

4G General Guidelines for Auction Halls

1 Introduction

1.1 Objectives and functions of the auction hall

The first sale of fish and fishery products takes place mainly at the auction hall as shown in Photo 1.1. So the major objective of the auction hall is to ensure the safe and efficient operation of the entire process from receiving to dispatching or transporting fish and fishery products under the appropriate hygiene management.

For its objective, the auction hall shall be planned and designed to fully function, taking into account the role and function of the fishing port, the function and use of the market, type of fishery, species and quantity of fish to be landed or brought in by land, and integrating it with related facilities such as landing quays, handling equipment, ice-making and supply facilities, clean seawater supply facilities, refrigeration and freezing facilities, parking lot and roads.

The auction hall functions as the first wholesale market in the process of fish from the sea to the table, and as the core of the fishery complex in the fishing port, with a concentration of warehouses and fishery processing plants behind it. Today, due to the growing importance of fishery resource management and sustainability in fisheries, the auction hall functions as a database for recording and storing catch and sales information through sales, and also as a starting point for traceability by attaching catch and sale information to each lot of fish and transmitting it to the next sale.



Photo 1.1 Auction hall of Boulogne-sur-Mer, France

1.2 Requirements for the auction hall

Given the objectives and functions of the auction hall, its performance requirements are as follows:

- Cool and hygienic environment for maintaining the quality of fish, in compliance with hygiene standards;
- Efficient, safe and secure layout and structure of buildings, related facilities, and installation of machinery and equipment, for handling and sales operations;
- Economic and easily maintained building and related facilities;
- Transparent and fair sales; and
- Catch and sales information recorded and stored in an adequate manner as the first sale.

Catch and sales information shall be electronically reported to the fisheries management organization or fisheries authorities for fishery resource management and statistics. The auction hall must ensure transparency and fairness, and accurately transmit catch and sales information of fish for each lot to buyers to ensure traceability at a starting point up to the end consumer. As described in Chapter 4H, ICT must be utilized to collect, process and transmit information so that the auction hall can fulfil its functions.

1.3 Marketing system (channels for production, sales and distribution)

The marketing system - channels for production, sales and distribution - of fish and fishery products vary by the role and function of the port, the size of the port, wild-caught or farm-raised fish, the type of fishery, pelagic or bottom fish, fish species, for food (edible) or non-food

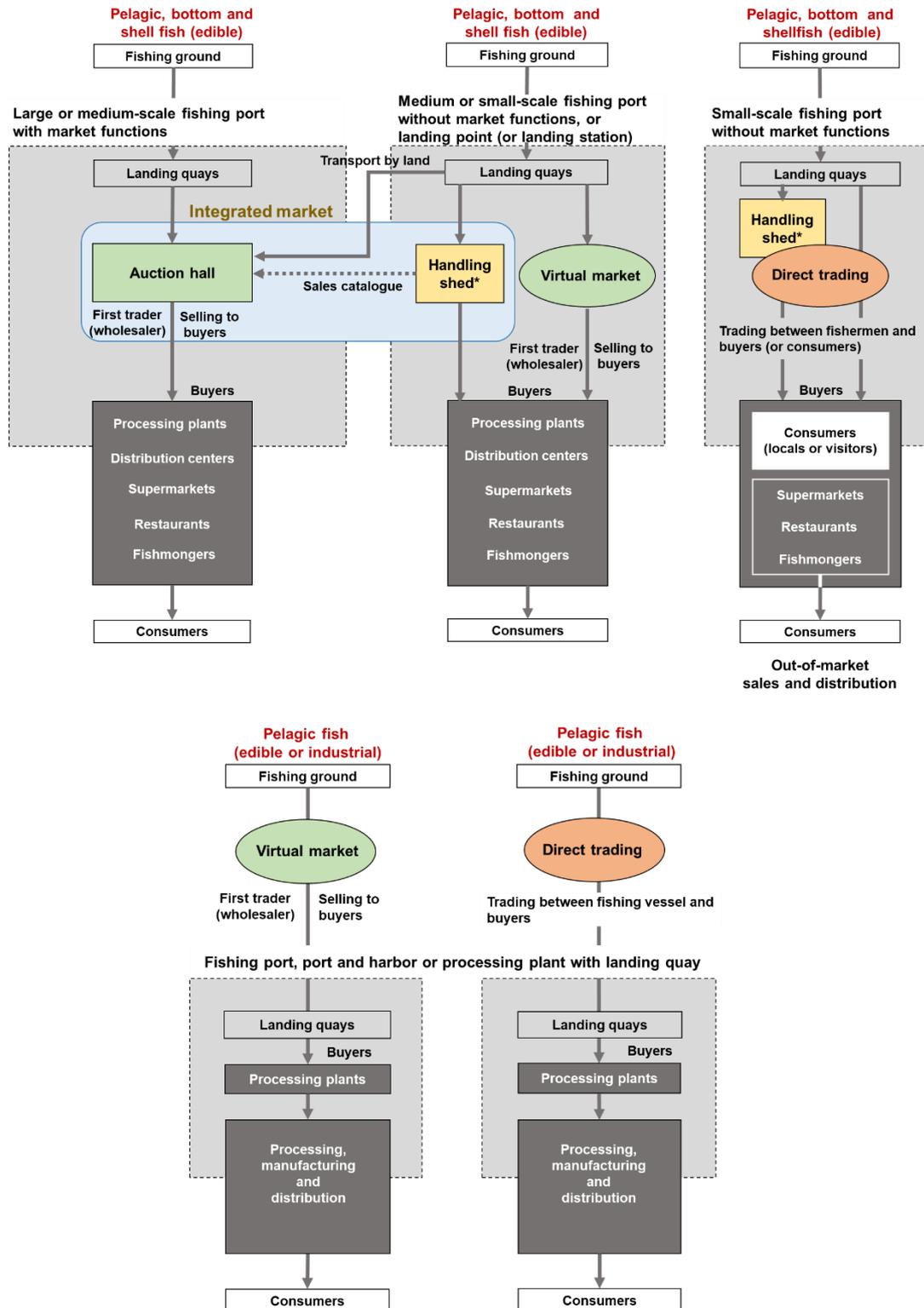


Figure 1.1 Major channels of production, sales and distribution for wild-caught fish

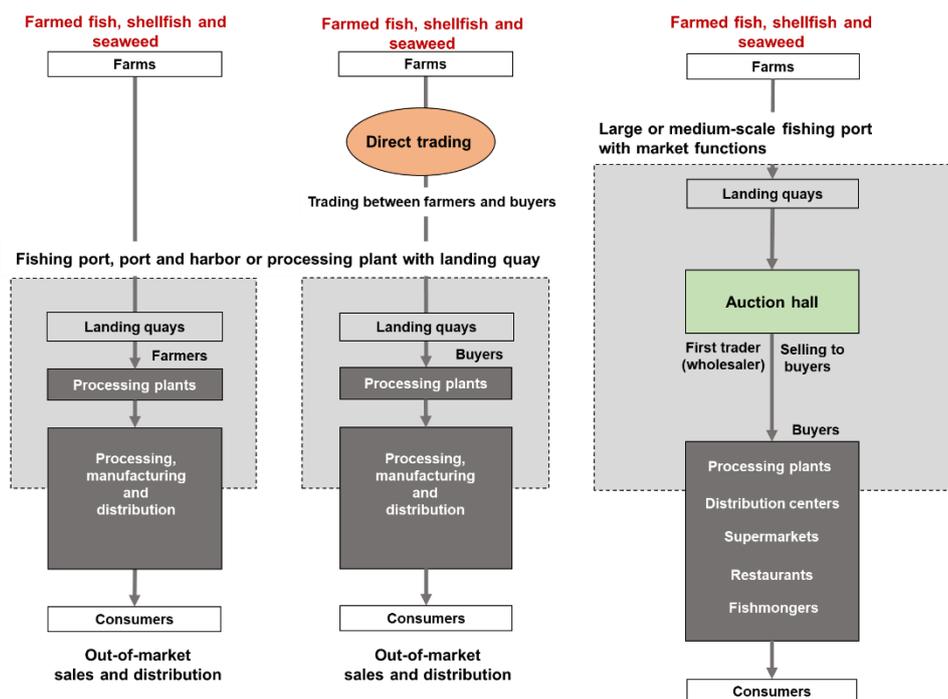


Figure 1.2 Major channels of production, sales and distribution for farm-raised fish

(industrial), fish state (fresh or frozen) and destination (within the region, outside the region or for export). The major channels of production, sales and distribution for wild-caught fish and farm-raised fish are shown in Figures 1.1 and 1.2, respectively.

1.3.1 Fisheries (wild-caught fish)

- Market functions of fishing ports in a region may be integrated into the base fishing port in order to increase prices and competitiveness through increased lot size and improved quality in the face of stagnant catches.
- Fish is landed at the base fishing port, and fish landed at the surrounding fishing ports may be brought in by land. The base fishing port has an auction hall where fish is sold to buyers through auctions. In this case, surrounding fishing ports are also called landing point or landing station.
- Fish landed at the surrounding fishing ports may be included and sold at the auction hall of the base fishing port. After sales, the fish landed at the surrounding fishing ports is either delivered to the winning buyer or transported to the destination designated by the winning buyer. Sales and logistics are separated, and the use of ICT (see Chapter 4H) facilitates this separation.
- Fish may be sold on the virtual market on the website. Fish auctioned is either dispatched from the individual fishing port where they are landed to the winning buyer or transported to the destination designated by the winning buyer. Likewise, the sales and logistics are separated.
- In small-scale fishing ports, there is no auction hall and the fish is traded directly between the fisherman and local consumers, restaurants, fishmongers, etc.
- Floating fish (edible and industrial) caught in a large amount is sold on virtual markets on the website or traded directly between the fisherman and the buyer, following catch information from the fishing vessels at sea. Fishing vessels go directly from the sea to fishing ports, ports and harbours or processing plants (with landing quays) designated by the winning buyers.

- Some of the above routes for fish do not go through markets (including a virtual market), which is called 'out-of-market distribution'.

1.3.2 Aquaculture (farm-raised fish)

- Farm-raised fish may be sold at the market or out of the market.
- With regard to out-of-market distribution, farm-raised fish (a) may be landed at a fishing port, port and harbour, or its own processing plant by the farmer, or (b) may be traded directly between the farmer and the buyer and landed at a fishing port, port and harbour, or the buyer's processing plant.

2. Management of quality and safety of fish and fishery products

Good hygienic practices in landing, handling, auctioning and dispatching fish and fishery products can greatly reduce outbreaks of fish-borne illnesses. Measures that ensure high standards of quality and safety also reduce post-harvest losses. The quality of fish and fishery products relies principally on their safety.

Facilities for landing, handling, auctioning and dispatching must meet prerequisite standards as described in **2.2.2**. Training for market personnel, buyers, fishermen and other users must be provided. Ensuring high standards for quality and safety can minimize losses that results from spoilage and damage to trade and from illness among consumers, and generate further economic benefits.

2.1 Quality

Most often "quality" refers to the aesthetic appearance and freshness or degree of spoilage which the fish has undergone. It may also involve safety aspects such as being free from harmful bacteria, parasites or chemicals.

The methods for quality assessment of fresh or chilled fish may be divided into two categories: sensory and instrumental. Since the consumer is the ultimate judge of quality, most chemical or instrumental methods must be correlated with sensory evaluation before being used in the laboratory.

2.1.1 Factors affecting quality

1 Fish species, fishing ground and season

The spoilage rate and shelf life of fish is affected by many parameters and fish spoil at different rates. In general it can be stated that larger fish spoil more slowly than small fish, flat fish keep better than round fish, lean fish keep longer than fatty fish under aerobic storage and bony fish are edible longer than cartilaginous fish. Several factors probably contribute to these differences and whereas some are clear, many are still on the level of hypotheses.

2 Handling on board

The modern catch handling on board is carried out to maximize the quality of the landed fish and to provide a continuous flow of quality fish "from the sea to the table". The modern catch handling comprises quick transferring catch from gear to vessel, holding of catch before handling, sorting/grading, bleeding/gutting/washing, or Ike-jime/Shinkei-jime* and chilling storage on board, and quick landing at fishing ports.

*Ike-jime/Shinkei-jime: one of methods to reduce the lactic acid and therefore maintain the quality of fish. The technique originated in Japan, but is now widespread use. It involves driving a quick and direct spike into the hindbrain, usually located slightly behind and above the eye, or severing the major artery and spinal cord.

3 Keeping and transporting live fish

The obvious way of avoiding spoilage and loss of quality is to keep caught fish alive until consumption. Today, keeping fish alive for consumption is a common fish-handling practice both in developed and developing countries and at both artisanal and industrial level. The most recent development is to keep and transport fish in a state of hibernation, when the body temperature of live fish is reduced drastically

to reduce fish metabolism and to eliminate fish movement completely. Keeping and transporting live fish is becoming more important.

4 Chilling fish with ice

The practical advantages of using ice are in fish preservation for the reasons of temperature reduction, holding of catch before handling, keeping fish moist with melting ice, advantageous physical properties, convenience, or extended shelf life.

5 Storage temperature

Both enzyme activity and microbial activity, which are responsible for spoilage of most fresh fish, are greatly influenced by temperature. Many bacteria cannot grow below 10°C. Therefore, if fish is stored at low temperatures, the shelf life of the fish is significantly prolonged.

6 Fish handling in artisanal fisheries

Artisanal fishing vessels handle relatively a small amount of fish compared with commercial fishing vessels and fish for shorter periods of time (usually less than a day, very often a few hours). However, the use of ice is necessary to keep the quality of the fish, whether sold directly locally or on the market.

2.1.2 Quality assessment

The quality assessment criteria comprise freshness categories and size categories. The freshness category of each lot shall be determined on the basis of the freshness rating of the fish and a number of additional requirements. Fish shall be sized by weight or by number per kilogram.

2.1.2.1 Freshness categories

Council Regulation (EEC) No. 103/76 lays down common marketing standards for certain fresh or chilled fish. The freshness rating shall be defined by reference to the scale set out in Annex A to **Council Regulation (EEC) No. 103/76**, which covers the three aspects: appearance, condition and smell. Each part examined shall be awarded marks corresponding to the freshness criteria in the scale. The arithmetic mean of the marks awarded shall indicate the holistic freshness rating. There are three freshness categories of E (Extra), A and B where E is the highest quality and below B is the level where fish is discarded for human consumption. There is, however, still some discrepancy as the category does not take account of differences between species into account as it only uses general parameters. So at present the freshness of fish sold on the market are evaluated by experienced market personnel. This freshness categories are generally accepted in the EU countries for sensory assessment.

Table 2.1 shows the freshness categories used in Denmark. The auction halls in Denmark that employ online auctions have more detailed categories than those of the EU, in order to facilitate buyers who are unable to inspect the products out of the region or abroad. Quality assessment criteria are properly applied and a high degree of trust has been established between the seller and the buyers.

Table 2.1 Freshness categories, Denmark

Quality level	Description
E	Top super quality
E/A+	3/4 super (more E than A+)
A+/E	Fine quality, but only up to 3/4 super (more A+ than E)
A+	Shiny quality with little part of super quality
A+/A	Shiny quality with little part quality
A/A+	Iced fish with a little part of shiny quality
A	Iced fish
A/A-	Iced fish mainly for filleting
A-	Hard iced fish (only for filleting)
B	B-quality

2.1.2.2 Size categories

Fish shall be sized by weight or by number per kilogramme. Lots shall be placed in size categories in accordance with the scale set out in Annex B to **Council Regulation (EEC) No. 103/76**. Each lot must contain fish of the same size. A small lot need not, however, be of uniform size; if it is not, the lot shall be placed in the lowest size category represented therein. The size category and presentation (round, semi-dressed, dressed or filleted, etc.) must be clearly and indelibly marked on labels affixed to the lot.

2.1.3 Assurance of fish quality

The Hazard Analysis Critical Control point (HACCP) system has now gained worldwide recognition as the most cost-effective and reliable system for assuring quality as well as food safety. It is based on the identification of risks, minimizing those risks through the design and layout of the physical environment in which high standards of hygiene can be assured, sets measurable standards and establishes monitoring systems.

2.2 Safety

2.2.1 Initiatives in international organisations and countries

2.2.1.1 Codex Alimentarius Commission

As a means of guaranteeing food safety, the HACCP management has been promoted on a global scale as a legal requirement for food safety management. Since 1993, the Codex Alimentarius Commission (FAO-WHO) has published and revised **the General Principles of Food Hygiene (CXC 1-1969)** and its Annex Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its Application. The new 2020 revision covers General Principles of Food Hygiene: Good Hygiene Practices (GHPs) and the Hazard Analysis and Critical Control Point (HACCP) System.

