at some point on board the boat.
- Always ensure that your supplier provides you with the relevant chemical data sheets for the products you use.

- Always ensure the persons involved in the application of these products during cleaning are instructed in their correct method of application.
- Always keep chemicals correctly stored away from working areas.

4.3.5 Records

As part of a well-managed cleaning schedule, boats should keep a record of the cleaning activity that takes place onboard. This provides a record of the 'due diligence' the boat has undertaken to ensure that the fish landed is from a vessel which is operating a regular cleaning programme. The record then forms part of the traceable quality history of the fish landed by the boat.

The record should also incorporate a check on the working and storage areas and equipment of the boat to ensure that once the cleaning activity has taken place that the work has been done to satisfactory level.

4.3.6 Methods of Application and Frequency

The method by which areas and equipment of a vessel should be cleaned will depend upon their use, and how heavily soiled they becomes during use.

- In many cases simple hosing down of work areas at regular intervals to prevent build up of fish and marine debris is sufficient.
- When it comes to thorough clean-downs, a number of applications can be used: areas can be manually scrubbed down with cleaning solutions, or vessels may utilise the use of a powerhose to apply high pressure cleaning with built in chemical applicators.
- Some items of equipment can be soaked in sanitising dips; rinsing off should be carried out with either clean seawater or freshwater.
- A thorough clean-down at the end of a trip is essential. Failure to clean effectively at this time will result in a high build up of bacteria. The first fish on the next trip will pick up these bacterial residues and spoil more readily. These first fish, it must be remembered, will be the oldest of the following trip and must be preserved well.
- It is recommended that a refresh clean is carried out on a vessel before fishing starts at the beginning of the next trip.

A Cleaning Schedule Summary for Use on Fishing Vessels

Area or Item of Equipment	Recommended Frequency of Clean	Method of Application
Net Pounds	*When nets are shot away from stowage area.* *One full clean per trip.*	*Hose down.* *Wash down, hose rinse.*
Fish Working Deck Area	*As necessary.* *Significant breaks in fishing.* *End of trip.*	*Hose down.* *Chemical clean, hose down.* *Chemical clean, soak, rinse.*
Fish Hopper or Pound	*Between hauls.* *Significant breaks in fishing.* *End of trip.*	*Hose down.* *Chemical clean, hose down.* *Chemical clean, soak, rinse*
Fish Conveyor/Elevator	*Between hauls.* *Significant breaks in fishing.* *End of trip.*	*Hose down.* *Chemical clean, hose down.* *Chemical clean, soak, rinse.*
Gutting Tables/Boards	*As necessary.* *Significant breaks in fishing/when not in use.* *End of trip.*	*Rinse.* *Chemical clean, hose down.* *Chemical clean, leave in sanitising dip till next trip.*
Grading Bins	*Between hauls.* *Significant breaks in fishing.* *End of trip.*	*Hose down.* *Chemical clean, hose down.* *Chemical clean, soak, rinse.*
Gutting Machine	*As necessary.* *Significant breaks in fishing.* *End of trip.*	*Hose out.* *Chemical clean, hose out.* *Chemical clean, soak, hose out.*
Fish Washer	*Between hauls.* *Significant breaks in fishing.* *End of trip.*	*Hose down.* *Chemical clean, hose down.* *Chemical clean, soak, rinse*
Baskets	*Between hauls.* *Significant breaks in fishing.* *End of trip.*	*Hose down.* *Chemical clean, hose down.* *Chemical clean, soak, rinse*
Scales	*As necessary.* *End of trip.*	*Rinse platform.* *Chemical clean and rinse platform, and wipe down keypad.*
Hold	*End of trip.*	*Chemical clean for all surfaces; soak, and rinse off.* *Ensure no residual taint - use freshwater to rinse.*

NB: It must be noted that in reference to applications referring to a hose and/or rinse down, clean seawater or, if in harbour, freshwater, should be used.

Never use harbour water for cleaning applications.

