The Good Practice Guide for Pelagic Fishermen

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1 Introduction

1.1 Background

This booklet has been produced for fishermen who are engaged in the capture of pelagic species from fisheries around the UK and the EU. The booklet is intended as a guide for the pelagic 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, 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 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 pelagic 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 pelagic catching sector of the fishing industry will be covered in this guide. This guide also provides advice to pelagic 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 pelagic 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 pelagic 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 for which 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 Pelagic Fishing Vessels

The requirements laid out in the following tables are detailed for pelagic fishing vessels which are designed and equipped to hold their catch at sea for a duration of 24 hours or more, in RSW or CSW tanks, or, after freezing, in cold storage areas. 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.*	Vessels must be designed and constructed to prevent contamination of fish 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, the harboring of vermin and to facilitate easy cleaning.	A supply of clean seawater is required for RSW and CSW tanks, and for 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 stainless-steel, aluminium and food-grade plastics in fish handling and storage areas.

Legal Requirement	**Interpretation**	**Recommended 'best practice'**
Schedule 4 Part II Requirements applicable to article 1.2 fishing vessels *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.* *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.*	RSW or CSW tanks 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. The RSW or CSW tanks again must be sited away from crew areas to prevent contamination of the fish.	RSW or CSW tanks should be adequately insulated to protect fish against heat from the engine compartment, ambient deck conditions and the surrounding sea.
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.	Painted surfaces must not be in a blistered or flaking condition which constitutes a contamination hazard. RSW or CSW tanks 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.	Non-corrosive metal finishes of any structure or equipment on which the fish come into contact should not be painted.
Schedule 4 Part II *8 (a) Tanks must be equipped with adequate seawater filling and drainage installations, and must incorporate devices for achieving uniform temperatures throughout the tank.*	Pumps or other circulation methods should be used in the tanks.	Good circulation should be achieved in the tanks to prevent warm spots. If warm spots occur in any tank, some fish will spoil more rapidly than others.

8 (b) Tanks must have a means of recording temperature connected to a temperature sensor positioned in the section of the tank where temperatures are highest.	The warmest part of the tank will normally be close to the hatch.	Only by measuring the warmest temperatures in the tanks can skippers be sure that maximum legal temperatures are not exceeded. Where possible, circulating tank water should be monitored with an automated system which provides records of water temperature pre and post chilling through the vessel's refrigeration system.

3.2 Construction and Layout of the Vessel - Fish Handling and Storage Areas – Specific Requirements for Factory Vessels.

Legal Requirement	Interpretation	Recommended 'best practice'
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 3 Chapter I Conditions Applicable to Factory Vessels Section 1 *1. (a) a reception area for taking fishery products on board …. designed in such a way as to protect the products from the sun or the elements … and from dirt or contamination.*	At all times, fish needs to be protected from the drying effects of sun and wind, and contamination from seagulls.	
(b) a system for conveying fishery products … to the work area that conforms with the rules of hygiene.	The conveyancing system should be kept clean and in a good state of repair.	Suitable materials are stainless steel, aluminium, rubberised tubing and plastic, as appropriate.
(c) work areas large enough for the preparation and processing of fishery products … designed in such a way as to prevent any contamination of the product.	Work areas should be constructed from materials that are smooth, durable, impervious and easy to clean.	Suitable materials are stainless steel, aluminium, and plastic, as appropriate.
(d) storage areas that are large enough … and easy to clean.	Walls in storage areas should be smooth, durable and impervious.	Suitable materials are stainless steel, aluminium, and plastic, as appropriate.
(e) a place for storing packaging materials … separate from product preparation and processing areas.	Walls in packaging storage areas should be smooth, durable and impervious.	Packaging materials should be stored in clean and dry areas, off the floor and away from walls
(f) special equipment for pumping waste or fishery products unfit for human consumption either directly into the sea or into a watertight		