2.2.1.2 World Trade Organization

With the inception of the World Trade Organization (WTO) in 1995, WTO members had to strive to harmonize their food safety standards with Codex standards, and thus efforts to apply the HACCP system to food safety management as a means of assuring food safety were promoted and enacted on a global scale.

Exporting fish and fishery products must comply with the laws and regulations of the destination country. In the case of exporting to the EU, processing vessels and the first sale market in the fishing port need to be registered, and onshore facilities for processing, manufacturing or storage need to be certified to meet the EU standards for the structural and hygienic management of facilities. In the case of exporting to the US, onshore facilities for processing, manufacturing or storage need to be certified to meet the US standards for the structural and hygienic management of facilities.

2.2.1.3 EU

The current EU food safety policy framework consists of the White Paper on Food Safety and the General Food Law Regulation. The main contents are the "Farm to Table" principle covering all stages of food and feed supply, the promotion of traceability and the introduction of risk analysis and the precautionary principle. **Regulation (EC) No 178/2002 of the European Parliament and of the Council** lays down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. A fundamental revision of food-related laws and regulations was undertaken to take account of these general principles and requirements. At the heart of this is the consolidation of food hygiene provisions (the implementation of the so-called 'Hygiene Package'), which consists of regulations and directives designed to consolidate, harmonize and simplify the detailed and complex food hygiene requirements spread over 17 directives. The Regulations were promulgated in 2004 and have been in force in the Member States since 2006.

Regulation (EC) No 852/2004 of the European Parliament and of the Council forms the core of the "hygiene package" (except primary production), which states in 7 principles that the primary responsibility for the provision of safe food lies with the food industry and that this responsibility must be

ensured throughout the food chain. The seven principles state that food businesses have the primary responsibility for providing safe food and that this responsibility must be ensured throughout the food chain. Flexibility of the HACCP requirements is also granted to small and medium-sized companies and local traditional methods. Annex to **(EC) No 852/2004** states about the general hygiene provisions for primary production and its associated operations. The application of general hygiene management program and HACCP is seen as a means of achieving this.

2.2.1.4 US, Canada and Australia

Since 1997, in US, HACCP management has been required for fish and fishery products, meat and poultry meat and their processed products, and fruit and vegetable beverages traded across state borders. **The Food Safety Modernization Act (FSMA)**, which was enacted in 2011, requires all facilities that manufacturing, processing, packing, or storing food for consumption in the United States to register with the FDA and to renew their registration. The Act also requires facilities to plan and implement measures that incorporate the concept of HACCP.

Canada has progressively mandated the HACCP system for fish and fishery products, meat and meat products since 1992. Australia has progressively mandated the HACCP system for milk and dairy products, seafood, meat and meat products for export since 1992. Japan implemented the HACCP system in 2020.

2.2.2 Application of the prerequisite program (PRP) to the auction hall

A prerequisite or prerequisite programme (PRP) has been proposed in Codex and ISO (**ISO/TS 22002-1:2009 Prerequisite Programmes on Food Safety**) respectively as food safety basic conditions and activities that are necessary to maintain a hygienic environment suitable for the production, handling and provision of safe end products and safe food for human consumption. The PRP, when combined with the HACCP system, completes the food hygiene system.

The PRP to the auction hall, in line with those of Codex and ISO 22000, and giving into consideration the functions and characteristics of the hall, can be as follows:

1 Layout and structures of buildings;

Buildings shall be designed, constructed and maintained in a manner appropriate to the nature of the operations to be carried out, the food safety hazards associated with those operations and the potential sources of contamination from the auction hall surroundings. Buildings shall be of durable construction which presents no hazard to the product.

2 Internal lay-out and structures;

Internal layouts shall be designed, constructed and maintained to facilitate good hygiene and operations in the auction hall. They shall be built of durable materials and be easy to maintain and clean. The movement patterns of forklifts & trolleys, fish and people, and the layout of machinery and equipment, etc. shall be designed to protect against potential contamination sources.

3 Supplies of air, water and other utilities;

The provision and distribution routes for utilities to and around the workplaces and storages shall be designed to minimize the risk of fish contamination. Utilities' quality shall be monitored to minimize the fish contamination risk.

4 Drainage and waste storage disposal systems;

Adequate drainage and waste disposal systems shall be in place to prevent contamination of fish and workplaces and storages.

5 Suitability of machinery and equipment, etc. for cleaning and maintenance;

Fish contact machinery and equipment, etc. shall be designed and constructed to facilitate cleaning, disinfection and maintenance. Contact surfaces shall not affect, or be affected by, fish or cleaning system. Food contact equipment shall be constructed of durable materials able to resist repeated cleaning.

6 Management of purchased materials, supplies, disposals and handling of products;

Purchasing of materials which impact food safety shall be controlled to ensure that the suppliers used have the capability to meet the specified requirements. The conformance of incoming materials to specified purchase requirements shall be verified.

7 Measures for the prevention of cross contamination;

Programs shall be in place to prevent, control and detect contamination. Measures to prevent physical, allergen and microbiological contamination shall be included.

8 Cleaning and sanitizing;

Appropriate cleaning and sanitizing programs shall be established to ensure that facilities, machinery and equipment, etc. and the environment are maintained in a hygienic condition. The programs shall be monitored for continuing suitability and effectiveness.

9 Pest control;

Measures through hygiene, cleaning, incoming materials inspection and monitoring procedures need to be in place to prevent the access of pests, discourage their activity and infestation on site and for the elimination of pests and the hazards they are likely to cause. Personnel need to be trained to identify and report pest activity. Incoming materials need to be inspected before acceptance to ensure they are free from pest activity.

10 Personal hygiene;

Appropriate standards of personal hygiene shall be in place to prevent the contamination of fish. All the users such as personnel (i.e. auction hall staff), suppliers, buyers, transporter shall wear suitable clothing, caps and boots. All those involved shall wash and sanitize their hands and boots before entering fish handling areas/rooms. Rules for hand washing should be in place and measures that can lead to contamination such as smoking, spitting, eating, sneezing or coughing shall be prevented in fish handling areas/rooms.

11 Storage;

Machinery and equipment, etc. and fish shall be stored in clean, dry, well-ventilated areas/rooms protected from dust, condensation, fumes, odors or other sources of contamination.

12 Product information;

Product information shall be presented to buyers in such a way as to enable them to make informed choices. When to deliver fish to buyers, traceability information, i.e. catch and sales information of the fishery products by lot can be provided by labelling and paper documents or other forms.

Lot identification is essential when to recall fish and fishery products, or issue catch certificates. Each lot of fish shall be recorded and stored permanently, and marked to identify the producer and the lot. The traceability/product tracing system shall be designed and implemented, especially to enable the smooth recall of the fish and fishery products or issuance of catch certificate, where necessary.

13 Training and competence;

All those engaged in operations who come directly or indirectly into contact with fish and fishery products shall have sufficient understanding of food hygiene to ensure they have competence appropriate to the operations they are to perform. Training is fundamentally important to any food hygiene system and the competence of all those engaged. Adequate hygiene training, and/or instruction and supervision of all those who are involved in any activities contribute to ensuring the safety of fish.

14 Transportation; and

During transportation, measures shall be taken where necessary to:

- Protect fish and fishery products from potential sources of contamination, including allergen cross contact;
- Protect fish and fishery products from damage likely to render the food unsuitable for consumption; and
- Provide an environment which effectively controls the growth of pathogenic or spoilage micro-organisms and the production of toxins in fish.

Fish and fishery products may become contaminated or may not reach its destination in a suitable condition, unless effective hygiene practices are taken prior to and during transport.

15 Other aspects as appropriate.

Other prerequisite measures shall be considered that are viewed as appropriate for the type of fish being handled or type of the auction hall.

2.2.3 Application of the HACCP system to the auction hall

The HACCP system proposed by the Codex Alimentarius Commission consists of 7 principles and 12 steps. It involves a hazard analysis of all processes in food handling establishments from the entry of raw materials to the delivery of end products, to identify such processes that are essential to providing a safe end product. The operator shall keep record and check the status of implementation to ensure that safe food is provided to consumers.

FAO proposed the HACCP system and its applications in Quality and quality changes in fresh fish in 1995 – **Quality and Quality Changes in Fresh Fish, 1995**. In 2021, US Food and Drug Administration (FDA) released **Fish and Fishery Products Hazards and Controls Guidance Fourth Edition**, to help processors of fish and fishery products conduct a Hazard Analysis and Developing a HACCP Plan.

The HACCP system to the auction hall, in line with those proposed by the Codex Alimentarius Commission, FAO and FDA, and giving into consideration the functions and characteristics of the auction halls, can be as follows:

1 Assemble HACCP Team and Identify Scope (Step 1)

The operator shall ensure that the appropriate knowledge and expertise are available for the development of an effective HACCP system. This may be achieved by assembling a multidisciplinary team responsible for different activities related to the operations in the auction hall, e.g. sales, maintenance, quality control, cleaning and disinfection. This team is responsible for developing the HACCP plan.

2 Describe product (Step 2)

A full description of the fish and fishery product shall be developed, including relevant information such as states of fish, handling methods from its arrival to shipping.

3 Identify intended use and users (Step 3)

The operator shall describe the destinations and use of fish intended or expected according to the fish species, state of fish, type of fishery, etc., while actually buyers buy fish with an idea of the species, quantity and destination in advance.

4 Construct flow diagram (Step 4)

A flow diagram that covers all operations from arrival of fish and fishery products to shipping them in the auction hall shall be developed.

The flow diagram may vary according to the fish species, state of fish, type of fishery, etc. The flow diagram shall indicate all inputs - not only fish but also fish contact materials such as machinery and equipment, etc., water, air.

5 On-site confirmation of flow diagram (Step 5)

Measures shall be taken to confirm the works against the flow diagram during all stages and all time of operation, and amend the flow diagram where appropriate. The confirmation of the flow diagram shall be performed by a person or persons with sufficient knowledge and expertise of the hygiene management and operations in the auction hall.

6 List all potential hazards, conduct a hazard analysis to identify the significant hazards, and consider control measures (Step 6/ Principle 1)

The HACCP team shall list all potential hazards. The subsequent Hazard analysis consists of identifying potential hazards and evaluating these hazards to determine which of them are significant for the fish handling operations in the auction hall. The HACCP team shall then identify where these hazards are reasonably likely to occur at each operation (including all inputs).

The HACCP team shall next evaluate the hazards to identify which of these hazards are such that their prevention, elimination, or reduction to acceptable levels is essential to the production of safe food (i.e., determine the significant hazards that have to be addressed in the HACCP plan).

Hazards which are such that their prevention, elimination or reduction to acceptable levels is essential to maintain the safe fish or fishery products shall be identified and controlled by measures designed to prevent or eliminate these hazards or reduce them to an acceptable level.

7 Determine the Critical Control Points (Step 7/ Principle 2)

The operator shall consider which among the available control measures listed during step 6, Principle 1 shall be applied at a CCP. Critical Control points are to be determined only for hazards identified as significant as of the result of a hazard analysis. CCPs are established at steps where control is essential and where a deviation could result in the production of a potentially unsafe food. The control measures at CCPs should result in an acceptable level of the hazard being controlled.

8 Establish validated critical limits for each CCP (Step 8/ Principle 3)

Critical limits establish whether a CCP is in control, and in doing so they can be used to separate acceptable fish or fishery products from unacceptable ones. These critical limits shall be measurable or observable. In some cases, more than one parameter could have a critical limit designated at a particular step.

9 Establish a Monitoring System for Each CCP (Step 9/ Principle 4)

Monitoring of CCPs is the scheduled measurement or observation at a CCP relative to its critical limits. The monitoring procedures shall be able to detect a deviation at the CCP. Further, the monitoring method and frequency shall be capable of timely detection of any failure to remain within critical limits, to allow timely isolation and evaluation of the fish or fishery products. Where possible, operational adjustments shall be made when monitoring results indicate a trend towards a deviation at a CCP.

10 Establish corrective actions (Step 10/ Principle 5)

Specific written corrective actions shall be developed for each CCP in the HACCP system in order to effectively respond to deviations when they occur. When critical limits at CCPs are monitored continuously and a deviation occurs, any product being produced at the time the deviation occurs is potentially unsafe.

The corrective actions shall be taken when a deviation occurs to ensure that the CCP has been brought under control or fish or fishery products which are potentially unsafe are handled appropriately, and does not reach buyers and transporters. The affected product shall be segregated, analysed and properly disposed.

11 Validation of the HACCP Plan and Verification Procedures (Step 11/ Principle 6)

Before the HACCP plan can be implemented, its validation is needed; this consists of making sure that the following elements together are capable of ensuring control of the significant hazards relevant to the fish handling operations in the auction hall: identifying the hazards, critical control points, critical limits, control measures, frequency and type of monitoring of CCPs, corrective actions, frequency and type of verification and the type of information to be recorded.

Validation of control measures and their critical limits is performed during the development of the HACCP plan.

12 Establish Documentation and Record Keeping (Step 12/ Principle 7)

Efficient and accurate record keeping is essential to the application of a HACCP system. HACCP procedures shall be documented. Documentation and record keeping shall be appropriate to the nature and size of the operation and sufficient to assist the business to verify that the HACCP controls are in place and being maintained.

2.2.4 Hygiene management based on the HACCP concept for the auction hall

(1) Auction

Given the function and characteristics of the auction hall, the hygiene management based on the concept of the HACCP system (hereinafter referred to as the quasi-HACCP system) may be appropriate for the auction hall. The quasi-HACCP system can consist of:

- Create a hygiene management plan including control points, control methods and checking methods;
- Implement the hygiene management plan; and
- Keep record, verify and review as necessary.

As shown in Figure 2.1, the quasi-HACCP system is a level of hygiene management situated between the PRP and the HACCP system, so as to go smoothly up to implementing the HACCP system.

(2) Handling shed

For the handling shed, which has no market function, the HACCP or quasi-HACCP system is not required, but the PRP and the structure of facilities, equipment and machinery as a food safety measure for public health are

(3) Processing plant

Pelagic fish (edible or industrial) may be sold directly on a virtual market or traded directly and then landed onto trucks or forklifts at the quay before being brought into the processing plant, or directly brought into the processing plant by fish pumps at the quay. In this case, the HACCP system is required for the processing plant.

Farm-raised fish is sold directly to the buyer and brought into the processing plant or into the farmer's own processing plant. In this case, the processing plant is also required to have a HACCP system.

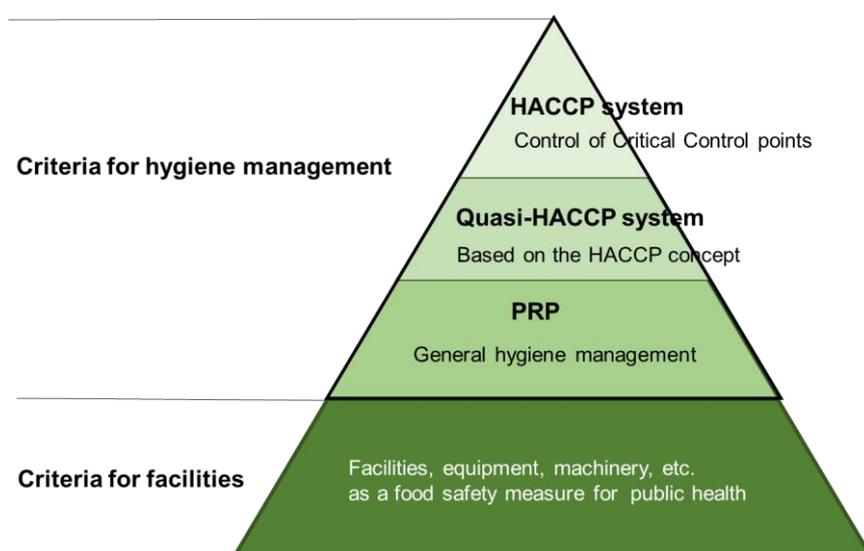


Figure 2.1 Image of hygiene management at the auction hall

3 Traceability and IUU fishing

3.1 Traceability in EU

3.1.1 Control of labelling and traceability of production methods and catch areas

Council Regulation (EC) No 104/2000 requires that, in retailing to consumers, the name of the product (so as to identify the species), the production method (caught at sea or in inland waters or farmed) and the catch area are indicated appropriately by marking or labelling.