4.4 Pest Control

Fishing vessels have a legal responsibility to ensure that the presence of pests does not present a food-safety risk to the catch. However, the approach a vessel must take to comply with this requirement is rather different than that of a shore-based food establishment by the nature of the vessel's operating conditions.

It should always be remembered that any type of animal onboard a fishing vessel will constitute a pest. Furthermore, pests will generally be attracted to the vessel either because of the availability of food and/or the provision of shelter from the environment.

Pests have the potential to carry two types of contamination hazard into the fish handling and storage areas. Firstly, they harbour and carry germs, both in terms of food related illness and other types of disease. Secondly, they present a foreign body risk to the fish; this can be from dead specimens of the pests themselves, or faeces, fur, feathers, etc.

Whilst at sea, arguably the greatest pest problem will be encountered from seabirds. When vessels are in harbour however, infestation from insects and rodents may also present a significant hazard in addition to the risks from birds.

Food premises ashore can be proofed very effectively against pest ingress. This however, is not possible with fishing vessels; therefore other preventative measures are needed:

Ashore

- Ensure all working areas have been fully cleaned and no waste-fish matter remains on deck areas.
- Ensure that all nets and gear are free from waste fish-matter and debris.
- Ensure all handling equipment is clean and free from waste fish-matter.
- Ensure all containers are clean and stored in an area where they cannot be contaminated from seabird faeces.
- Do not take on board clean boxes until the vessel is ready to sail.
- Vessels with holds should keep the hatch doors shut when not in use.
- Doors to accommodation and/or wheelhouse should be kept shut.
- Open-decked boats should be washed down when re-sailing.
- Any evidence of pests must be investigated and appropriate action taken.
- Any sightings of pests must be reported to the skipper.
- Any infestation of pests must be eliminated. Affected areas must be disinfected.
- The services of a competent, professional pest-control company should be sought, if necessary, to eliminate the problem.

At Sea

- During fishing all waste fish and offal must be discarded from the vessel.
- ‘Clean-as-you-go’ policies must be followed between hauls.
- Bird faeces deposited on open deck areas and equipment must be washed off in a timely manner.
- The protective clothing of the crew must be cleaned of bird faeces as necessary.
- Nets and gear must be regularly checked and kept free from waste fish-matter and debris.
- Any evidence of pests must be investigated, and appropriate action taken.
- Any sightings of pests must be reported to the skipper.
- Any infestation of pests must eliminated. Affected areas must be disinfected.

4.5 Temperature Monitoring and Control

Many vessels operating in the industry today are equipped with insulated and refrigerated holds. Such equipment aids the preservation of the catch in an optimum condition when landed. The correct setting and maintenance of the fish-room temperature is essential if the fish is to be held over time with minimal quality loss.

If set too warm, the catch will be stored at a temperature which does not fully inhibit the growth of naturally occurring spoilage bacteria on the fish. This will result in a faster quality-loss of the catch, thereby reducing its shelf life. If the temperature is set too cold, then the ice applied to the boxes or bins may freeze solid. This will occur at temperatures below freezing and will prevent melt water from the ice cooling the product effectively. Furthermore, surface layers of fish which are exposed to temperatures below 0°C will probably crust-freeze over time in the fish room. The results from the slow freezing of fish when it is processed, often leads to high water loss and poor quality fillets which are soft and gaping.

Refrigerated fish rooms will generally have cooling plates or coils which are fitted to the bulkheads and ceiling of the room. The temperature will vary from area to area within the fish room. Such temperature variations will be dependant on a number of factors:

- the pattern of air circulation in the hold,
- the efficiency of the refrigeration unit,
- the number of times and the duration in time that the hatch door is open,
- the external ambient conditions,
- the duration of any defrost cycle on the plant.

It is due to these reasons that it is extremely important to carry out checks that the fishroom temperature is within a range which will hold the product suitably chilled. It is also important to ensure that the measured temperature is a good reflection of the overall fishroom temperature.