tank reserved for that purpose. If waste is stored and processed on board with a view to cleaning, separate areas must be allocated for that purpose. *(g) equipment providing a supply of potable water or pressurised clean seawater ….* *(h) …. changing rooms, wash hand basins and toilets, the latter not opening directly onto areas where fishery products are prepared, processed or stored. The wash hand basins must be equipped with appliances for washing and drying hands that comply with hygiene requirements; the wash hand basin taps must not be hand-operable.*	Any fish not to be frozen down must not come into contact with fish intended for human consumption. Wrist-operated taps are acceptable, but knee- or foot-operated taps are preferable.	Infra-red taps are another possibility. Paper towels are recommended for drying hands. Used towels should be placed in a foot-operated lidded bin.
2. Areas used for …. freezing of fishery products must have: *(a) a non-slip floor that is also easy to clean and disinfect. Structures and fixtures must have limber holes that are large enough to …. allow water to drain freely* *(b) walls and ceilings that are easy to clean …* *(c) hydraulic circuits must be arranged or protected … to ensure that it is not possible for any leakage of oil to contaminate fishery products* *(d) adequate ventilation and, where necessary, proper vapour extraction*	Floors should be painted with a non-slip paint or finished in a suitable condition that they are not slippery, especially when wet. Walls should be smooth, durable and impervious. Ceilings should also be smooth. Hydraulic lines should be fixed to the sides of rooms or bulkheads, rather than crossing over the centre of working areas especially in places where fish are exposed. Good mechanical ventilation should be installed which will prevent condensation from forming on vessel superstructure.	The paint should be renewed as necessary. Duck-boards should also be kept clean, and particular attention should be paid to floor areas around the duck-boards. Paintwork should be renewed as necessary. Hydraulic circuits should be checked regularly, particularly at joins and bends, and any cracks repaired immediately. It is important to ensure mechanical ventilation is kept in a good state of repair, and cleaned regularly.

(e) adequate lighting.	The area should be bright enough for crew to work without their eyes being strained. This is particularly important for areas where fish is inspected.	Ideally, all lights should be covered, and any cracked covers should be replaced as necessary.
(f) appliances for cleaning and disinfecting tools, equipment and fittings	A deck washing hose which can easily reach all areas requiring cleaning must be provided.	Power hoses are recommended for large areas.
(g) appliances for cleaning and disinfecting the hands with taps that are non-hand operable and with single-use towels	Wrist-operated taps at wash hand basins are acceptable, but knee- or foot-operated taps are preferable.	Wash hand basins should be stainless steel. Used towels should be placed in a foot-operated lidded bin. Infra-red taps are now available too.

3.3 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.	Pumps, chutes, hoppers, etc, should be designed to prevent physical damage caused by long drops or by crushing.	Pump rates should be set at a level prevents bruising and which does not lead to crushing in hoppers or chutes. Chutes should be angled so that the fish do not drop too quickly into the tank.
Schedule 3 Chapter I Section I Conditions Applicable to Factory Vessels		
Part 3 *Equipment and tools …. must be resistant to seawater corrosion, easy to clean and well-maintained.*	Plastic and stainless steel are suitable materials, as appropriate.	Any damaged equipment and/or tools must be replaced as necessary, as they are harder to keep clean, and they increase the risk of foreign body contamination in the final product.

3.4 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.* *Before use it must be stored under conditions which prevent its contamination.*	Ice must be made from potable water or clean sea water. When storing ice, it must be held in a clean surroundings. The ice must stored away from the elements 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. It should be made, transported and handled under hygienic conditions to avoid its contamination.	If ice is not directly available from the quayside it should be transported to the vessel under cover in clean and preferably insulated conditions. Ice machines on board vessels must be sited away from sources of contamination and be regularly cleaned and disinfected.

3.5 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 vessel and equipment, especially catch hoppers, conveyors, chutes, tanks etc. must be clean.	Cleaning should follow a documented schedule that specifies the cleaning agents and their use. Prior to the start of any fishing trip or operation, the skipper or a designated crew member should check the standard of hygiene for all fish handling and storage areas.
5. Fishery products other than those kept alive must undergo cold treatment as soon as possible after loading.	Fish pumped from the nets should be transferred without delay to CSW or RSW tanks.	RSW and CSW tanks should be pre-chilled, to help ensure that fish, when it is brought on board, is brought down to 0ºC as quickly as possible.