Commission Regulation (EC) No 2065/2001 establishes "Chapter 3 Traceability and control" and Article 8 provides that the necessary information on the name of the product, the production method and the catch area, in relation to the species, shall be available at all stages of marketing. This information together with the scientific name of the species concerned shall be provided by means of the labelling or packaging of the product, or by means of a commercial document accompanying the goods, including the invoice. In addition, Article 9 requires each Member State to establish arrangements for checking the application of Article 8.

3.1.2 Control of the application of the Common Fisheries Policy

Council Regulation (EC) No 1224/2009 establishing a Community control system to ensure compliance with the rules of the Common Fisheries Policy requires masters of Community fishing vessels to complete and submit fishing logbooks and the landing declarations. Masters of fishing vessels of 12 metres' length overall or more shall complete and transmit the fishing logbook and landing declaration information by electronic means (Articles 14-15, 23-24). Regulation also requires the first sale market to complete and submit sales notes. Masters of fishing vessels of 12 metres' length overall or more shall complete and transmit sales note information by electronic means (Articles 62-64). In addition, "Article 58 Traceability" requires that all lots of fisheries and aquaculture products shall be traceable on a lot-by-lot basis, at all stages from catch and harvest to retail.

Specifically, for each lot, the following information is required: the identification number of each lot; the external identification number and name of the fishing vessel or the name of the aquaculture production unit; the date of catches or the date of production; the quantities of each species in kilograms expressed in net weight or, the number of individuals; the name and address of the suppliers; the scientific name, the relevant geographical area and the production method; whether fish and fishery products have been previously frozen or not.

3.1.3 Information to end consumers

Regulation (EU) No 1379/2013 of the European Parliament and of the Council requires that the end consumer shall be provided with information on the name and scientific name of the product, the production method (e.g. fishing or aquaculture farming), the fishing or aquaculture waters, type of fishery and, in the case of defrosted products.

3.2 Traceability in US

The Magnuson - Stevens Fishery Conservation and Management Act, commonly referred to as the Magnuson - Stevens Act (MSA), is the legislation to promote the U.S. fishing industry's optimal exploitation of coastal fisheries by consolidating control over territorial waters. Eight regional fishery management councils, composed of representatives of the fishing industry and state fishery officials, prepare fishery management plans for approval and implementation by the National Marine Fisheries Service (NMFS), which is an agency within the National Oceanic and Atmospheric Administration (NOAA), a part of the Department of Commerce.

The Magnuson - Stevens Act and its corresponding **Code of Federal Regulations (50 CFR § 648.7)** require licensed fishing vessels, traders, and processors to record the information. The masters or owners of fishing vessels shall complete and submit fishing log reports for each fishing trip, for each fishing gear and for each catch area (each report has a unique serial number). Electronic reporting is also available.

3.3 IUU fishing

Council Regulation (EC) No 1005/2008 establishing a Community system for the prevention, deterrence and elimination of illegal, unreported and unregulated (IUU) fishing requires EU importers of fish and their processed products to submit catch certificates and other documents.

The **Agreement on Port State Measures (PSMA)** which entered into force in 2016, is the first binding international agreement to specifically target IUU fishing. Its objective is to prevent, deter and eliminate IUU fishing by preventing vessels engaged in IUU fishing from using ports and landing their catches. In

this way, the PSMA reduces the incentive of such vessels to continue to operate while it also blocks fishery products derived from IUU fishing from reaching national and international markets. The effective implementation of the PSMA ultimately contributes to the long-term conservation and sustainable use of living marine resources and marine ecosystems. The provisions of the PSMA apply to fishing vessels seeking entry into a designated port of a State which is different to their flag State.

3.4 Catch certificate/catch document

There are two types of catch certification schemes: unilateral schemes, such as the EU catch certification scheme, where the importing country requires a catch certificate to be attached to imported products, and multilateral schemes, such as the Regional Fisheries Management Organisation (RFMO) catch documentation scheme, which requires participating countries to attach catch documentation to each other's catch.

3.4.1 EU catch certification scheme

According to the EU's IUU fishing regulation (**Council Regulation (EC) No 1005/2008**) since 2010, Member States have been required to attach a catch certificate from the government agency of the flag state of the fishing vessel to imported fishery products, in order to prevent, deter and eliminate the entry into the EU of fishery products originating from illegal, unreported and unregulated (IUU) fishing. Specific measures include (a) strengthening port of call controls by Member States to improve monitoring and supervision of vessels and their catches, and (b) introducing a catch certification scheme to improve the traceability of all fish and fishery products entering the EU.

3.4.2 US SIMP

The **Seafood Import Monitoring Program (SIMP)** was created under the Consolidated Appropriations Act of 2018 to establish data reporting and recording-keeping requirements for imports of seafood species groups most often associated with illegal, unreported, and unregulated (IUU) catch, with the goal of keeping IUU seafood products out of domestic markets. SIMP is managed by U.S. Customs and NOAA.

3.4.3 RFMO's catch documentation scheme

The Catch Documentation Schemes (CDSs), implemented by the RFMOs, include the followings:

- International Commission for the Conservation of Atlantic Tunas (ICCAT) CDS for the Bluefin;
- Commission for the Conservation of Southern Bluefin Tuna (CCSBT) CDS for the southern bluefin tuna; and
- Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) CDS for Magellanic lingcod.

3.5 Catch report, catch certificate and traceability

Fishery catch certificates are required for external trade in fish and fishery products. The application for a catch certificate is verified by the competent authorities on the basis of the catch report. The correctness of the catch report can be checked by traceability through transaction records. Electronic catch reporting and the utilization of ICT in transactions would ensure accurate and easy traceability (see Chapter 4H).

4 Fishery resource management and fishery statistics

Fishery resource management consists of resource assessment and research and catch quantity management. For the former, the national government and fisheries research organizations work together to conduct research vessel surveys, market surveys, and oceanographic observations with the cooperation of fishermen, fishing ports, and markets, and to establish an assessment system. With

regard to the latter, efforts are being made to appropriately manage catches and fishing effort in order to conserve resources and use them sustainably.

The EU Common Fisheries Policy (CFP) includes: (a) reduction of fishing effort based on resource recovery plans; (b) setting of Total Allowable Catch (TAC) – there is a management system for fishing quotas of the Individual Quota (IQ) and Individual Transferable Quota (ITQ) - and (c) combating illegal, unreported and unregulated (IUU) fishing.

ICT-based systems can be employed to rapidly collect and precisely analyse catch information from fishing vessels and sales information from auction halls (the first sale) of fishing ports.

4.1 TACs and quotas in EU

The Common Fisheries Policy (CFP) of the European Union (EU) forms the basic framework for the Member states' fisheries. Two important components of the CFP are the system for conservation and exploitation of the living resources in the sea by limiting the catch through the fixing of quotas and limitations of days at sea. By effort management, which includes fishing boats with an overall length of 10 meters or more, is understood a limitation of the number of days, a fishing boat can be at sea in a certain area with a certain gear.

Every year the Council of the European Union fixes total allowable catches (TAC) of each stock and the allocation of quotas to the Member States for the following year. The distribution of the TAC among the Member States aims at ensuring relative stability of fishing activities. The distribution of each TAC is based on a fixed model on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy.

Important elements of the procedures leading to the elaboration of the TAC/quota regulation are the consultations between the EU and third countries (countries outside the Union). The management of fisheries in international waters and of certain highly migratory species existing in EU, third country and international waters is often handled by regional fisheries organizations as i.e. The North-East Atlantic Fisheries Commission (NEAFC) or the Northwest Atlantic Fisheries Organization (NAFO).

The TAC/quota regulation administers the fishery on the fish stocks, which are autonomous to the EU, and on the joint stocks managed by the EU together with certain third countries. The Member States can exchange their quotas in full or partly provided the European Commission is notified in advance. In accordance with the CFP, the authorities in the Member State manage each national quota. The quota could thus be divided into subareas. The additional quantity is considered as exceeding permitted landings and will be deducted in the following year's quota. For stocks subject to TAC the Commission can allow a Member State to withhold a maximum of 10% of its quota to be transferred to the following year.

4.2 Fishing areas and fish stocks in EU

In this context, a fish stock is understood to be a specific species within a certain area. This area can be outlined using a statistical division of the sea and by national economic zones. FAO has provided a division of all oceans and seas into main statistical regions. Within each region, these are divided into divisions, which again can be divided into subdivisions. For instance, the International Council for the Exploration of the Sea (ICES) has established the division of the North East Atlantic into divisions and subdivisions.

National fishing zones reach up to 200 nautical miles from the coastlines or follow internationally approved boundaries. The utilization of certain EU Member States fish quotas are shown in separate tables. The stock and area codes that Member States have to use in their monthly transmissions of data to the EU Commission regarding landings of species subject to a quota are used in these tables.

4.3 Fishery statistics in EU

Council Regulation () No. / provides the fishery statistics. The fishery statistics are produced by the fisheries authorities and are based on reports (sales notes) from the first sale or trade with fish and fishery products enriched with data from the fishing boats' logbooks. For sales notes from the home

fishing boats, which sell their catches in other EU Member States, the sales note is received electronically from the authorities of the Member State concerned.

It is prohibited for non-commercial fishermen to market their catches. Anyone who is the first to buy, receive or collect fish etc. directly from the fishermen for sale on the home market, for export (including transit) or for processing, is obliged to register as a buyer and report to the fisheries authorities. The same applies to fishermen, who sell their own catch directly to the consumers, process or export their own catch. That the information duty is lying on the first hand receiver ensures that all direct landings of fish are reported regardless the sales method and whether the landing is made by the home or foreign fishing boats.

The fisheries authorities registers all home and foreign landings from fishing boats in the home ports together with landings from home fishing boats in foreign ports. The information stored in the sales note register includes species, market categories (gutted, head on, head off, roe, liver, preservation, product destination, quality and size) in addition with fishing boat identification, date and place of landing and name of purchaser. This information is a part of the basis for the official fishery statistics.

The fisheries authorities adds information to sales note by a comparison either with the logbook for the fishing trip during which the catch was taken or with a declaration of catch area from a fisherman notified for a period. The comparison of the sales note with the logbook and the declaration of catch area and the addition of the catch area to the sales is carried out automatically.

All species for human consumption are identified and recorded. For fish landed directly for reduction to fish meal/fish oil, a sampling procedure is used to determine the species composition.

Catches and quotas are always calculated in whole fish (live weight). The information on quantities in the sales notes are, however, always given in landed weight. The difference between the two concepts is the reduction, which arises, when the fish for human consumption is cleaned for entrails, filleted or processed in another way and iced on board the fishing boat before landing. Since 2009, to convert stored or processed fish weight into live fish weight, a common EU-wide conversion factor has been used.

4.4 Catch report and sales report in US

In the US, under the **Magnuson - Stevens Fishery Conservation and Management Act**, eight Regional Fishery Management Councils (RFMCs) are responsible for preparing, monitoring and reviewing fishery management plans for each area. The Act requires U.S. fishermen to report to the agency in their fishery management plans the type and quantity of gear used, the amount of fish caught by species, the waters in which they operate, and the days when they operate.

The ACT also provides that the Secretary of Commerce shall make recommendations for the implementation of "a standardized fishing vessel registration and information management system". The recommendation stipulates that US processors of fishery products, dealers and other primary purchasers from fishing vessels be required to submit information.

In the Atlantic District, which covers the northeastern United States, the Code of Federal Regulations sets out the rules for recording and reporting. The owner or operator of every licensed fishing boat must prepare and report a Fishing Vessel Trip Report (FVTP) for each trip, including the vessel's name and permit number, type of gear, waters fished, estimated weight of each species landed and discarded, port of landing, date of sale, and dealer's permit number and name. The report must be kept on board the fishing boat and reported to the National Marine Fisheries Service (NMFS), NOAA.

Federally licensed dealers are also required to prepare and maintain a detailed report (including the name and permit number of the vessel, date of purchase or receipt, quantity, unit price and value of each species, and port of landing) and submit it to the RFMC.

In Europe and the USA, not only do masters of fishing boats have to report their catches of each species to the competent authorities (catch reporting), but those who receive fish from the masters (in the case of markets, wholesalers) also have to report their sales notes (sales reporting). The both reporting requirements and reporting means (electronic or not) depend on the size of boats or the turnover.

5 Sustainable fisheries

5.1 Sustainable Development Goal 14, UN

Sustainable Development Goal 14 (SDG 14) is about "Life below water" and is one of the 17 Sustainable Development Goals established by the United Nations in 2015. The official wording is to "Conserve and sustainably use the oceans, seas and marine resources for sustainable development". The Goal has ten targets to be achieved by 2030. The first seven targets are "outcome targets": reduce marine pollution; protect and restore ecosystems; reduce ocean acidification; sustainable fishing; conserve coastal and marine areas; end subsidies contributing to overfishing; increase the economic benefits from sustainable use of marine resources. The last three targets are "means of achieving" targets: to increase scientific knowledge, research and technology for ocean health; support small scale fishers; implement and enforce international sea law. The Target 14.4 Sustainable fishing is: "By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics".

5.2 Eco-labelling in fisheries

Eco-labelling in fisheries is a scheme to label products that have been caught and produced in a way that considers the sustainability of ecosystems and resources, so that consumers can selectively purchase them. In 1995, the FAO General Assembly adopted the **Code of Conduct for Responsible Fisheries** and began to consider eco-labelling in fisheries, which embodies the Code of Conduct for the management of fishery resources and the conservation of ecosystems. In 2005, the FAO Fisheries Committee adopted the **Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries** (revised in 2009). In 2011, the commission developed the **International Guidelines for Aquaculture and Inland Fisheries Certification**. Since then, a number of fisheries ecolabel certification schemes have emerged around the world. In 2013, the Global Sustainable Seafood Initiative (GSSI) was established to promote certified fish and fishery products by approving certification schemes that meet specific standards based on FAO guidelines.

There is no globally agreed definition of 'sustainable fish and fishery products'. A more internationally acceptable description of 'sustainable fish and fishery products' would be 'fish and fishery products whose resources are maintained for optimal use by current and future generations'.

Fisheries eco-labelling is a scheme to label fish and fishery products that have been caught and produced in a way that considers the sustainability of ecosystems and resources, so that consumers can selectively purchase them. There are two types of fishery ecolabel certification: (a) production stage certification (for fisheries and aquaculture) - fishery or aquaculture certification - and (b) distribution and processing stage certification - Chain of Custody certification (CoC).

5.3 Market requirements for eco-labelled fish and fishery products

In addition, certification at the distribution and processing stage ensures that certified fish and fishery products do not mix with non-certified ones and reach consumers through distribution, processing and retailing.

In the market dealing with eco-labelled fish and fishery products, the followings are required:

- Certified fish and fishery products are sold at the CoC certified market in separate lots so that they are not mixed with non-certified products;
- It must be discernible that the fishery products are certified or non-certified in the landing information, sales catalogue and sales results; and
- Certified fish and fishery products must be labelled with a certification label.

An increasing number of producers, markets and processors work to obtain domestically or internationally recognized eco-labels such as fishery certification and CoC certification, and upload information to their websites about the certification status, and landing and selling information of certified fish and fishery products. This is because there is a high level of consumer interest in sustainable fish

and fishery products, both domestically and internationally, and as a result buyers in the market place value and purchase eco-labelled ones.

6 Framework for the functioning and dimensioning of the auction hall

6.1 Management of the auction hall

6.1.1 Management body

The auction hall is managed by (a) the fishing port manager, (b) the state or regional government, the municipality (which may be the same as the fishing port manager), the fishery cooperative or other fishery related organizations, and is operated by (c) the same manager, (d) the concessionary fishery related organization, or a concessionary company including a wholesaler, and (e) a series of companies such as collectors, wholesalers and other service providers. The form of operation, however, generally conforms to regulations and guidelines laid down by the manager of the auction hall.

6.1.2 Work, operations and activities

The principle activities are (a) general affairs, settlement of payment and report to the fisheries authorities as the administration work, (b) sales operations as the primary work, (c) service, environment, sanitation and social welfare as the ancillary work, and (d) efforts conducive to regional promotion.

6.1.3 Finance, payment and credit

The auction hall manager or concessionary operator controls all activities and services so that these are properly provided to the users. The costs of these activities and services vary by country and type of fishery, but are covered by a levy of a certain percentage of sales and service charges.

The auction hall manager or concessionary operator sells fish and fishery products, issues purchase notices and invoices to buyers and arrange financial guarantees required by the sellers (fishing vessels or fishermen). Generally, bank guarantees are required for and credit ceilings are established. In some cases, a deposit of a certain amount is required for the trade. At very small auction halls, personal relationships based on trust may allow trades to be carried out by means of notes and without guarantors. Fisheries banks comprising fishery cooperatives and other fishery-related cooperatives may be used to settle trade payments.