It is strongly recommended that vessels fitted with refrigerated holds have a display thermometer or recorder, ideally located in the wheelhouse. These provide a means of monitoring the hold temperature provided the sensor is accurate and is located in an appropriate position. The fishroom will have ‘hot’ and ‘cold’ locations within it, depending on its design. The sensor should be fitted in an area which neither reflects the warmest or coldest location. It should not be situated near the hatch where it will be effected by the intake of warm air when the hatch is open. Similarly, it should not be located in close proximity to a cooling pipe or plate as this may then reflect an unrealistically cold temperature.

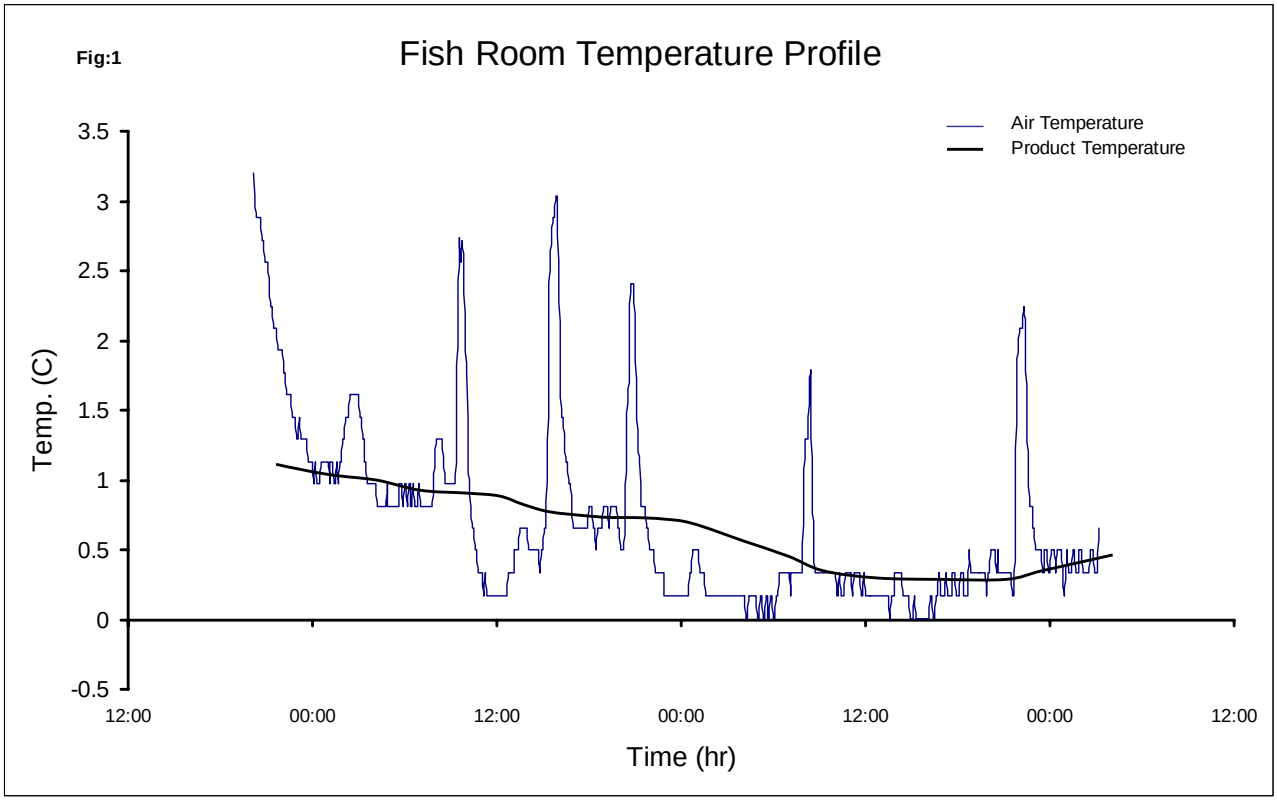
Ideally a damped sensor should be used – these are designed to react a little slowly in response to fluctuations in air temperature, rather than one which varies quickly with any rapid temperature variations which may occur. In most cases, one well placed sensor will be sufficient; however, in large

vessels with sizeable fish rooms, it may be desirable to have more than one monitoring sensor.