3.6 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 – Fishing Operations		If trawling, tow-times should be kept as short as practical. Long tow times may result in damage and quality loss of product. Once trawled fish are brought alongside they should be pumped aboard as soon as possible. Trip duration should be as short as practical.
Schedule 4 Part II Requirements applicable to article 1.2 fishing vessels *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, distribution hoppers, pumps conveyors and any equipment coming into contact with fish must be rinsed down with clean sea-water. Any fish or debris trapped in the net and/or gear must be removed.	All fish should be transferred to RSW or CSW tanks before taking the next haul on board, so that cleaning can take place.

3.7 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'**
4. The fishery products shall be handled in such a way as to prevent bruising.	Pumping practices must minimise the potential for physical damage caused by long drops or by crushing.	Pump rates should be set at a level which does not lead to crushing or other damage. Chutes and pipes leading from distribution hoppers into RSW or CSW tanks should be angled so that there are no steep angles or long drops into the tanks.

3.8 Onboard RSW and CSW 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 II		
8 (c) The operation of the tank or container system must secure a chilling rate which ensures the mix of fish and seawater reaches 3ºC at the most 6 hours after loading and 0ºC at the most after 16 hours. *.*	In the interest of food safety, refrigeration systems must be capable of cooling fish and seawater within this prescribed timeframe.	Pre-chilling of RSW tanks before fish is brought on board will help meet these storage requirements. Also, the ratio of fish to water must not be too high, as smaller quantities of water will chill larger quantities of fish, and the temperature requirements will not be met. Insufficient water will result in undue damage to fish held in the tanks. The addition of ice to water will hasten the rate at which the temperature of the fish/water mix falls.
8 (e) The date and number of the tank must be clearly indicated on the temperature recordings which must be kept available for the control authorities.	Catch traceability must be established for the fish in separate tanks as the responsible authorities may wish to check that storage temperatures in the tanks have been within legal requirements.	Fish merchants and their customers may wish to check such details for their own traceability and due diligence procedures. As herring and mackerel is often frozen, it is recommended that the tank temperature records are kept for at least two years.

3.9 Onboard Freezing and Frozen Storage

Legal Requirement	Interpretation	Recommended 'best practice'
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 3, Chapter IV, Section 2 Para 1 *Plants must have -* *freezing equipment sufficiently powerful to achieve a rapid reduction in the temperature*	The fish must be frozen down to -18ºC or colder at its core.	The shelf-life of frozen fish will be greater if it is frozen down to -25ºC or colder.
freezing equipment sufficiently powerful to keep products in storage rooms at a temperature not exceeding those laid down in these Regulations.	Frozen fish should be stored at -18ºC or colder.	The shelf-life of frozen fish will be greater if it is maintained at a temperature of -25ºC or colder.
Para 3 *Storage rooms must have a temperature recording device in a place where it can be easily read. The temperature sensor of the recorder must be located in the area furthest away from the cold source.*	Temperature sensors must be sited in the coldstore in a location which is not unduly affected by the evaporators. It is possible to record temperatures manually, by noting readings from a display outside the cold store.	Thermographs or probes linked to a computer provide vessels with automatic readings taken regularly throughout the trip. Computer-linked systems can be set to sound an alarm if the temperature rises above -18ºC for any length of time.
Temperature charts must be available for inspection by the supervisory authorities at least during the period in which the products are stored.	Charts and records must be kept in a readily accessible format and location.	Ideally, temperature records should be kept for at least two years, for full traceability purposes.