6.2 Characteristics of fishing ports and basic fishery data

The functioning and dimensioning of the auction hall are subject to the following characteristics of fishing ports and basic fishery data:

1 Classification of fishing ports;

According to the volume of landings, the number and size of fishing vessels and the amount of fishing port facilities:

- Large-scale fishing port
- Medium-scale fishing port
- Small-scale fishing port

According to the type of fishery:

- Base for distance water fisheries (pelagic fisheries)
- Base for offshore fisheries
- Base for coastal fisheries
- Base for aquaculture

According to the function of production and distribution:

- International base fishing port

- National base fishing port
- Regional base fishing port
- General fishing port

According to the level of technology:

- Artisanal fishing port
- Developed fishing port
- Advanced fishing port

2 Structure of fishing fleet;

The categories below are divided into foreign fishing vessels (registered in other ports) and local fishing vessels (registered locally or based in the port concerned).

- Number of vessels and their size
- Type of fishing vessel and fishing methods
- Fishing trip time in consideration of seasonal variations
- Annual/monthly/daily fish catch or production for each type or size of fishing vessel

3 Structure of vehicles for transporting before/after auctioning; and

- Daily number of vehicles, type of vehicle and its size
- Daily quantity of fish and fishery products
- Daily number of vehicles for other use

4 Fish catch and aquaculture production, according to species;

- Annual/monthly/daily landings by sea and land and by local and foreign vessels
- State of fish and fishery products (Live, fresh or frozen, Round, semi-dressed, dressed or filleted)
- Use of fish (Fish for human consumption, fish for industrial use)

5 Marketing system; and

See 1.3, particularly below.

- Destination of fish and fishery products sold at the auction

(Second sale market in the fishing port, external markets, processing plants, fishmeal factories, canning factories, warehouses, freezing and refrigeration facilities, packing centers or distribution centers, fishmongers, supermarkets or other retailers, restaurants, local consumers)

6 Structure of the commercial sector.

- Number of persons or companies which are involved in buying, dispatching and transporting

6.3 Major operations at the auction hall

Depending on the type of fishing port and marketing system, major operations at the auction hall centered on the flow from receiving to dispatching or transporting fish and fishery products are listed below:

6.3.1 Before receiving fish and fishery products

1 Information service on expected landings;

2 Preparing for receiving fish and fishery products;

- Cleaning and sanitizing floors, machinery, equipment, fish containers, etc.
- Placing machinery, equipment, fish containers, etc.

6.3.2 From receiving to dispatching or transporting

1 Unloading of fish and fishery products from vessels and trucks inside the auction hall or landing quay;

2 Washing, sorting (and grading);

3 Grading, weighing and placing into boxes (activity which may be executed in chilled areas);

4 Storage into a chilled room until the sale if necessary;

5 Display;

- Information service on sales catalogue.
- Examination by the buyers.
- Health and hygiene inspection.

6 Auction;

(Case 1)

7 Storage of surplus into a chilled or freezing room (for the following day's auction).

(Case 2)

7 Delivery to buyers;

- Information service on auction results;

8 Preparation and packing;

- Which is carried out by the buyer or transporter commissioned by the winning buyer; or
- Which is done as the same, once after transported to buyer's office/room and processed, and

9 Loading into trucks and transport;

- Which is carried out by the buyer or transporter commissioned by the buyer.

(Case 3)

7 Preparation and packing (for fish and fishery products auctioned online);

- Which are carried out by the market's side or by transporter commissioned by the winning buyer; and

8 Loading into trucks and transport (for fish and fishery products auctioned online);

- Which is carried out by the market's side or by transporter commissioned by the winning buyer.

6.3.3 After delivery to winning buyers

1 Cleaning, sanitizing and setting in order.

2 Preparation and issue of landing statements and sales notices, and settlement of payments; and

3 Reporting of sales results to the fisheries management organization or fisheries authorities.

6.4 Sales system at the auction hall

6.4.1 Whole or sample display and sale

(1) The whole pass through the auction hall (particularly for demersal fish and shellfish).

(a) Sale with whole display

This type of sale generally applies to the auction hall where a variety of species or a large amount of fish and fishery products are sold to many buyers.

Once the whole fish and fishery products are unloaded from fishing vessels and trucks into fish containers, they are sorted, graded, weighed and placed into fish boxes and tanks at the auction hall. After the whole fish are auctioned by lot at the auction hall, the fish are finally loaded into trucks and transported to the destination designated by the winning buyers. Weighing, display and auction may take place while the fish and fishery products are carried by conveyor belts in front of the buyers (See 6.4.2.).

(b) Sale by sample display

This type of sale generally applies to the auction hall where a certain species and grades of fish are sold. Once the whole demersal fish and farm-raised fish are unloaded into fish containers, they are sorted, graded, weighed and placed into fish boxes and tanks at the auction hall. After the fish are auctioned by sample display at the auction hall, the whole fish are loaded into trucks.

Once the whole pelagic fish are unloaded into fish containers, they are weighed by tank at the auction hall. The weight ratio by grades in the sample tanks are examined. After the fish are auctioned by sample display, the whole fish are loaded into trucks.

This is rapid and very efficient but requires a high degree of trust between buyers and sellers (market side).

(2) Only samples pass through the auction hall

This type of sale generally applies to the auction hall where a large amount of pelagic fish are sold. The fish are unloaded into containers for sample and the weight ratio by grades are examined at the auction hall. After the fish in the holds are auctioned by sample display at the auction hall, the whole fish are unloaded directly from the holds into tanks or trucks at the landing quay.

Given the above sales system of whole or sample display and sale, major operations at the auction hall from receiving and dispatching or transporting fish and fishery products are shown in Figure 6.1.

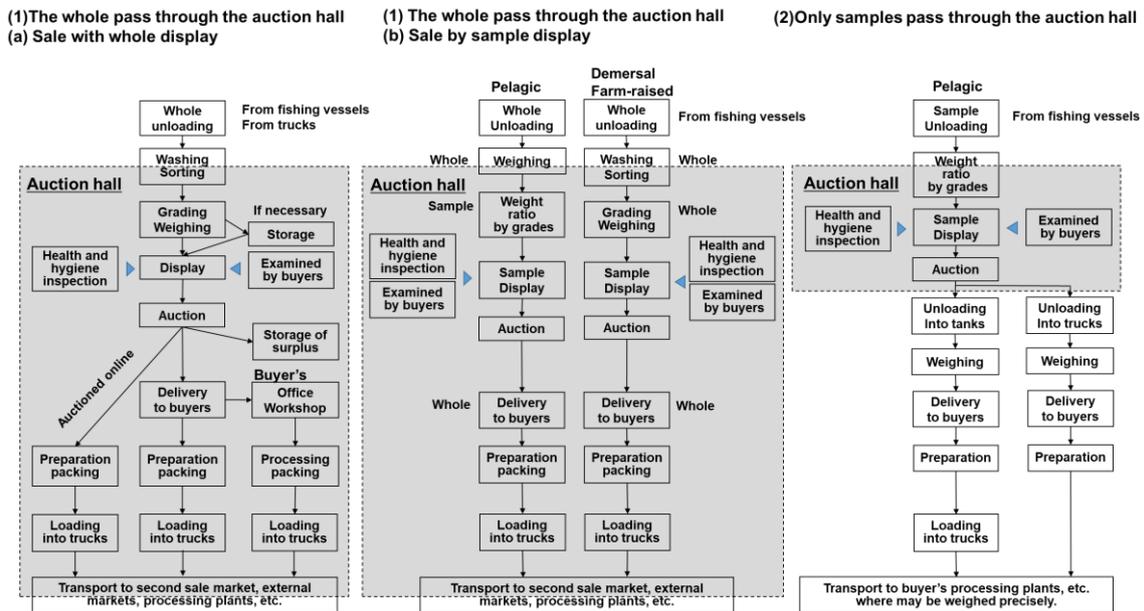


Figure 6.1 Major operations from receiving to dispatching or transporting

6.4.2 Auction system

(1) Auction methods

Auction is an old tradition of selling or buying of products and services which allows the highest bidder to get hold of the fish and fishery products. The auction methods are as follows:

1 Dutch auction/descending-price auction;

This is an auction in which the auctioneer begins with a high asking price in selling and lowers it until some buyer accepts the price, or it reaches a predetermined reserve price. This is also called a clock-auction or open-outcry descending-price auction. This type of auction shows the advantage of speed.

2 English auction/ascending-price auction; and

This is an open-outcry ascending-price auction. The auctioneer opens the auction by announcing a suggested opening bid, a starting price. Then, the auctioneer accepts increasingly higher bids from the buyers with an interest in the item.

3 First-price sealed-bid auction/blind auction.

This is also known as a blind auction. All bidders (buyers) simultaneously place sealed bids so that no bidder knows the bid of any other bidders. The bidder who has placed the highest price is a winner.

(2) Level of ICT utilization

According to the level to which ICT, IoT is utilized, as well as the degree of automation and systematisation of the auctions, auctions are classified as conventional auction/manual auction, electronic auction, online auction, and web transaction. Details are given in Chapter 4G.

(3) Where the auction takes place

Examples of locations where auctions take place are shown in Table 6.1, Photos 6.1, 6.2, 6.3. In general, auctions take place at the following places:

1 Display area (shared area for display and auction);

The auctioneers and buyers are all together for the auction where the fish and fishery products are displayed. A mobile or stationary auction clock and electronic board/screen may be always installed in the area or brought in at the time of the electronic auction.

2 Auction area;

The auctioneers and buyers are all together in the auction area separate from where the fish and fishery products are displayed. A mobile or stationary auction clock and electronic board/screen may be always installed in the area or brought in at the time of the electronic auction.

(Auction management room on site)

The auction management room is located in the display and auction area. This is where the auctioneers and their related market personnel manage (a) the first-price sealed-bid auction using slips of paper, and (b) online auction in a descending-price or ascending price way or a first price sealed-bid way.

3 Auction room; and

The auctioneers and buyers are all together in the auction area separate from where the fish and fishery products are displayed. A mobile or stationary auction clock and electronic board/screen are always installed in the room and electronic device terminals (i.e. PCs, tablets and smartphones) are also available for electronic auction or online auction.

4 Anywhere Inside and outside the auction hall.

Under conditions where the LAN in the auction hall is in place, buyers can participate in the auction by using electronic device terminals. Provided that the LAN is connected to the internet, buyers can participate in the online auction from anywhere in the world by using electronic device terminals.

Table 6.1 Where the auctions take place

Auction method	Level of computerization				Where the auction takes place	Reference	
	Conventional auction (Physical attendance)	Partly-computerized (Physical attendance)	Electronic auction (Physical attendance)	Online auction			
Descending-price or ascending price auction	Open-outcry auction record the sales results on the slips of paper				Display area	a.	
		Enter the sales results for each lot on an electronic device (i.e. PC, tablet)				b.	
			Join the auction by using the remote controle while watching the fish (products) on the floor, an auction clock, electronic board or screen			(c.)	
				Join the auction by using electronic device (i.e. PC, tablet, smartphon)	Auction area	Display area attended by personnel and buyers Also buyers join the auction from anywhere	c.
			Join the auction by using the remote controle while watching the fish (products) on the conveyor belt sales lanes, an auction clock, electronic board or screen	Join the auction by using electronic device (i.e. PC, tablet, smartphon)		Auction area attended by personnel and buyers Also buyers join the auction from anywhere	d.
			Join the auction by using the remote controle while watching the auction clock, electronic board or screen	Join the auction by using electronic device (i.e. PC, tablet, smartphon)	Auction room	Auction area attended by personnel and buyers	e.
			Join the auction by using electronic device (i.e. PC, tablet, smartphon)			Auction room attended by personnel and buyers Buyers join the auction from anywhere	f.
				Join the auction by using electronic device (i.e. PC, tablet, smartphon)	Auction management room	Auction management room only for personnel Buyers join the auction from anywhere	g.
	First price sealed-bid auction	Join the auction using slips of paper				Auction management room	Auction management room only for personne
			Join the auction by using electronic device (i.e. PC, tablet, smartphon) in the auction hall		Auction management room	Auction management room only for personnel	i.
					Auction room	Auction room atteded by market staff and buyers	j.
				Join the auction from anywhere by using electronic device (i.e. PC, tablet, smartphon)	Auction management room	Auction management room only for personnel Buyers join the auction from anywhere	k.



a. Open-outcry auction, record the sales results on the slips of paper in the display area



c. Electronic auction and online auction in the display area



b. Open-outcry auction, record the sales results on the slips of paper in the display area



d. Electronic auction and online auction in the auction area



Photo 6.1 Examples of where the auction takes place

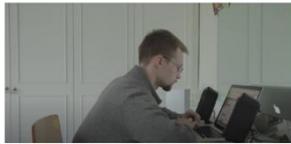


e. Electronic auction and online auction in the auction room



f. Online auction in the auction room, where buyers may also be present

Photo 6.2 Examples of where the auction takes place



Supplier at his office



Auctioneer at the auction administration office



Buyer at his office



g. Online auction in the auction administration office



Display area



Slips of paper



Auction administration office



h. Electronic auction and online auction in the auction room



Auction administration office

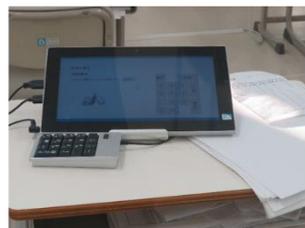


Join the auction by using a tablet at the display area

i. Online auction in the auction room, where is available for buyers



Auction room



Display room (chilling room)

j. Electronic auction in the auction room

Photo 6.3 Examples of where the auction takes place



k. First price sealed-bid on the website

Figure 6.2 Example of where the auction takes place

(Virtual market).

The virtual market, an advanced form of the online auction, may be set up on the web where auctioneers and buyers are all together for the online auction. The virtual market is managed and operated at the administration office.

7 Location and layout of the auction hall

The major objective of the auction hall is to ensure the safe and efficient operation of the entire process from receiving to dispatching or transporting fish and fishery products under the appropriate hygiene management. So the auction hall shall be planned and designed to fully function, taking into account the role and function of the fishing port, the function and use of the market, type of fishery, species and quantity of fish to be landed or brought in by land, and integrated with related facilities such as landing quays, handling equipment, ice-making and supply facilities, clean seawater supply facilities, refrigeration and freezing facilities, parking lot and roads, as described in 1.1.

Therefore, the following location and layout shall be planned so that fish and fishery products can move in one direction without intersecting with the flows of people, fishing vessels and vehicles:

- 1 The location of the auction hall in the fishing port;
- 2 The layout of the auction hall, i.e. arrangement of buildings and facilities on the auction hall premises; and
- 3 The layout of the main building, i.e. each operational area/room within the main building.

7.1 Location of the auction hall in the fishing port

The following considerations shall be taken into account when locating the auction hall in the fishing port:

- For close proximity to the landing quays, the main building of the auction hall is located directly behind the landing quays, or across the road;
- The main building of the auction hall is planned and designed in coordination with the landing quays, the roof over the landing quays, the roof overhang of the main building, etc., taking into account the type of operation for unloading, washing, sorting, grading and weighing. Where only samples pass through the auction hall (See 6.4.1(2)), the main building does not necessarily have to be located directly behind the landing quay;
- Where there is a clear difference in the sales system by type of fishery and fish species, the same building may be divided for each type of fishery and fish species, or each building may be planned for each type of fishery and fish species.

- For security and hygiene management, fencing around the entire auction hall premises or fishing port and gates to control access to the fishing port or to the auction hall premises.

Figure 7.1 shows an image of the location of the auction hall for fishing vessels involved in (a) coastal fisheries, operating daily, (b) offshore fisheries for demersal fish, operating for several days, and offshore fisheries by purse seine for pelagic fish, operating for a week or so.