A regular temperature-checking procedure should be implemented, and a record of the temperatures kept as a matter of good practice. Many modern monitoring systems have the facility to record temperatures automatically, and this data can be stored on a wheelhouse computer.

Smaller vessels and those without a display thermometer can still monitor and record fishroom temperatures by using a hand-held probe. Alternatively, data loggers have been successfully used to measure both air and product temperature in fishrooms.

Fig:1



The above temperature profile illustrates how air temperature in the refrigerated hold of a vessel will fluctuate rapidly due to continuous hatch opening during fishing operations. The temperature of the catch, which has already cooled primarily due to action of the ice melt-water, remains relatively stable.

4.6 Hazard Analysis – For Demersal Fishing Operations

Hazard Analysis is a *systematic* approach to identifying and controlling hazards and risks associated with food, to help ensure that consumers are not presented with food which is contaminated, and therefore potentially unsafe to eat.

At each stage of the operation, from catching nephrops, through grading, tailing, washing, icing and boxing, to unloading the catch:

- Hazards are identified - physical, chemical or bacterial contaminants which can potentially make the catch unsafe to eat.
- Control measures are identified to prevent food safety problems arising.

4.6.1 Common hazards which may affect the catch during a fishing operation:

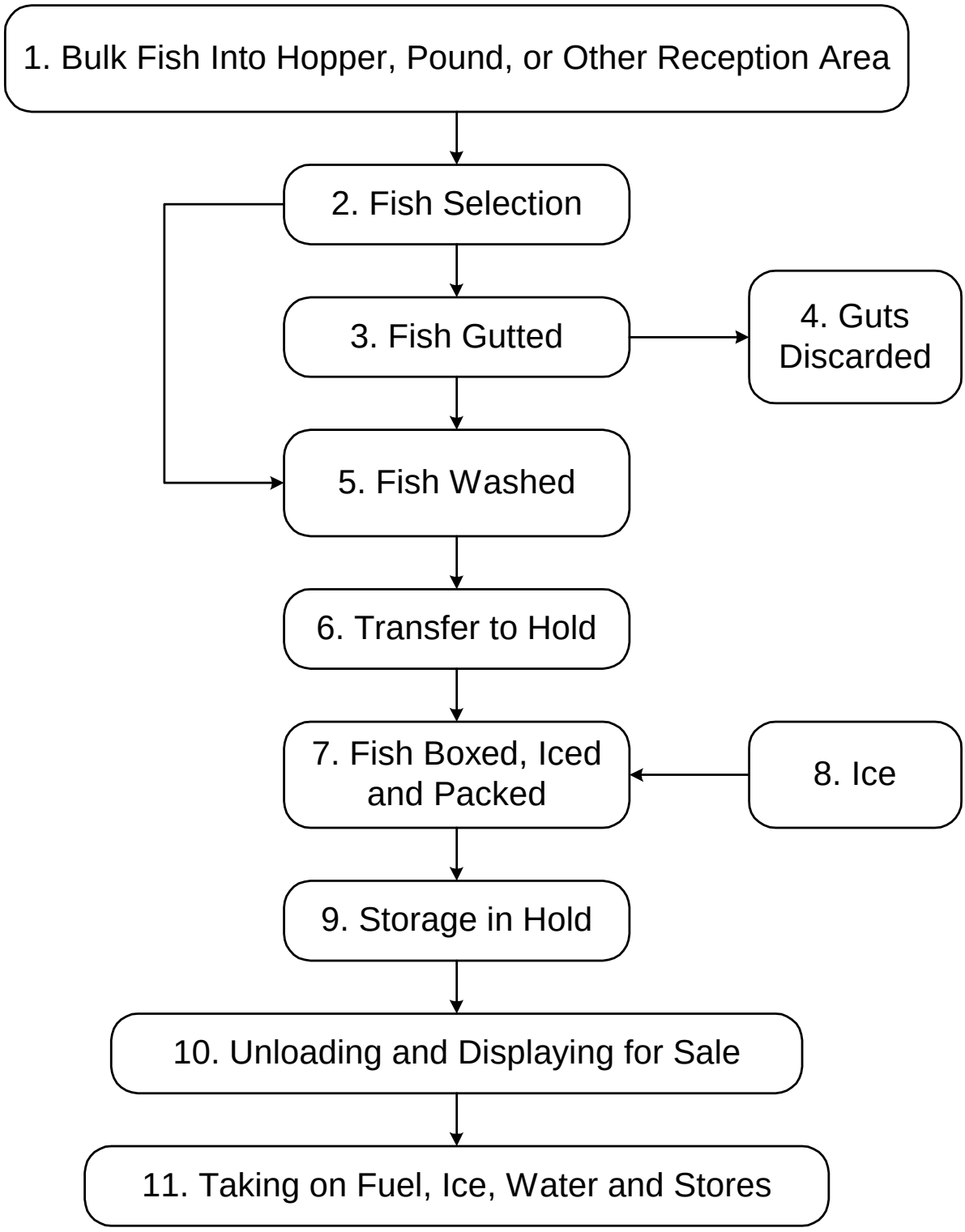
There are three general types of hazards – physical, chemical, and bacterial.