3.10 Post-Fishing

Legal Requirement	Interpretation	Recommended 'best practice'
The Food Safety (Fishery Products & Live Shellfish) (Hygiene) Regulations 1998. Schedule 4 Part II *8 (d) After each unloading, the tanks, circulation systems and containers must be completely emptied and thoroughly cleaned using potable water or clean seawater. They should only be filled with 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.	During catching seasons, RSW or CSW tanks will be flushed clean and filled as the vessel starts a new trip. Water treatment systems may be used to clean the tanks during the flushing process. Cleaning and refilling of the tanks should be delayed until the vessel is at sea in an area which will provide clean seawater unaffected by shore pollution and run-off. Food-safe chemicals, detergents and sanitisers should be used for manual cleaning operations.
Schedule 4 Part II Requirements applicable to article 1.2 fishing vessels *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, etc, must be thoroughly cleaned and disinfected. Effective measures must be taken to protect the fishing vessel from infestation of any pests if evidence of their presence is noted.	For a detailed guide to best practice for cleaning please refer to appendix 4.2.

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 chemicals on board the vessel. They should also be trained in the use of the cleaning schedule.

3.11 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* *- unloading ….. operations proceed rapidly* *- fishery products are placed without unnecessary delay in a protected environment at the temperature required of the nature of the product, and, where necessary, in ice in transport, storage or market facilities, or in an establishment.* .	During landing operations every reasonable measure must be taken to prevent the catch from contamination from the open environment. Landing of the catch must be carried out as quickly as possible. If fresh fish is not discharged directly into a factory, it must be stored and transported at around 0ºC, using iced water if necessary. Frozen fish should be placed in a cold store or refrigerated vehicle.	The pumped transfer of catch from one vessel to another at sea is not recommended. This extra handling operation has a detrimental effect on the subsequent quality of the catch.

3.11 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 also be kept clean and any oilskins should be washed down after each haul is cleared. Crew must wash their hands and/or 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 metal-detectable waterproof plasters are the preferred choice wherever possible. Skippers should familiarise themselves with the concept and use of hazard analysis to help minimise the risk of catch contamination.

4 Appendices

4.1 Traceability

4.1.1 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:

4.1.2 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 – the vessel is required to record dates when individual RSW or CSW tanks were filled. On freezer trawlers, skippers should also note dates when fish were frozen.

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.

4.1.3 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.

4.1.4 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.

4.1.5 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'

4.2 Cleaning Schedules

The use of a simple cleaning schedule can act as a straightforward tool to improve and maintain a high standard of hygiene aboard 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.

4.2.1 Vessel Cleaning Guidelines

4.2.1.1 Objectives

If the crew are aware of the importance of good basic hygiene practices then the overall quality and safety 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.

This set of guidelines explains why certain hygiene practices are important to the fisherman. It is felt that 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.

4.2.1.2 Working areas

Proper cleaning practices must take place here to maintain a clean environment.

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 stored in an environment with minimal bacterial contamination.

4.2.1.3 Equipment

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.

In transporting the fish from the hopper to the working areas or tanks, this equipment can 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.

4.2.1.4 RSW and CSW tanks

Ensure that tanks are thoroughly cleaned and rinsed at the end of every trip, or at the start of a new trip, as appropriate. Any fish left in the tanks will quickly become rancid.

4.2.2 Chemicals

It is highly recommended that the correct chemicals be sourced 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 sourcing the correct choice of chemical 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 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.

4.2.3 Records

As part of a well managed cleaning schedule boats should keep a record of the cleaning activity that takes place aboard. This provides a record of the 'due diligence' the boat has undertaken to ensure that the fish landed has been done so on a vessel which is operating a regular cleaning schedule. 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, the work has been done to satisfactory level.

4.2.4 Methods of Application and Frequency

The method by which areas and equipment of a vessel should be cleaned will depend upon its application and how heavily soiled it becomes during use.

- In many cases simple hosing down as necessary 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 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 between trips is essential. Failure to effectively clean 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.

NB: It must be noted that in reference to applications referring to a hose- or rinse-down, either clean seawater or, if in harbour, freshwater should be used. Harbour water must never be used for cleaning applications.

4.3 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.
- Do not take on board clean boxes or baskets until the vessel is ready to sail.
- Vessels with holds should keep the hatch doors shut when not in use.
- Doors to accommodation, wheelhouse, and RSW or CSW tanks should be kept shut.
- Open-decked boats should be washed down when re-sailing removing any evidence of faeces, feathers, etc.
- 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.