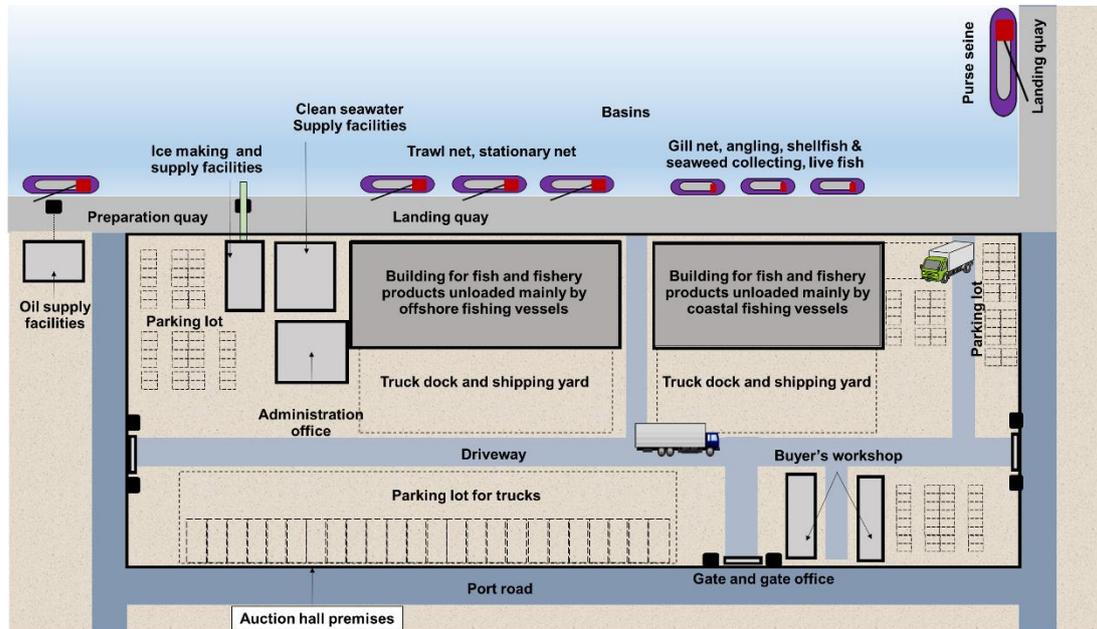


Figure 7.1 Image of the location of the auction hall in the fishing port

7.2 Proximity among areas/rooms in the main building and facilities for the auction hall

7.2.1 Proximity among areas/rooms and facilities

Table 7.1 shows how close areas/rooms in the main building and facilities for the auction hall and related facilities must be to each other in terms of location, whether they must be located in the same building, and whether, in the case of a multi-story building structure, on which floor each of them shall be located.

Areas/rooms in the main building and facilities used for operations from receiving to dispatching or transporting fish and fishery products are located very close to each other and on the same ground floor. In the case of online auctions, the auction room, which is not necessarily close to the areas/rooms above, may be located on the first floor of the main building or in the separate building.

The storage for machinery and equipment such as forklifts, sorting or grading machine are also located close to the landing quays and areas/rooms for washing, sorting, grading and weighing in the main building.

7.2.2 Sharing among areas/rooms and facilities

Some facilities and areas/rooms and facilities in the main building can be shared to carry out a series of operations in a safer and more efficient manner, due to their close proximity. Shared areas/rooms and facilities for each operation can also reduce construction and maintenance costs. Figure 7.2 shows the major operations according to the flow of fish and fishery products.

Considering the type of fishery, type of fish, quantity, type of auction, etc., the following alternatives can be made for the possibility of sharing facilities and areas/rooms:

Alternative 1: Shared area A for washing, sorting, grading, weighing, display and auction; and

Alternative 2: Shared area A1 for washing, sorting, grading and weighing, and shared area A2 for display and auction.

Table 7.1 Proximity among areas/rooms and facilities

Work, operations and activities	Auction hall facilities (AHF) Related facilities (RF)	Areas/rooms, facilities	Proximity	1st floor or higher	Separate building		
Administration for the auction hall	AHF	Administration office	Close	Possible	Possible		
		Computer room					
		Training and meeting room					
Primary work	RF	Landing quay, Handling equipment	Close (except for online auction room)				
	AHF	Truck dock and shipping-in yard					
	AHF	Washing and sorting area/room, sorting machine					
	AHF	Grading and weighing area/room, grading machine					
	AHF	Cold storage (freezing and refrigeration facilities inside auction hall building)					
	AHF	Display area/room					
	AHF	Auction area/room					
	AHF	Auction management room					
	AHF	Auction room (online auction)				Possible	Possible
	AHF	Delivery area/room					
	AHF	Circulation and passage					
	AHF	Preparation and packing area/room, platform					
RF	Truck dock and shipping yard						
Ancillary work	Service	RF	Driveway, port road and parking lot				
		RF	Ice making, storage and supply facilities				
		RF	Clean water supply facilities				
		AHF	Storage for machinery, equipment, etc.				
		RF	Freezing and refrigeration facilities (outside auction hall building)		Possible		
	AHF or RF	Fish box washing and storage					
	AHF or RF	Producer's office/room		Possible			
	AHF or RF	Buyer's office/room		Possible			
	AHF or RF	Buyer's workshop (primary processing)					
	AHF	Electrical room		Possible			
	AHF	Drainage system					
	AHF	Waste storage					
	AHF	Climate control					
	AHF	Hand and boot washing and sanitizing facilities					
	Social welfare service	AHF	Veterinary laboratory				
AHF		Facilities to prevent birds and animals from infesting					
AHF		Cleaning and Sanitizing					
AHF		Dressing room					
AHF		Training and meeting room					
AHF		Lounge					
AHF		First aid facilities		Possible			
RF		Coffee and snack bar, canteen, and restaurants					
RF		Bank					
AHF		Lavatory					
Collaboration with tourism, education and learning	RF	Exhibition room	Close	Possible	Possible		
	RF	Training/meeting room					
	RF	Tour passage					
	RF	restaurant					
	RF	Observation deck					
	RF	Lavatory					

(1)The whole pass through the auction hall
(a) Sale with whole display

Facilities and areas/rooms necessary for major operations

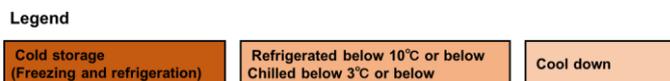
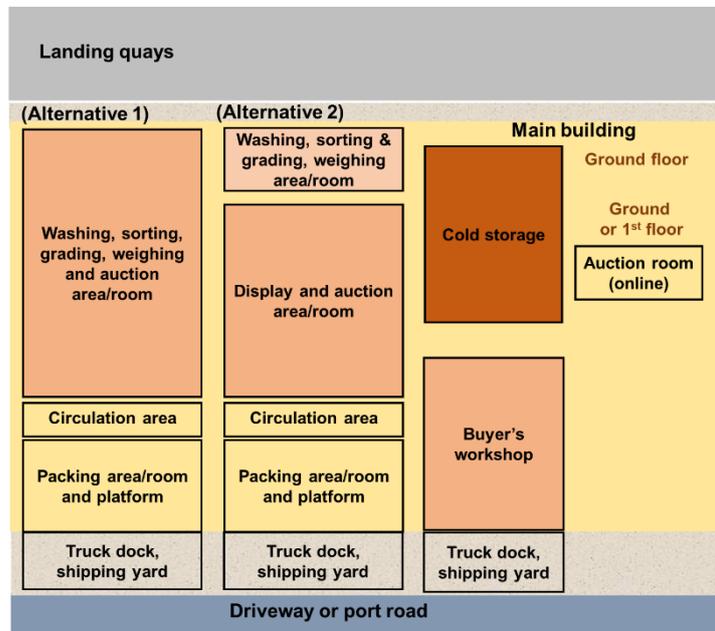
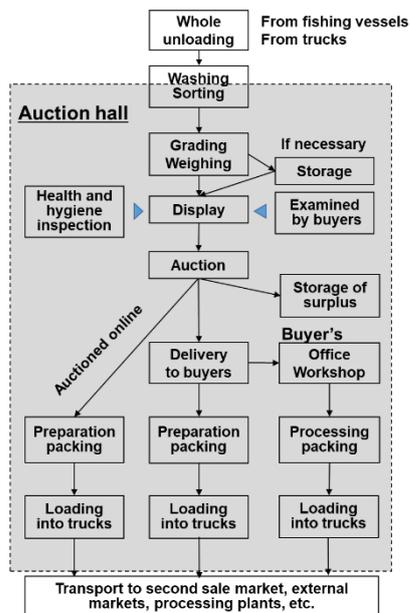


Figure 7.2 Sharing among areas/rooms and facilities

7.3 Layout of the auction hall

Images of the cross-section and ground plans of the auction hall are shown in Figure 7.3 and 7.4 for the case of Alternative 2. Basically, the areas where each operation is carried out are arranged from the shore side to the land side so that fish and fishery products flow in one direction. The shipping-in yard is provided on the side of the main building for fish and fishery products unloaded from trucks. The shipping yard is provided on the rear of the main building so that the trucks loaded with fish and fishery products can access to the driveway or port road, and parking lots for trucks are also provided nearby.

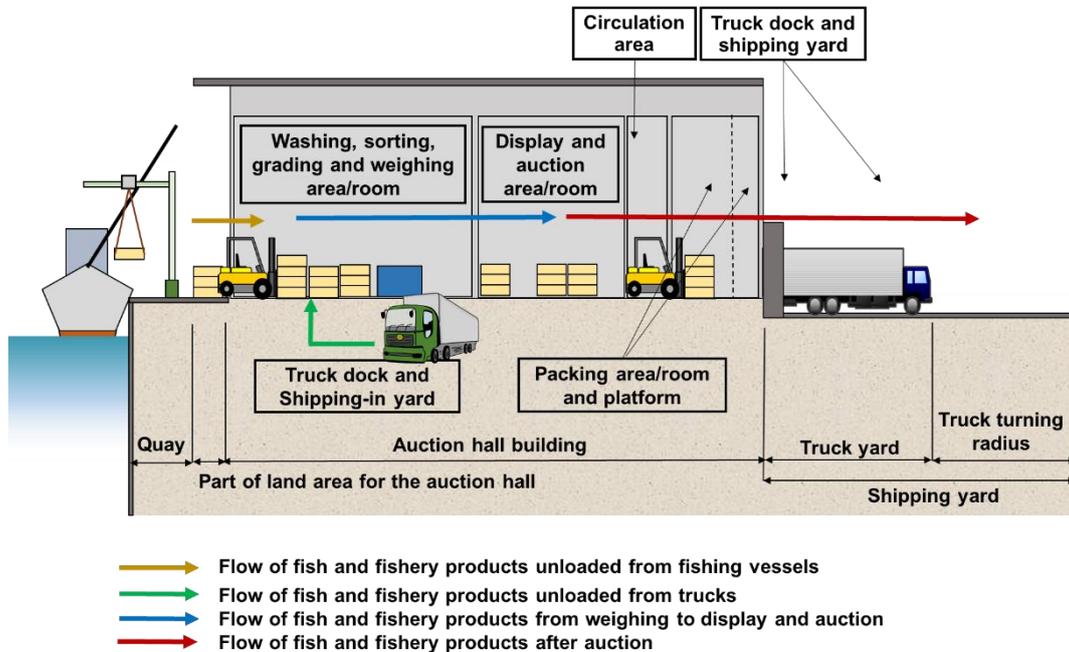


Figure 7.3 Image of the cross-section plan of the auction hall

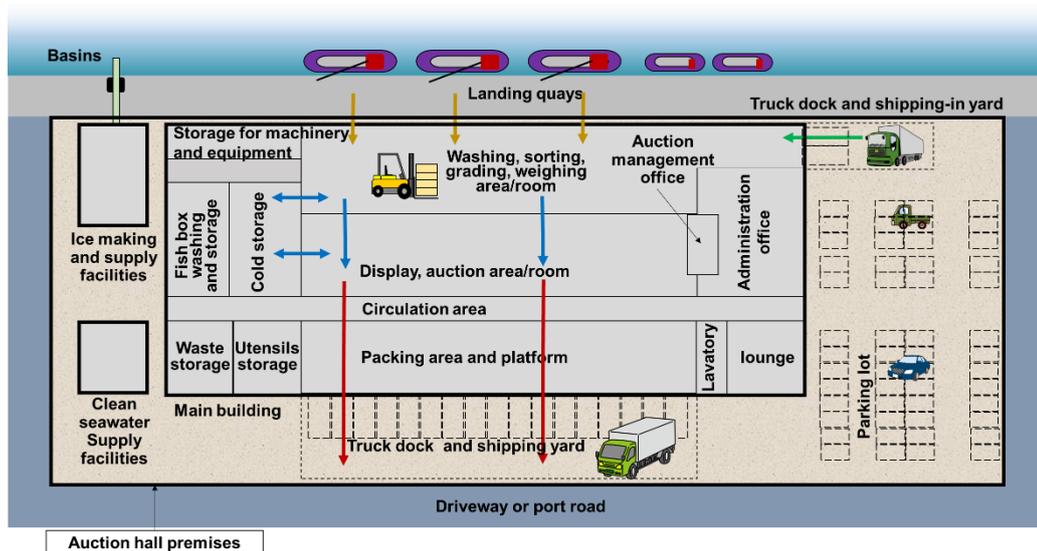


Figure 7.4 Image of the ground plan of the auction hall

Figure 7.5 shows an image of the one-way flow of fish and fishery products by the adequate arrangement of (a) the washing, sorting, grading and weighing area, (b) the display and auction area, (c) the circulation area and passage, (d) the packing area and platform and (e) the truck dock and shipping yard. In addition, the arrangement of external and internal entrances and exits of the main building is also significant to allow for the safe and smooth movement of forklifts and trolleys.

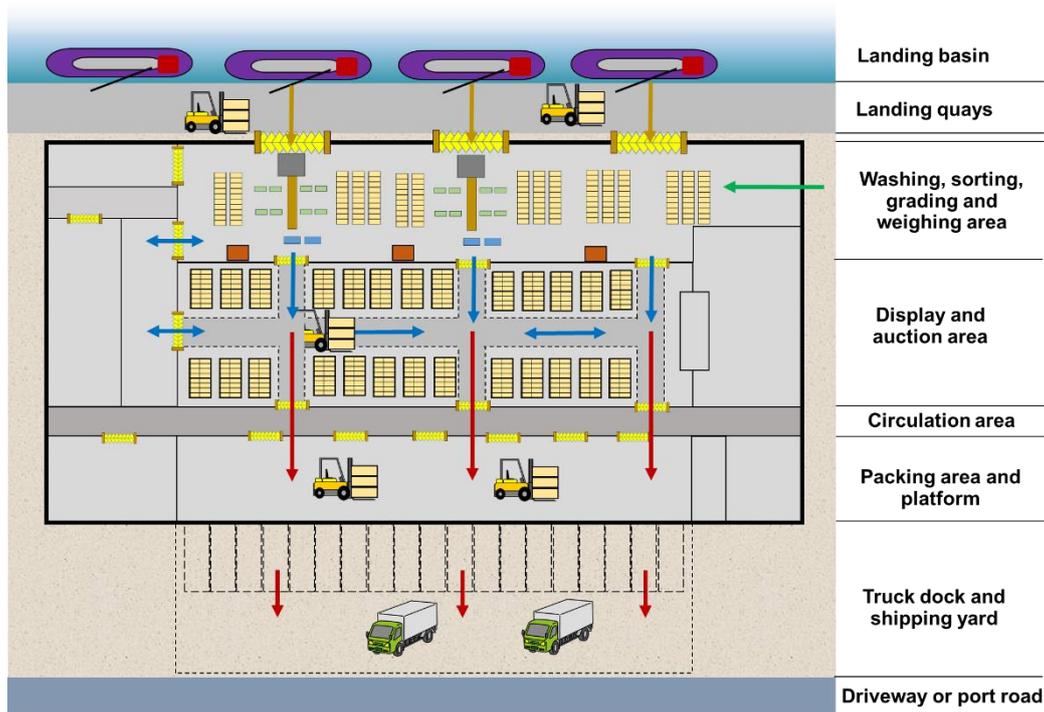


Figure 7.5 Image of use of areas and flow of fish and fishery products in the main building

[Case study]

Location and layout of the auction hall, Matoshinhos, Portugal

In Portugal, the development, maintenance and management of fishing ports is carried out by the state-owned company, Docapesca (Ports and Auction Markets S.A.). The layout and use of the Matozinhos fishing port, the base fishing port in the Norte Regional Area, is shown in Figure 1. The fishing port has a number of functional facilities, including a management office, auction hall, ice making and supply facilities, freezing and refrigeration facilities and fishing gear warehouse. A quay for landing, a couple of piling piers and a floating pier for landing and idling are located in front of the auction hall building for landing.