Physical hazards include dangerous or unwanted foreign bodies such as slivers of glass, splinters of wood, rust, bits of netting, or flakes of paint.

Examples of chemical hazards are diesel, oils, or greases, cleaning chemicals.

Sources of bacterial hazards include dirty fish rooms, equipment, boxes, and poor hygiene standards on the part of your crew, and bacteria already present on fish will multiply much more rapidly if the fish is not gutted and iced as soon as possible after being caught. Bacterial spoilage is the major factor affecting the freshness of white fish. Although it is accepted that such bacterial spoilage is not a food safety issue, it is still important with regard to fish freshness and consumer acceptability.

An Example of an Onboard Fish Handling Operation



From the flow diagram it is then possible to conduct the hazard analysis for the handling activities of the vessel:

Stage	Hazard	Controls
1. Bulk Fish into Hopper, Pound or Other Reception Area.	**Physical** Dangerous or unwanted foreign bodies found in nets.	Constant checks by crew while working with fish or nets. Clear away any objects from nets before any further tows are made. High standards of crew hygiene.
	Chemical Contamination from any diesel spillages, or other chemicals, on deck.	Clean any spillages immediately, and before any hauls are brought on board. Store all chemicals well away from fish handling or storage areas.
	Bacterial Bacterial growth caused by high temperatures or delay in working fish.	Ensure fish is gutted, washed, boxed and ice as soon as possible after each haul is made.
	Also, introduction of bacteria from poor staff hygiene, or dirty fish holding areas.	Ensure staff hygiene standards remain high, and fish unloading areas are kept clean and in good condition.
2. Fish Selection.	**Physical** Dangerous or unwanted foreign bodies.	Constant visual checks by crew when working with fish; keep fish working areas clean and in good condition.
	Chemical Contamination from any diesel spillages, or other chemicals, on deck.	Clean any spillages immediately, and before any hauls are brought on board.
	Bacterial Bacterial growth caused by high temperatures or delay in working fish.	Ensure fish is selected as soon as possible after haul is landed.
	Also, introduction of bacteria from poor staff hygiene, or dirty fish holding areas.	Ensure staff hygiene standards remain high, and fish holding areas are kept clean and in good condition.