4.4 Temperature Monitoring

Pelagic vessels are normally equipped with refrigerated tanks, or they use a mixture of ice and water. The correct setting and maintenance of the tank temperatures is essential if the fish is to be held over time with minimal quality loss.

If set too high the catch will be stored at a temperature which does not inhibit the bacterial growth of naturally occurring bacteria on the fish. This will result in a faster quality loss of the catch, thereby reducing its potential shelf life. With pelagic species, good temperature control is necessary to inhibit the development of histamine in the fish.

It is extremely important to monitor temperatures throughout the tanks to ensure that fish is suitably chilled. Tanks will have ‘hot’ and ‘cold’ locations within them, depending on their design. Temperature sensors should be fitted in areas which reflect the warmest temperatures.

Ideally a damped sensor should be used. This is of a type which is designed to react a little slowly to fluctuations in air temperature, rather than one which varies quickly with any rapid temperature variations which may occur.

If fish is frozen onboard, then temperatures of fish should be monitored and recorded to ensure that the fish is frozen down to at least -18ºC.

Temperature recorders are also required in any onboard cold storage facilities.

A record of the storage temperatures – both in tanks and cold storage facilities - should be kept as a matter of good practice, and to meet legal requirements. Many modern monitoring systems have the facility to record temperatures automatically, and this information can be stored on a computer. A thermograph is another possibility, providing automatically-updated paper records.

4.5 Hazard Analysis – For Pelagic 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 whole fish, through storing in tanks, to unloading the catch:

- Hazards are identified:
    - Any biological; physical or chemical property that may cause the fish to be unsafe for human consumption.

- Control measures are identified:
    - Any activity or action that can be used to eliminate or reduce a food safety hazard to an acceptable level.

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, and cleaning chemicals.

- Sources of bacterial hazards include dirty fish tanks, equipment, and poor hygiene standards on the part of the crew. Bacteria already present on fish will multiply much more rapidly if the fish is not chilled as soon as possible after being caught. Bacterial spoilage is the major factor affecting fish freshness. As has been said, however, temperature control is particularly important for pelagic species as far as food safety is concerned, given the risk of scombrotoxin poisoning This is a real potential food safety issue. Scombrotoxin poisoning is caused by histamine toxin which accumulates in the flesh from bacterial spoilage when fish is held at elevated temperatures. Fish held at 0°C poses no problem whereas at storage above 10°C the toxins can reach high levels quite quickly. The toxin is not removed by subsequent processing or cooking.

The flow diagram below is followed by a table of likely hazards, and suitable controls.