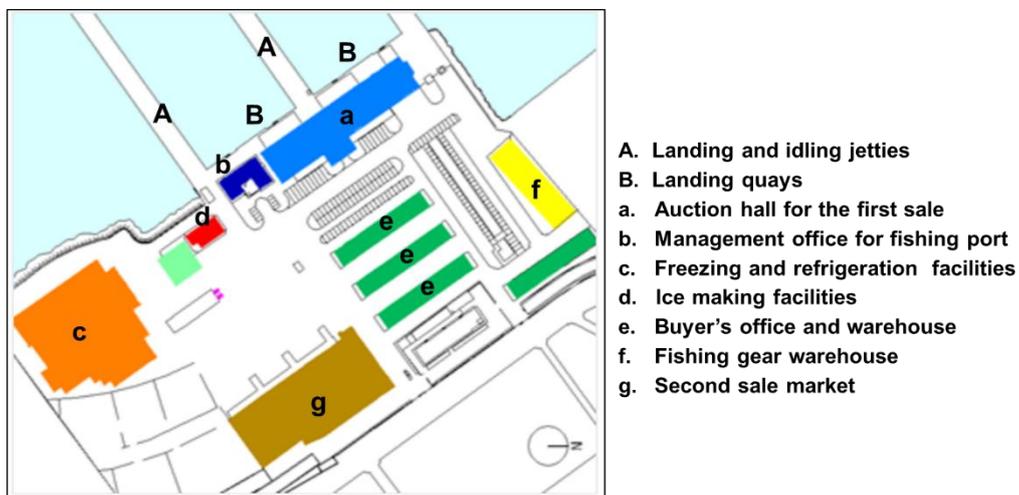
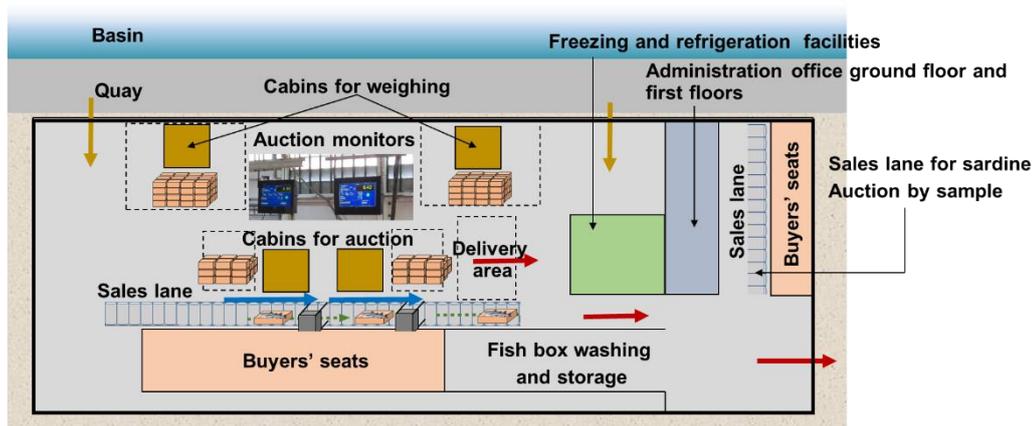


Figure 1 Location of the auction hall and its related facilities, Matoshinhos, Portugal

The layout and use of the auction hall is shown in Figure 2. The auction hall consists of areas/rooms for sorting, weighing, auction and delivery after auction, a cold storage, washing and storage facilities for fish boxes, administration office, etc. The sales area is divided into two areas, one for floating fish (sardines) and the other for other fish species. For the latter, two auction cabins and two monitors are installed to allow two auction sales to be conducted simultaneously. Auctions are carried out by using remote controllers while the fish and fishery products in the fish boxes are moving on the sales lanes. The online auction system is also in place, but currently only a few buyers participate online. Soon after fish and fishery products are auctioned, they are placed together at the place for each winning buyers, whose numbers are marked on the floor.



Building area on the ground floor of the auction hall: 3,200m²



Figure 2 Image of ground plan, Matosinhos, Portugal

8 Scale and capacity requirements

This section is mainly concerned with the layout of the sales system shown in Figures 7.4 and 7.5.

8.1 Administration

8.1.1 Administration office

The administration office, which is distinguished from the management office for the entire fishing port, is an office for the preparation and issue of purchase notices and the settlement of payments for the sale of fish and fishery products, as well as for the accounting and general affairs for the auction hall and for the report of the sales results and fishery statistical data to the fisheries authorities or the fishery management organization. The market office may be in a separate building from the fishing port office or in the same building.

In the case where the auction hall is managed by a municipality and operated by a concessionary wholesale company, the office may be shared by the two bodies, or each may have its own office. The administration office is usually located on one side of the ground floor of the main building, or on the first floor if the main building is a two-story structure. A separate building for the administration office may also be located adjacent to the main building of the auction hall.

(Required area)

The required area for the administration office is determined by considering the arrangement and occupied area of the tables, desks, chairs, fixtures and fixings, etc., and their necessary clearance and aisles. The office may be accompanied by the lavatory, computer room, training/meeting room, etc. The required area of the administration office can be a certain rate of that of the main building. This rate may be determined by reference to those in other auction halls with similar characteristics. The required land area for the separate building can be calculated by considering the building-to-land ratio.

8.1.2 Computer room

The computer room, also known as a server room, is a room dedicated to the installation of server computers and related equipment for market operations. The heat exhausted from the servers, which operate 24 hours a day, 365 days a year, is enormous and can cause the temperature of the equipment to rise, leading to breakdowns, so an air conditioning system for the server room must be installed to efficiently remove the heat. In some cases, spare batteries are provided for emergency use in the event of a power failure.

(Required area)

The area of the room is determined by considering the arrangement and occupied area of the servers, their necessary allowance, and space for maintenance management of the system.

8.1.3 Training and meeting room

(Required area)

The required area for the training and meeting room is determined by considering the number of people accommodated, the arrangement of tables and chairs and their necessary allowance.

8.2 Primary work (sales operations)

8.2.1 Landing quay

(This section may be deleted due to coordination with Chapter 4B Planning Principles.)

Landing quays are used for landing fish and fishery products from fishing vessels, which generally berth alongside. Landing quays are also in front of or in close proximity to the main building of the auction hall for bringing in the main building. In some fishing ports, washing and sorting may also be carried out on the landing quays.

(Required length and width)

The required length of the landing quays can be calculated as follows, depending on the type of fishery and drafts of the fishing vessels (i.e. quay depths) on a representative day in the peak fishing season:

$$B_B = \Sigma \frac{N_V}{R_B} \cdot B$$

Where,

B_B : Total berth length (m)

N_B : Number of fishing vessel for landing (vessels)

B : Berth length (m) = overall length of fishing vessel (m) + allowance (m)

R_B : Berth use rate = available time for landing (min.) / landing time per vessel (min.)

The available time for landing is determined by the time the auction hall is open or the time after arrival of the fishing vessels and the start of the auction. The landing time per vessel (the time for a fishing vessel to berth, land and leave the quay) shall be set in accordance with the actual situation at the fishing port or data obtained in the other fishing ports with similar characteristics.

The quay width must be appropriate to the actual situation of the use of the quays, the use of the land behind it (e.g. auction hall) and the quay structure. Figure 8.1 shows the survey results of landing quay widths by country and fishing port. The minimum and maximum quay widths are 2.0m and 22.0m respectively, with nearly 80% of the quays less than 10.0 m. Note that in Japan, quay widths are often set at 3.0m and 10.0m, except in special cases.

Most of the catch is boxed by species and standard on board before entering the port. Fish and fishery products in containers are placed on the quay apron after being unloaded from the hold, and are immediately brought in the main building of the auction hall by forklifts or carts. So the quay widths are narrow but enough. On the other hand, the catch may be unloaded at the quay, where it is washed and sorted. In such cases, the quay width is wider and a roof may be installed on the quay or the roof of the auction hall building may be extended over the quay.

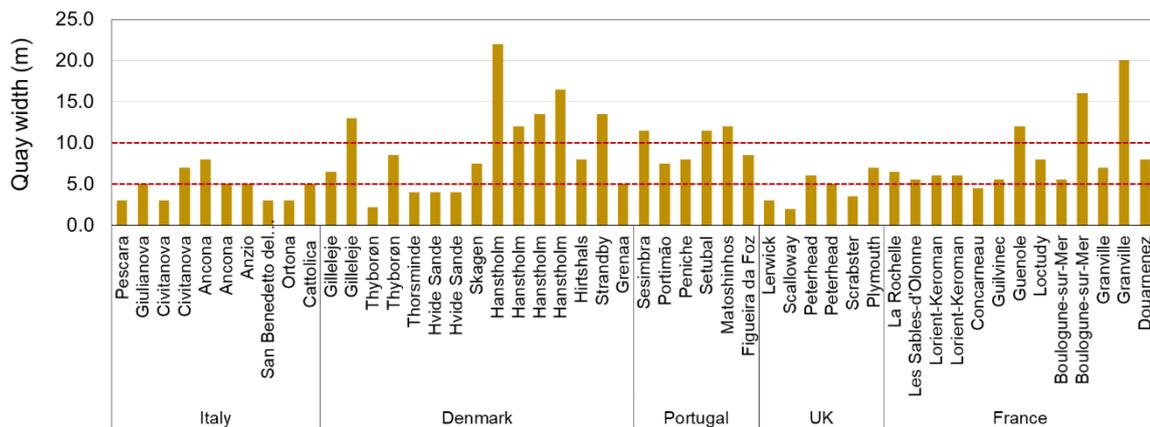


Figure 8.1 Example of landing quay widths by country and fishing ports

8.2.2 Truck dock and shipping-in yard

The truck dock and shipping-in yard shall be located on the side of the main building to ensure smooth access to the washing, sorting, grading and weighing area. The truck dock is part of loading facilities and where fish and fishery products are loaded into trucks. The platform is provided connected to the truck dock for the temporary storage of fish and fishery products in containers.

(Required area)

The required number of truck docks is calculated as follows:

$$N_{UD} = \frac{N_V \cdot t}{T}$$

Where,

N_{UD} : Required number of unloading docks

N_V : Number of unloading trucks

t : Unloading time per truck (min.)

T : Allowable total time for unloading (min.)

Figure 8.2 shows that the depth of the shipping-in yard shall be the length of the truck yard plus its turning radius, assuming the truck docks vertically. The required area for the shipping-in yard is calculated as follows:

$$A_{SI} = B_V \cdot (1 + \alpha_2) \cdot (L_V + L_{VR}) \cdot N_{UD}$$

Where,

A_{SI} : Required area for the shipping-in yard (m^2)

B_V : Width of truck (m)

α_2 : Allowance rate

L_V : Length of truck yard (i.e. overall length of truck) (m)

L_{VR} : Truck turning radius (m)

N_{UD} : Required number of unloading docks

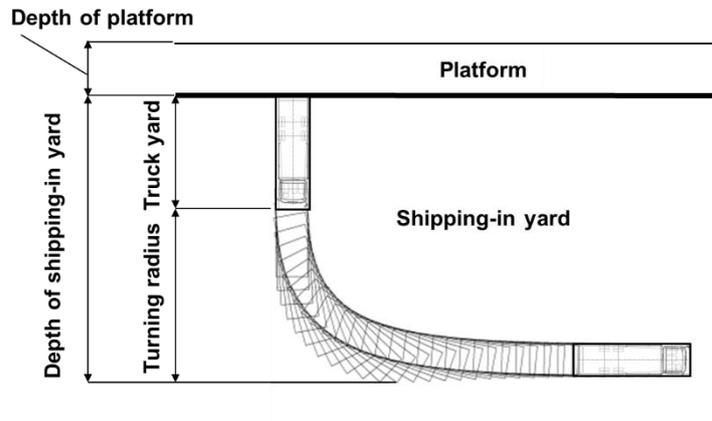


Figure 8.2 Shipping-in yard

The required area for the platform is calculated as follows by considering the number of fish boxes stored temporarily:

$$A_{PI} = B_V \cdot (1 + \alpha_2) \cdot L_{PT} \cdot N_{UD}$$

Where,

A_{PI} : Required area for the platform (m^2)

B_V : Width of truck (m)

α_2 : Clearance rate

L_{PT} : Depth of platform (m)

N_{UD} : Required number of unloading docks

8.2.3 Washing, sorting, grading and weighing areas/rooms

In the case of a mixture of fish species and grades in size landed or unloaded, the fish catch are sorted and graded according to species, and then are weighed. These operations are usually conducted in the same area of the main building in a row. Where fish and fishery products are sorted, graded and weighed on board, they may be weighed on a sampling basis.

The washing, sorting, grading and weighing require a large number of personnel to work quickly, and their areas require low temperature control, taking note of the working environment, whereas the areas for display and auction must be refrigerated or chilled. Therefore, the washing, sorting, grading and weighing shall preferably be carried out in the areas separate from the display and auction areas. Conveyor belts, sorting tables, automatic sorting machines, weighing scales, fish boxes and tanks are used for these operations. Sorting and grading are carried out by hand or by machine as shown in Photo 8.1, according to species and their quantities. Washing is carried out during unloading and sorting and does not require a specific area.



Manual, Minamisanriku, Japan



Grading machine, Scalloway, UK



Photo 8.1 Examples of grading

(1) Required area for manual sorting and grading

One or a few sorting tables are set up behind which are fish boxes and tanks for the sorted and graded ones as shown in Figure 8.3. The required area for washing, sorting, grading and weighing is calculated as follows, by considering fish and fishery products by type of fishery and species, number of fish boxes and tanks on a representative day in the peak season:

- Required area for washing, sorting, grading and weighing for berth N (A_{wN})
- = area occupied by sorting table
- + area for sorting and grading operations
- + area for fish boxes and tanks
- + area for weighing scales and their operations (See Photo 8.2)
- + the above allowance
- = $BN \cdot L_{wN}$

Where,

A_{wN} : Required area for washing, sorting, grading and weighing for berth N (m^2)

BN : Length of berth N (m)

L_{wN} : Depth of washing, sorting, grading and weighing for berth N (m)

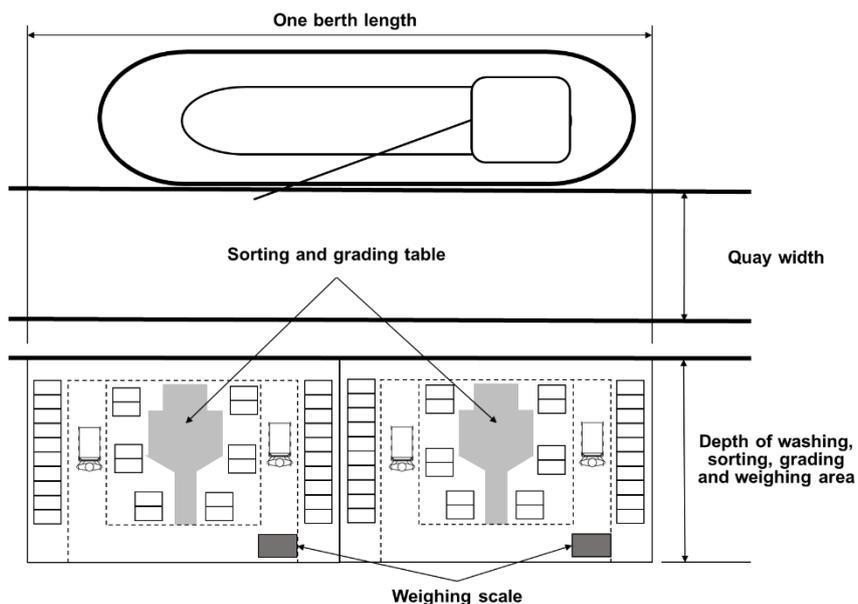


Figure 8.3 Example of arrangement of sorting tables for one berth

Total required area is calculated as follows:

$$A_W = A_{W1} + A_{W2} + A_{WN} + \dots + A_{WN_B}$$

Where,

A_W : Total required area for washing, sorting & grading and weighing (m^2)

A_{WN} : Required area for washing, sorting, grading and weighing for berth N (m^2)

N_B : Number of berths



Photo 8.2 Various types of weighing scales

(2) Required area for mechanical sorting and grading

The required area for washing, sorting, grading and weighing can be calculated as follows by considering fish and fishery products by type of fishery and species, number of fish boxes and tanks on a representative day in the peak season:

- Required area for washing, sorting, grading and weighing for berth N (A_{WN})
- = area occupied by sorting and grading machines
- + area for fish boxes and tanks
- + area for weighing scales and their operations
- + the above allowance

Total required area is calculated in the same way as in **8.2.3 (1)**.

The required area may be calculated by reference to the washing, sorting, grading and weighing area per tonne of fish and fishery products on a representative day in the peak season in other auction halls with similar characteristics.

8.2.4 Cold storage

In this chapter, freezing and refrigeration facilities installed in the auction hall building for temporary storage for sale are referred to as 'cold storage', and are distinguished from freezing and refrigeration facilities where buyers and processors store fish and fishery products purchased at the market or collected for processing.