3, 4, and 5. Gutting, Washing, and Draining the Catch, and Discarding of Guts.	**Physical** Dangerous or unwanted foreign bodies in fish working areas.	Keep all fish working areas and items of equipment clean and in good condition.
	Chemical Contaminants present in dirty water.	Use only clean seawater for washing fish.
	Also, tainting of fish from cleaning chemical residues.	Ensure all work surfaces are fully rinsed after cleaning with chemicals.
	Bacterial Introduction of bacteria from water, or from poor staff hygiene, or dirty premises or equipment.	Use only clean seawater for washing fish. Keep all fish working areas and surfaces clean. Keep staff hygiene standards high. Ensure guts from newly-gutted fish do not come into contact with fish waiting to be gutted, or other baskets or boxes used for holding fish
	Also, rapid growth of bacteria if fish is warm, or if there is a delay in processing fish.	Gut or tail and wash fish quickly, and box and ice fish without delay.
6. Transfer to Hold.	**Physical** Dangerous or unwanted foreign bodies in chutes and/or boxes used to transfer fish to hold.	Ensure chutes and/or boxes are kept clean and in good condition.
	Chemical Contamination from hold areas.	Ensure all cleaning chemicals are thoroughly rinsed off after chutes and/or boxes are cleaned.
	Bacterial Introduction of bacteria from poor staff hygiene, or dirty equipment.	Ensure chutes and/or boxes are kept clean and in good condition. Keep staff hygiene standards high.
7 and 8. Fish Boxed, Packed and Iced.	**Physical** Dangerous or unwanted foreign bodies in ice or boxes.	Constant checking by crew at all times when handling, boxing or icing fish. Remove any objects found.
	Chemical Contamination from any diesel, oils or grease in boxes.	Check that boxes are free from any chemical contaminants before filling with ice or fish.
	Bacterial Contamination from dirty boxes and/or ice.	Check that boxes are clean before filling with ice or fish. Clean any dirty boxes before use. Do not use dirty ice. Ensure ice is stored in a clean and hygienic area.
	Also, rapid growth of bacteria caused by warm temperatures.	Ensure sufficient ice is used to keep fish cold until it is landed. Do not overfill boxes.

9. Storage in Hold.	**Physical** Dangerous or unwanted foreign bodies.	Keep all fish storage areas clean and in good condition.
	Chemical Contamination of fish from diesel or other chemicals.	Clear up any diesel spillages as soon as possible, and keep fish storage areas clean.
	Bacterial Contamination of stored fish from dirty storage areas.	Keep the fish hold clean.
	Also, rapid growth of bacteria caused by warm temperatures.	Ensure sufficient ice is used to keep fish cold until it is landed. If fish hold is refrigerated, then this equipment should be switched on as soon as practical after fish has been landed.
10. Unloading and Displaying for Sale.	**Physical** Dangerous or unwanted foreign bodies.	Constant visual checks, and high standards of crew hygiene.
	Chemical Contamination from any diesel spillages in harbour or market hall	Constant visual checks during unloading operation. Do not unload fish onto contaminated areas.
	Bacterial Rapid growth of bacteria caused by warm temperatures.	Ensure fish is adequately iced, especially if boxes are landed several hours before the sale commences, or the fish is to loaded onto vehicles.
11. Taking on Fuel, Ice, Water and Stores.	**Physical** Dangerous or unwanted foreign bodies brought on board.	Constant visual checks by crew during loading operations, and when working with catches later on trip.
	Chemical Contamination of fish working or storage areas, boxes or equipment with spillages of diesel	Take care when refuelling – clean up any spillages immediately. Clean any boxes or other items of equipment that may have been contaminated.
	Bacterial Contamination of fish working or storage areas, boxes or equipment.	Careful loading practices, and immediate cleaning of any dirty surfaces.

4.7 Personal Hygiene for Crew

Crew on board fishing vessels are of course thought of first and foremost as fishermen. It is well worth remembering, however, that they are all also classed as food handlers. As a food handler they have both legal and moral responsibility in handling the fish in such a way as to prevent its contamination.