Flow Diagram for Pelagic Vessels with RSW or CSW Tanks, and Freezing Facilities

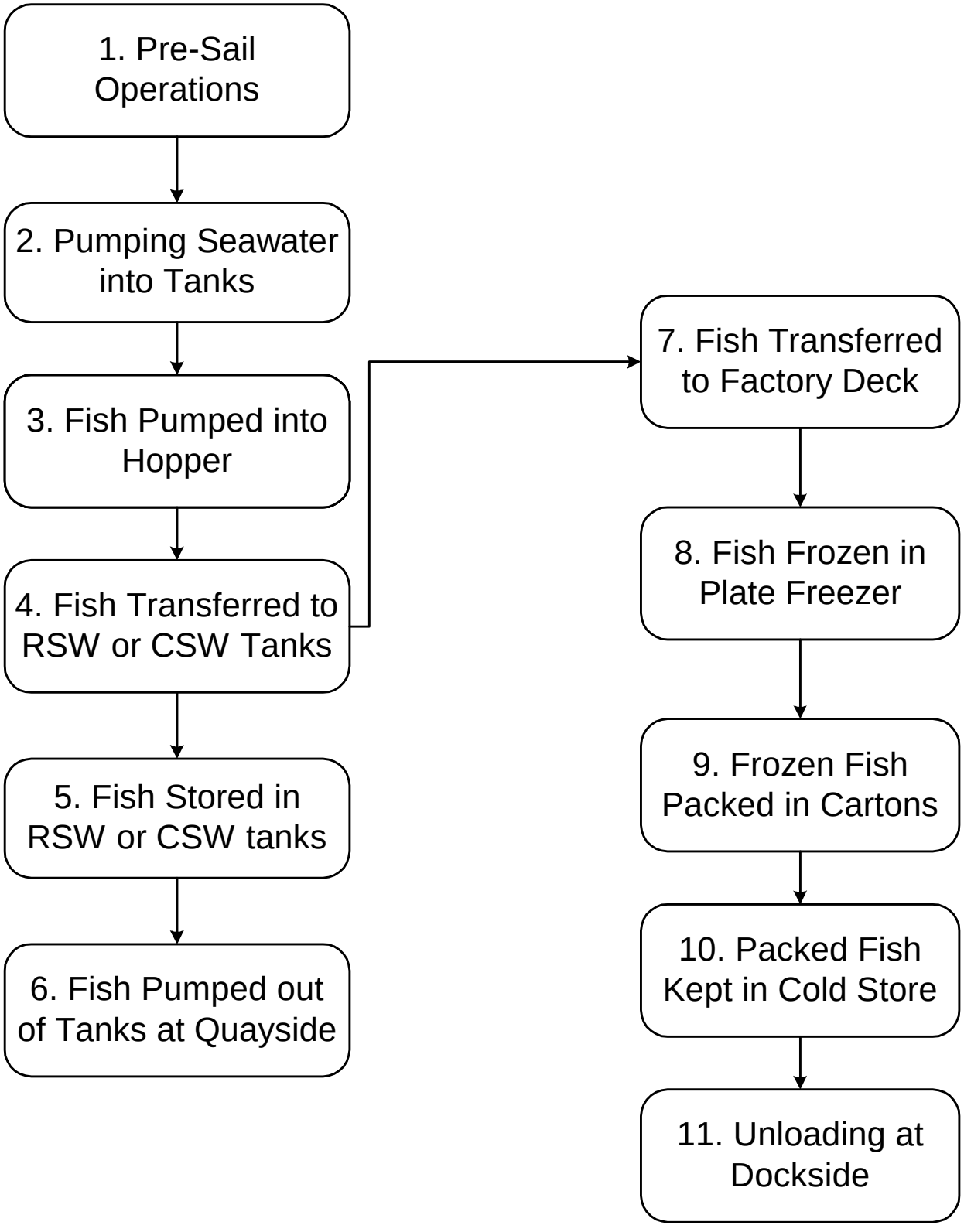

Table of Hazards and Controls for Pelagic Fishing and Freezing Operations

Stage	Hazard	Control
1. Preparing to Sail – Taking on Ice, Water, Fuel	**Physical** Introduction of dangerous foreign objects into fish handling equipment and/or storage tanks.	Constant monitoring during loading operations – removal of any objects found.
	Chemical Contamination of fish handling equipment and/or storage tanks with fuel.	Constant monitoring during loading operations – clean up any spillages and clean areas affected.
2. Pumping Seawater Into RSW or CSW Tanks	**Physical** Introduction of dangerous foreign objects into tanks.	Ensure hoppers and pipes are kept clean and in good condition.
	Chemical Chemical contamination of tanks, hoppers, pipes.	Use food-grade cleaning chemicals for tanks and equipment, and ensure they are thoroughly rinsed. Use only clean seawater.
	Bacterial Contamination of tanks with dirty water.	Use only clean seawater.
3. Fish Pumped into Hopper	**Physical** Dangerous or unwanted foreign bodies in pipes and/or hopper.	Ensure pipes and hopper are cleaned regularly to remove any foreign objects, and ensure they are maintained in good condition.
	Chemical Contamination from cleaning chemicals, or contaminated water.	Ensure pipes and hopper are thoroughly rinsed before fish is pumped into them, to remove any traces of cleaning chemicals. Clean up any spillages of chemicals immediately.
	Bacterial Contamination from dirty pipes or hopper.	Ensure all equipment is clean at the start of the trip, and kept clean as necessary between hauls.
4 and 5. Fish Transferred to RSW or CSW Tanks, and Stored Until Pumped off at Quayside	**Physical** Dangerous or unwanted foreign bodies in tanks.	Ensure tanks are cleaned regularly to remove any foreign objects, and ensure they are maintained in good condition. This is especially necessary to prevent contamination by rust, flaking paintwork.
	Chemical Contamination from cleaning chemicals, or contaminated water.	Ensure tanks are thoroughly rinsed before fish is pumped into them, to remove any traces of cleaning chemicals.