A cold storage is used to store the sorted, graded and weighed fish and fishery products before they are displayed for sale, when their freshness may be affected. In addition, fish and fishery products left over from the auction may be stored until the next sale. The recommended storage temperature ranges are (a) between 3°C and 10°C for refrigerated storage, (b) between 0°C and 3°C for chilled storage and (c) -18°C or below for frozen storage.

(Required capacity and area)

The required capacity and area for the cold storage is calculated as follows by considering the amount of fish and fishery products stored up to the time of sale on a representative day during the peak season and their storage period:

$$A = \frac{G \cdot (1+\beta_1) \cdot (1+\beta_2)}{H \cdot K}$$

Where,

A: Area required for the cold storage (m²)

G: Capacity (tonnes)

β_1 : Allowance rate for the cold storage

β_2 : Area rate for ancillary facilities, etc.

H: Effective ceiling height (m)

K: Capacity per storage volume (t/m³)

The cold storage shall be equipped with thermometers and hygrometers, if necessary, with pressure gauges, and other measuring instruments.

The required area may be calculated by reference to the area per tonne of fish and fishery products for the cold storage in other auction halls with similar characteristics.

8.2.5 Display and auction areas/rooms

The washed, sorted, graded and weighed fish and fishery products are displayed and auctioned to buyers. Display and auction are usually conducted in the same area of the main building in a row.

The required area for the display and auction can be calculated from the number of displayed fish boxes and their occupancy ratio - the ratio of the area occupied by fish boxes alone in an area - and the number of cycles - the number of times fish boxes with fish in are displayed and auctioned in a day. When various types of fishery and species are handled differently, the required area is calculated for each of them.

(1) Number of displayed fish boxes (bottom boxes)

The number of displayed boxes (bottom boxes) for berth N can be calculated as follows:

$$PN = \frac{WN}{wN \cdot N_sN}$$

Where,

PN: Number of displayed boxes (bottom boxes) for berth N

WN: Weight of fish and fishery products for berth N (kg)

wN: Weight of fish and fishery products in a fish box for berth N (kg)

N_s: Number of stacks of fish boxes for berth N

(2) Occupancy ratio of fish boxes (bottom boxes)

Fish and fishery products are displayed in a certain number of boxes together as shown in Photo 8.4. Walkways around the boxes are necessary for handling the boxes and buyers' examination as shown in Figure 8.4. The occupancy ratio of a block of fish boxes (bottom boxes) is calculated as follows:

$$rN = \frac{pN \cdot aN}{mN + pN \cdot aN}$$

Where,

r_N : occupancy ratio for berth N

p_N : Number of bottom boxes in one block
for berth N

a_N : Area occupied by one fish box
for berth N (m^2)

m_N : Area for the walkway for berth N (m^2)



Photo 8.3 Example of display and auction area
Peterhead, UK

Large fish like tuna, fish in baskets, etc. shall be displayed on palettes for hygiene and transport reasons and even fish in fish boxes shall preferably be displayed in the same manner, as shown in Photo 8.4. So the area occupied by the palettes can be taken as the area occupied by fish boxes as shown in Figure 8.5.



Furubira, Japan



Choshi, Japan

Photo 8.4 Examples of display and auction area

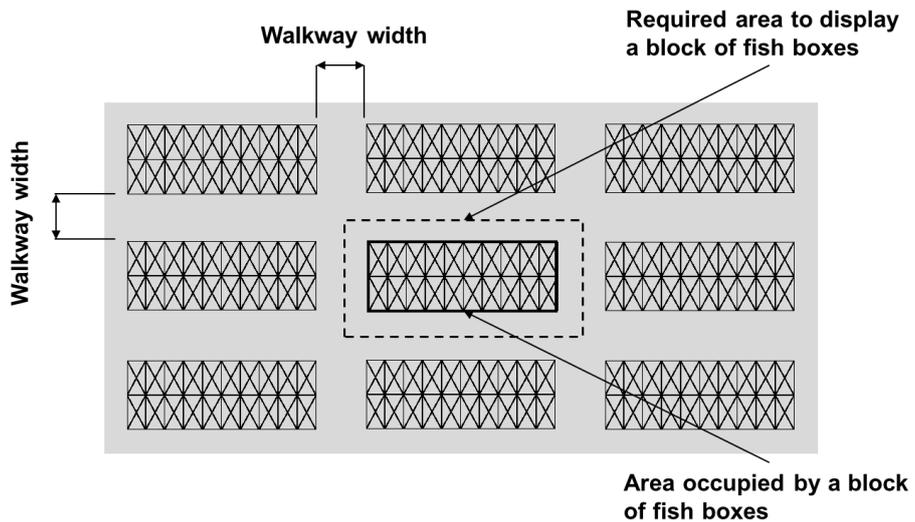


Figure 8.4 Example of arrangement of fish boxes in the display area

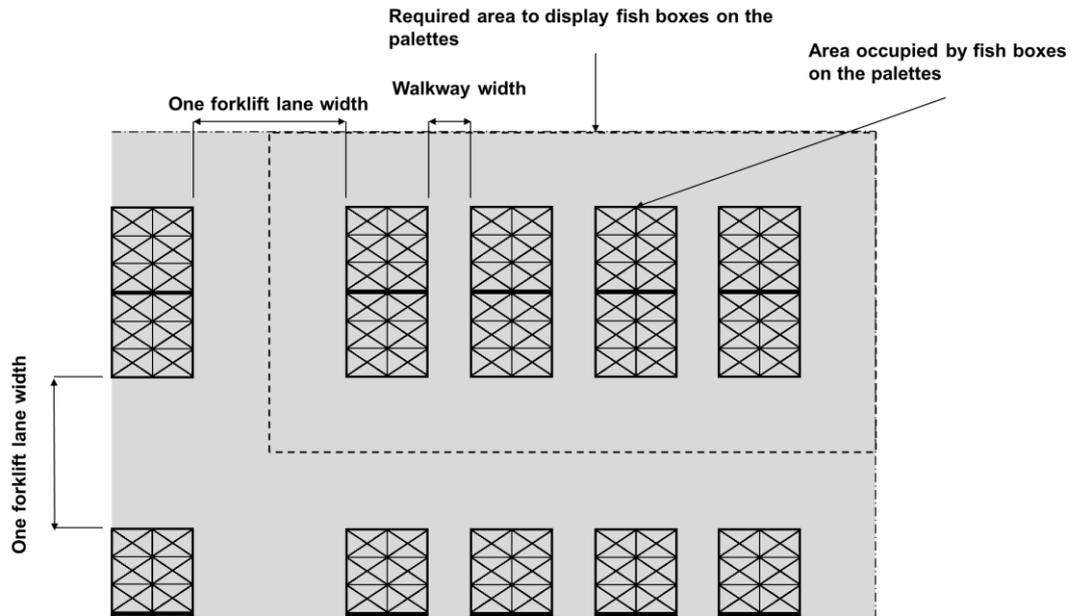


Figure 8.5 Example of arrangement of fish boxes on the pallets in the auction area

(3) Required area

The required area for display and auction for berth N is calculated as follows:

$$A_{AN} = \frac{PN}{pN \cdot rN} \times A_{0N} (= BN \cdot L_{AN})$$

Where,

A_{AN} : Area for display and auction for berth N (m^2)

PN : Number of displayed boxes (bottom boxes) for berth N

pN : Number of boxes per block (bottom boxes) for berth N

rN : Occupancy ratio for berth N

A_{0N} : Area occupied by the displayed boxes per block for berth N (m^2)

BN : Length of berth N (m)

L_{AN} : Depth of display and auction area for berth N (m)

Total required area is calculated as follows:

$$A_A = A_{A1} + A_{A2} + A_{AN} + \dots + A_{AN_B}$$

Where,

A_W : Total required area for display and auction (m^2)

A_{WN} : Required area for display and auction for berth N (m^2)

N_B : Number of berths

The required area for each berth or total required area may be calculated by reference to the display and auction area per tonne of the fish and fishery products on a representative day in the peak season in other auction halls with similar characteristics.

8.2.6 Auction management office (site office)

The auction management room is located in the display and auction area. This is where the market personnel manage the progress of the auction and provide information on sales catalogues and sales results to buyers via monitors or screens in the auction hall and website.

The required area of the room is determined by considering the number of personnel who actually use at the same time and layout of necessary equipment, fixtures and fittings, etc.

8.2.7 Auction room (online auction)

The auction room may be separate from where fish and fishery products are displayed and may also be on the ground floor of the main building, on the first floor (if the main building is a two-story structure), or in the administration office. This is where the auctioneers and buyers gather together for the electronic auction. Buyers can also participate in the auction from anywhere online, if online auctions are available.

The room is equipped with electronic clocks, boards or screens, tables and desks with electronic terminals on them for buyers and auctioneers. The required area of the room is determined by considering the number of buyers who actually visit the room and auctioneers and layout of necessary equipment, fixtures and fittings, etc.

8.2.8 Delivery area/room

Soon after the sale of fish and fishery products by lot or by fishing vessel is completed, they are gathered to an open area or designated place for each winning buyer in the same display and auction area, where they are delivered to the buyers, as shown in Photo 8.5. In the auction hall where the fish and fishery products are placed on a conveyor belt for auction, the area for delivery is provided at the end of the conveyor belt.

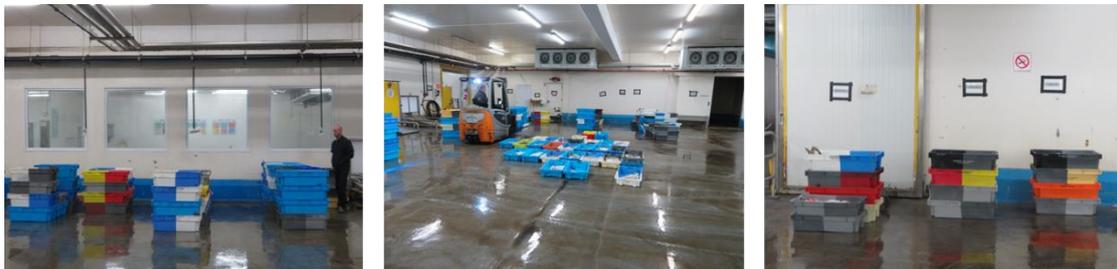


Photo 8.5 Examples of delivery area, Guilvinec, France

8.2.9 Preparation and packing area/room, platform

The fish and fishery products in fish boxes are brought from the display and auction area to the preparation and packing area and platform, where they are replaced into fish boxes or packed with additional ice, as necessary. They may also be packed in the display and auction area soon after the auction as shown in Photo 8.6. The platform, connected to the truck dock, is where the fish and fishery products in fish boxes are temporarily placed for truck loading as shown in Photo 8.7.



Photo 8.6 Packing in the display area, Lerwick, UK



Photo 8.7 Example of platform, Peterhead, UK

(Required area)

The required area for preparation and packing and platform for berth N is calculated as follows by considering the number of fish boxes stored temporarily:

$$A_{PN} = BN \cdot (L_{PTN} + L_{PPN})$$

A_{PN} : Required area for preparation and packing and platform for berth N (m^2)

BN : Length of berth N (m)

L_{PTN} : Depth of preparation and packing area for berth N (m)

L_{PPN} : Depth of platform for berth N (m)

Total required area is calculated as follows:

$$A_P = A_{P1} + A_{P2} + A_{PN} + \dots + A_{PN_B}$$

Where,

A_P : Total required area for preparation and packing for berth N (m^2)

A_{PN} : Required area for preparation and packing for berth N

N_B : Number of berths

8.2.10 Truck dock and shipping yard

The truck dock and shipping yard shall be located on the side or rear (road side) of the main building to ensure smooth access to the driveway or port road as shown in Photo 8.8. The truck dock is part of loading facilities and where fish and fishery products are loaded into trucks.



Photo 8.8 Example of Shipping yard, Concarneau, France

(Required area)

The required number of truck docks for berth N is calculated as follows:

$$N_{DN} = \frac{N_{VDN} \cdot tN}{TN}$$

Where,

N_{DN} : Required number of loading docks for berth N

N_{VDN} : Number of loading trucks for berth N

tN : Loading time per truck for berth N (min.)

TN : Allowable total time for loading (min.)

Figure 8.6 shows that the depth of the shipping yard shall be the length of the truck yard plus its turning radius, assuming the truck docks vertically. The required area for the shipping yard for berth N is calculated as follows:

$$A_{SO N} = B_{VN} \cdot (1 + \alpha_2) \cdot (L_{VN} + L_{VRN}) \cdot N_{DN}$$

Where,

$A_{SO N}$: Required area for the shipping yard for berth N (m^2)

B_{VN} : Width of truck for berth N (m)

α_2 : Allowance rate

L_{VN} : Length of truck yard (i.e. overall length of truck) for berth N (m)

L_{VRN} : Truck turning radius for berth N (m)

N_{DN} : Required number of loading docks for berth N

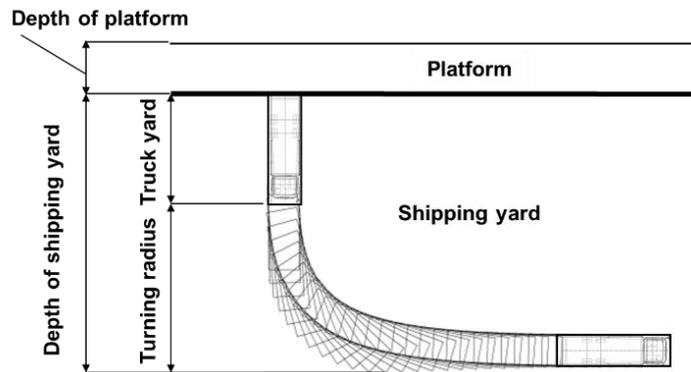


Figure 8.6 Shipping yard

Total required area is calculated as follows:

$$A_{SO} = A_{SO1} + A_{SO2} + A_{SON} + \dots + A_{SONB}$$

Where,

A_{SO} : Total required area for the shipping yard (m^2)

A_{SON} : Required area for the shipping yard for berth N (m^2)

N_B : Number of berths

8.2.11 Circulation and passage

Figure 8.7 shows the arrangement of the circulation and passage. The circulation area separates the preparation area from the display area and auction area as shown in Photo 8.10, and is also used as a passage (i.e. forklift lane, trolley lane or walkway) for handling of fish and fishery products. The circulation and passage are provided in order to transport fish and fishery products smoothly. There are basically the following passages with different uses, which are arranged to ensure smooth loading and unloading:

- (a) Passage connecting the washing, sorting, grading and weighing area and the display and auction area; and
- (b) Passage connecting the display and auction area and the preparation and packing area, platform for each buyer.

The areas for the above (a) and (b) are included in the required area for display and auction.