Food handlers may be classed according to the level of risk associated in the handling of a particular type of food. Fishermen are involved at the very start of the food supply chain; they harvest a natural resource and bring it ashore for further processing. The food safety risks in handling the fish at this stage are considered low. The Chartered Institute of Environmental Health, (CIEH) have classified food handlers according to this level of risk. Most fishermen would be considered as a Category A(2) food handler. This is defined as a person who is involved in working with produce which is subject to basic grading and washing but which will be subject to further processing prior to consumption.

Fish will spoil more quickly if it is contaminated as a result of poor crew hygiene. Crew must be aware that they have their role to play in assuring the quality of the product. Good personal hygiene awareness should form the basis of a pre-work hygiene induction, and new crew should not be allowed to start handling fish until the skipper or master is happy that they understand and accept the rules.

Following the initial induction training onboard, it is recommended that fishermen gain an Introductory Food Hygiene Certificate. Contact your local Seafish Group Training Association for more details. Training has been proved to be beneficial for crew morale and efficiency, and trained crew require less supervision and will handle fish properly, leading to improved quality and prices.

A basic list of good hygiene rules for all persons handling fish onboard and during landing operations is illustrated on the following page. The skipper or master should ensure that all crew are fully aware of these rules and that they adhere to them when handling, packing, storing and landing the catch.

Crew Hygiene Work and Work Rules

The hygiene rules below will apply to all crew when handling, storing and landing fish:

- All crew must wear protective clothing and keep it clean.
- Hats should be worn which cover the hair.
- Crew must only eat, drink, or smoke outside the handling and storage areas.
- Crew must wash and dry their hands before handling fish, and particularly after visits to the toilet.
- Gloves used for handling fish must be washed frequently.
- Crew must not, blow noses, cough, sneeze or spit over fish when handling it.
- Waterproof plasters must be used to cover cuts and grazes.
- Crew must inform the skipper if they are suffering from vomiting, diarrhoea or other stomach upsets.

5 Glossary

Ambient	The temperature of the surrounding environment.
Bacteria	A group of single cell living organisms. Some may spoil food and some may actually cause illness.
Cleaning	The removal of food residues, dirt, grease and other undesirable debris.
Cleaning Schedule	Written document setting out how a vessel is to be kept clean. It will detail each area and piece of equipment to be cleaned; the cleaning product to be used; person/s with responsibility for carrying out cleaning; standard of cleanliness required; frequency; and Health and Safety precautions to be taken. All persons concerned must be aware of their individual responsibilities. A supervisor is responsible for checking the total cleaning process.
Cold Store or Freezer	Equipment for keeping food at frozen temperatures. Usually set around -18^{o}C.
Compliance	Actions that satisfy the legal requirement
Contact Surface	Any surface which comes, or may come, into contact with fish, either directly or in such close proximity that it could contaminate the food if dirty. Includes work surfaces, containers and equipment.
Contamination	The introduction or occurrence in food of any microbial pathogens, chemicals, foreign material, spoilage agents, taints, unwanted or diseased matter, which may compromise its safety or wholesomeness.
Core Temperature	The temperature at the centre of a mass or piece of food.
Disinfection	Reduction in levels of contamination on food equipment or in food premises, normally by the use of chemicals to kill micro-organisms. Disinfectants used must be suitable for use in food premises.
Infestation	Entry and survival of pest animals and insects on board the vessel or within equipment or products.
Hygiene	Measures to ensure the safety and wholesomeness of food.
Personal Cleanliness	Measures taken by food handlers to protect food from contamination.
Pest	Animal life unwelcome in food premises, especially insects, birds, rats, mice and other rodents capable of contaminating food directly or indirectly.
Protective Clothing	Clothing – hats, boots, waterproofs - worn by the crew when handling fish to prevent contamination of fish by the individual.
Potable	Usually related to water supply. Safe to drink and acceptable for use in food preparation.
Refrigerated Hold	Area of the vessel fitted with equipment to keep product cold. Normally between 0ºC and 2^{o}C.
Spoilage	Fish deterioration resulting in off flavours, odours and possibly appearance indicating products are unsuitable for sale or to eat.
Taint	Contamination of food with undesirable flavours or odours.