	Bacterial Contamination of fish from dirty tanks.	Clean up any spillages of chemicals immediately. Ensure tanks are cleaned regularly.
	Bacterial growth arising from time/temperature abuse, especially for scombrotoxin poisoning.	Ensure fish are brought down to 3ºC within 6 hours, and 0ºC within 16 hours of being brought on board. Pre-chill tanks, and ensure tanks have an appropriate ratio of fish to iced and/or refrigerated water.
6. Fish Pumped out of Tanks at Quayside	**Physical** Dangerous or unwanted foreign bodies in pipes.	Ensure pipes are cleaned regularly to remove any foreign objects, and ensure they are maintained in good condition.
	Chemical Contamination from cleaning chemicals, or contaminated water.	Ensure pipes and hopper are thoroughly rinsed before fish is pumped into them, to remove any traces of cleaning chemicals. Clean up any spillages of chemicals immediately.
	Bacterial Contamination of fish from dirty pipes.	Ensure pipes are kept clean as necessary during the trip.
The Following Sections Refer to Vessels Freezing Fish		
7. Fish Transferred to Factory Deck	**Physical** Dangerous or unwanted foreign bodies.	Ensure all equipment such as conveyors, bins, etc are maintained in good condition, and kept free of foreign objects.
	Chemical Contamination from cleaning chemicals, or contaminated water.	Ensure conveyors, bins, etc are thoroughly rinsed before fish is placed in or on them, to remove any traces of cleaning chemicals. Clean up any spillages of chemicals immediately.
	Bacterial Contamination of fish from dirty equipment.	Ensure all equipment is cleaned as necessary.
	Bacterial growth arising from time/temperature abuse, especially for scombrotoxin poisoning.	Ensure freezing operations commence without delay.
8. Fish Frozen in Plate Freezers	**Physical** Dangerous or unwanted foreign bodies.	Ensure all equipment such as conveyors, bins, etc are maintained in good condition, and kept free of foreign objects.
	Chemical Contamination from cleaning chemicals, or contaminated water.	Ensure all freezing equipment is free from cleaning chemical residues, and clear up any spillages immediately.

	Bacterial Contamination of fish from dirty freezing equipment. Bacterial growth arising from time/temperature abuse	Ensure interiors are kept clean. Ensure fish is frozen down to at least -18ºC.
9. Frozen Fish Packed in Cartons	**Physical** Dangerous or unwanted foreign bodies. **Chemical** Contamination from cleaning chemicals. **Bacterial** Contamination of fish from dirty packaging materials Bacterial growth arising from time/temperature abuse	All packaging materials must be stored in dry and clean areas. All packaging materials must be checked before fish is placed into them. All packaging materials must be stored in suitable areas. All packaging materials must be checked before fish is placed into them. All packaging materials must be stored in dry and clean areas. All packaging materials must be checked before fish is placed into them. Fish must be packed as soon as possible after freezing, and transferred without delay to cold store.
10. Cold Storage of Packed Fish	**Physical** Dangerous or unwanted foreign bodies. **Chemical** Contamination from cleaning chemicals. **Bacterial** Bacterial growth arising from time/temperature abuse.	Ensure cold store is maintained in good condition, especially any glass or hard plastic surfaces. Keep cold store clean Ensue cleaning chemicals are stored in a locked cupboard. Ensure fish is stored at -18ºC or colder.
11. Unloading at Quayside	**Bacterial** Bacterial growth arising from time/temperature abuse.	Ensure fish does not warm up during unloading operations – fish should be transferred without delay to an on-shore cold store or refrigerated vehicle.

4.6 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 Rules

The list of 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, rates, 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.