Peniche, Portugal



Misaki, Japan

Photo 8.10 Examples of circulation

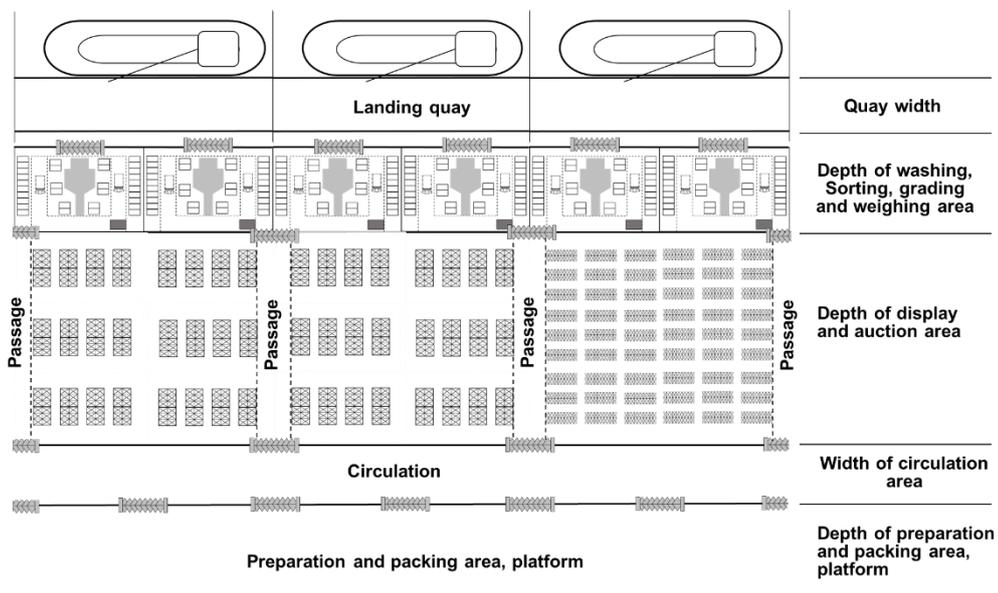


Figure 8.7 Example of arrangement of circulation and passage

(Required area for calculation)

The width of the traffic lane for forklifts and trolleys shall allow for two-way traffic as shown in Figure 8.8. The required widths of the traffic lanes for forklifts and trolleys are calculated respectively as follows:

$$L_F = 2 \cdot B_{FO} + C_{FC} + 2 \cdot C_{FE}$$

Where,

L_F : Required width of the forklift lane (m)

B_{FO} : Width of forklift (m)

C_{FC} : Central allowance (m)

C_{FE} : Edge allowance (m)

$$L_T = 2 \cdot B_{TO} + C_{TC} + 2 \cdot C_{TE}$$

Where,

L_T : Required width of the trolley lane (m)

B_{TO} : Width of trolley (m)

C_{TC} : Central allowance (m)

C_{TE} : Edge allowance (m)

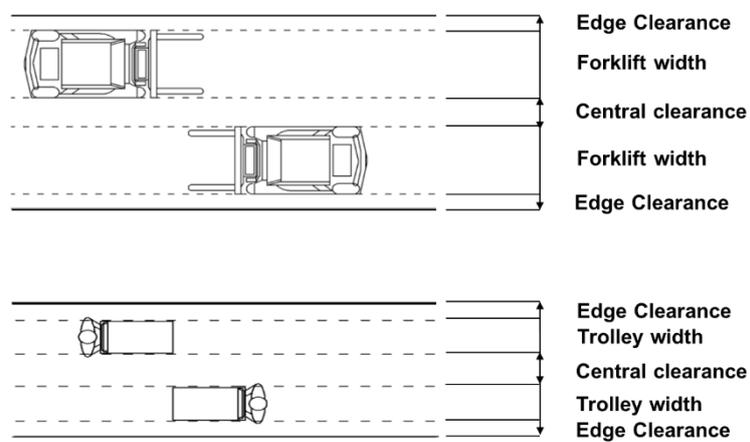


Figure 8.8 Forklift lane and trolley lane

The required width for circulation is calculated as follows:

$$L_C = L_F N_{LF} + L_T N_{LT} + L_P N_{LP}$$

Where,

L_C : Required width for circulation (m)

L_F : Required width of the forklift lane (m)

L_T : Required width of the trolley lane (m)

L_P : Required width of the walkway (m)

N_{LF} : Number of forklift lanes

N_{LT} : Number of trolley lanes

N_{LP} : Number of walkways

Total required area is calculated as follows:

$$A_C = (B_1 + B_2 + B_N + \dots + B_{N_B}) \cdot L_C$$

Where,

A_c: Total required area for circulation (m²)

B_N: Length of berth N (m)

N_B: Number of berths

L_c: Required width for circulation (m)

8.1.12 Transport

In generally, several modes of transport such as electric forklifts, conveyor belts, and manual and electric trolleys or carts are used singly or in a complementary fashion, from the arrival of fish and fishery products to shipping them. The particular modes used and their number vary according to the catch by type of fishery, species of fish, number of tanks and fish boxes, on a representative day during the peak season.

Conveyor belts may be used for the transport of fish and fish boxes from the vessel to the quay, washing, sorting, grading and weighing area/room. Conveyor belts may also be used for sorting & grading, transport to the cold storage, display and auction.

When forklifts and trolleys enter the main building, especially hygiene controlled areas/rooms, their tyres must be cleaned.

8.2.13 Machinery and equipment

- (a) Machinery and equipment, containers, tools and other facilities (hereinafter referred to as "machinery and equipment") appropriate for the each operational work shall be provided.
- (b) Machinery and equipment, etc. in the buyer's room/workplace for the primary processing purchased fish shall be properly cleaned and maintained.
- (c) Machinery and equipment, etc. that come into direct contact with fish shall be made of water-resistant materials, be easy to clean, and be capable of being disinfected with hot water, steam, or disinfectants.
- (d) Machinery and equipment, etc. that are difficult to fix or move shall be conveniently located for work and easy to clean and wash. In the case of assembled machines and equipment, etc., the structure shall be easy to disassemble and clean, and shall be capable of being cleaned and disinfected as necessary.
- (e) A necessary number of adequate machinery and equipment, etc. shall be provided, and facilities for storing them shall also be ensured as appropriate.

8.3 Ancillary work

8.3.1 Service

(1) Ice making, storage and supply facilities

Ice produced by ice-making facilities can be classified into several types such as block ice, plate ice, ice chip, sherbet ice and flake ice. Block ice is made in the shape of a block and stored in an ice storage facility, where they are crushed by an ice crusher when supplied. Plate ice is made in the shape of a plate, crushed by an ice crusher, and then shovelled out by an automatic delivery system. Block ice is often used when the annual ice consumption is high, while plate ice is used when it is low. Sherbet ice and flake ice are supplied in the form of sherbet, which is a mixture of fine ice particles and salt water. Because of a large amount of salt water used, seawater is often taken, filtered and sterilized.

The ice making facility is accompanied by an ice storage facility to establish an ice supply system that can cope with fluctuations in ice demands. A separate building for the ice making, storage and supply facilities may be located adjacent to the building of the auction hall.

The required capacities of the ice making, storage and supply facilities are calculated as follows:

$$C_M = \frac{W \cdot q}{D1} \quad C_S = \frac{W \cdot q}{D1} \times D2$$

Where,

C_M : Required capacity of an ice making facility (t/day)

C_S : Required capacity of an ice storage facility (t)

W : Annual catch (t)

q : Ice consumption per tonne (t)

$D1$: Annual operating days for ice making (days)

$D2$: Ice storage days (days)

The ice storage period $D2$ can be set up so that the amount of ice made and stored can meet the maximum ice consumption during a certain period of the peak season.

The required area of the ice making, storage and supply facilities is calculated as follows by reference to the areas of those by capacity, obtained in the other fishing ports:

Required area (A_{IS})

= area for an ice making room + area for a temporary storage room + area for a machine room
+ area for an ice storage room + the associated working space.

When a separate building for the ice making, storage and supply facilities is to be located adjacent to the main building of the auction hall, the required land area for the building can be calculated by considering the building-to-land ratio.

Figure 8.9 and 8.10 show examples of ground and cross-sectional plans for ice making, storage and supply facilities.

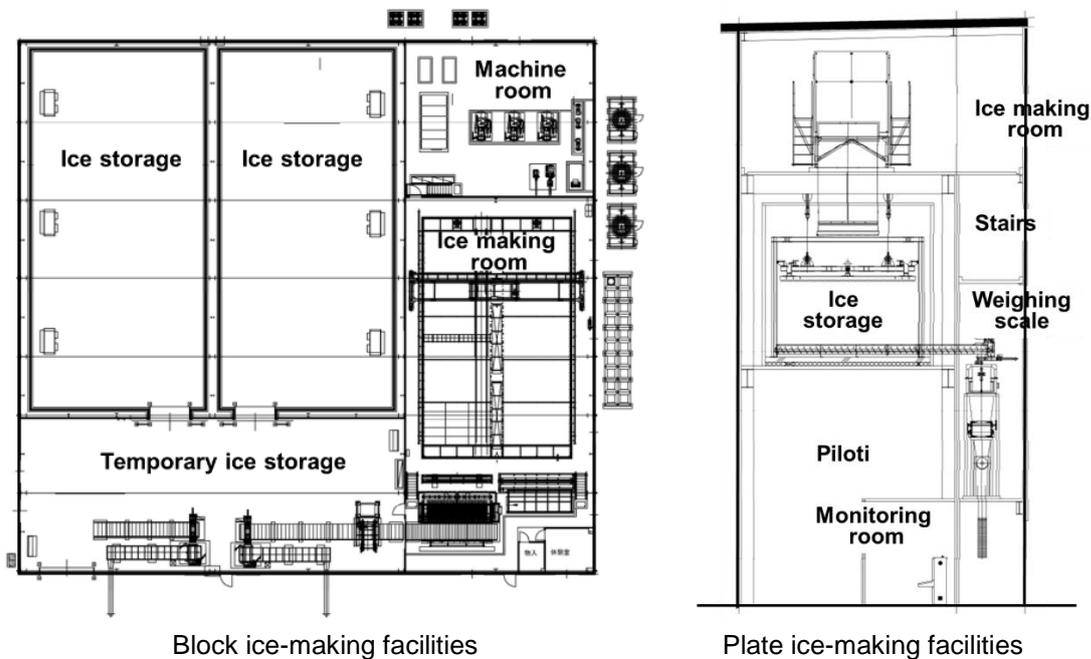
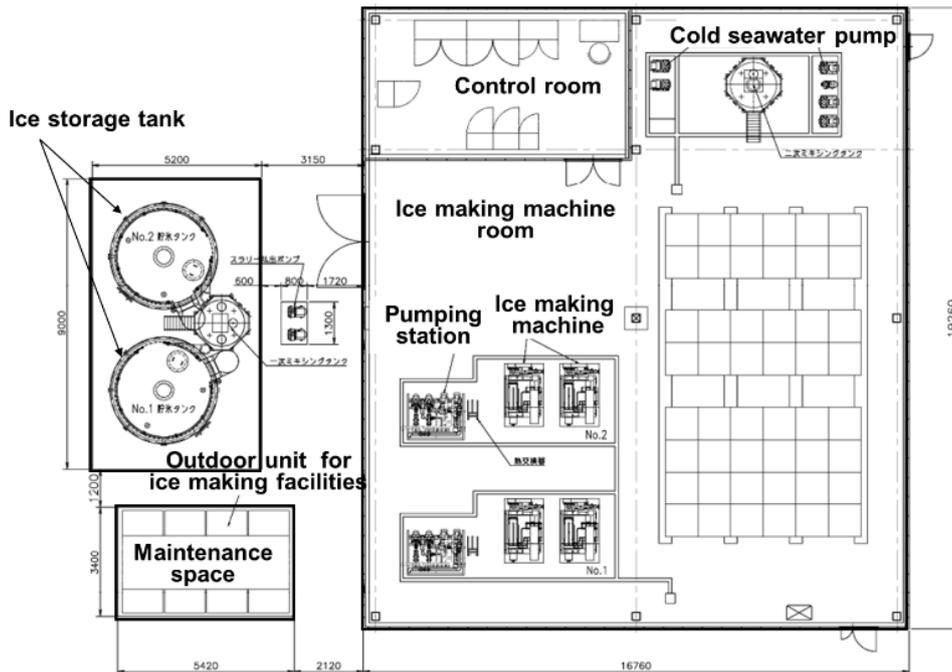


Figure 8.9 Examples of ice making, storage and supply facilities



20 tons/day for ice making, 60 tons/day for sherbet ice making

Figure 8.10 Example of ground plan for ice making, storage and supply facilities

(2) Clean water supply facilities

(Clean fresh water)

The water supply facilities shall be capable of supplying sufficient quantity of water by the water supplier or water suitable for drinking at an appropriate temperature to the necessary places. In the case of using water other than that supplied by the water supplier, the system shall be equipped with water treatment facilities, including water filtration and sterilization facilities. A water treatment facility as necessary, and the water source and water storage tank shall have a structure that is not contaminated from outside.

(Clean seawater)

The seawater supply facilities consist of an intake facility, treatment facility and distribution facility. The uses of seawater at fishing ports include water for fish pumps at the time of landing, water for washing to maintain the cleanliness of floors, facilities, machinery, equipment, etc., water for ice making and cold storage to maintain freshness, water for live fish tanks, and water for fish primary processing.

The maximum daily intake is planned based on the month with the highest volume of water use. The location and method of intake shall be determined according to the use of clean seawater and the required water volume. Depending on the use of clean seawater, the water treatment facility shall be planned.

The water intake facility shall be planned so that the required amount of high quality seawater can be stably taken.

A water intake point can be inside the fishing port, outside the fishing port, or on land (an infiltration well). The most suitable intake method shall be selected by comprehensively considering the distance to the intake point, water depth, water quality, bottom sediment, waves, currents, tidal conditions, the influence of sessile organisms, the use of the sea area, and the location and method of use after intake.

The water treatment facility include seawater filtration and sterilization facilities. For seawater filtration, it is advisable to use a gravel material with a large diameter for the separation of large suspended particles, and a gravel material with a small diameter for the separation of small particles. Seawater sterilization includes chlorine sterilization, ultraviolet sterilization, ozone sterilization and seawater electrolytic sterilization.

The water distribution facility consists of an appropriate combination of tanks, pipes and pumps, and can be either natural flow or pumped.

(3) Electrical room

Electrical equipment consists of receiving and transforming equipment, distribution equipment, power equipment, lighting equipment and communication equipment. In some cases, storage batteries are used to supply electricity in the event of an instantaneous voltage drop to prevent blackouts, and emergency generator equipment is provided in case of a disaster. The electrical room is responsible for the proper management of these facilities and the stable supply of electricity essential for the safe and comfortable use of the market (which may also include other electrical facilities used in the fishing port). Periodic inspections of these facilities are required. It is also recommended that measures be taken to prevent flooding due to storm surges and high waves.

(4) Fish box washing and storage

A fish box is a container that is loaded on board a fishing vessel to hold the catch and, after landing, is used as a container for sale or transport. Fish boxes must meet the following requirements:

- (a) To be durable and able to be safely stacked and stored on board the fishing vessel, in the auction hall, and in transit;
- (b) To be smoothly operated from catching to landing, selling and transportation, especially when the catch is weighed in boxes on board or after being brought in the market; and
- (c) To be hygienically maintained, e.g. styrofoam boxes should not be used more than once, and plastic boxes should be cleaned every time for use.

For this reason, it is better to use fish boxes of the same size, shape and material, which are standardised by fishing port, region or country. Market operators or fish-box manufacturers sell EPS fish boxes and lend out plastic fish boxes.



Lorient-Keroman, France



Guilvinec, France

Photo 8.11 Examples of fish box washing and storage

As shown in Photo 8.11, the washing facility is accompanied by the storage facility to create a fish box supply system that can cope with fluctuations in fish box requirements. A separate building for box washing and storage facilities may be located adjacent to the main building of the auction hall. The overall area of the fish box washing and storage facilities varies depending on the type of the auction hall, fish catch by type of fishery, number of fish boxes during the peak and off seasons.

The required capacities of the fish box washing and storage facilities are calculated as follows:

$$C_{BW} = \frac{W_W}{w} \quad C_{BS} = \frac{W_W}{w} \times \frac{N_{OP}}{N_{UL}}$$

Where,

C_{BW} : Required capacity of fish box washing facility (boxes/day)

C_{BS}: Required capacity of fish box storage facility (boxes)

W_W: Weight of unloaded fish and fishery products on a representative day during the peak season (kg)

w: Weight of fish and fishery products in a fish box (kg)

N_{OP}: Total number of fishing vessels operating during the peak season (vessels)

N_{UL}: Number of fishing vessels unloading fish and fishery products on a representative day during the peak season (vessels)

The required area of the fish box washing and storage facilities is calculated as follows by reference to the areas of those by capacity, obtained in the other fishing ports:

Required area (A_{WS})

= area for washing + area for temporary storage area + area for storage area

+ the associated working space.

When a separate building for the fish box washing and storage facilities is to be located adjacent to the main building of the auction hall, the required area of the building can be calculated by considering the building-to-land ratio.

(5) Freezing and refrigeration facilities

The freezing and refrigeration facilities where buyers and processors store fish products purchased on the market or collected for processing are located separate from the auction hall building. The required capacity and area for the facilities are calculated as described in 8.2.4. In addition, the required land area for the facilities can be calculated by considering the building-to-land ratio.

(6) Producer's office/room

Offices or rooms for producers – fishermen, fishing companies, etc. - can be provided at their requests. The area of the office/room is determined by reference to the areas of those obtained in the other fishing ports. The number of offices/rooms is determined by considering the sellers' requests. The sellers' offices/rooms are usually located on one side of the ground floor of the main building, or on the first floor (if the main building is a two-story structure).

(7) Buyer's office/room/workshop

Offices, rooms or workshops for buyers – buyers, transporters, etc. - can be provided at their requests. While buyer's office/room is for administrative work, buyer's workshop is for the primary processing treatment, packing and shipping of purchased fish and fishery products as shown in Photo 8.12. Buyer's workshop may be accompanied by a truck dock and a shipping yard. The workshop for the primary processing shall be equipped with the facilities for freezing and refrigeration of fish and fishery products, live fish tanks, and washing and sanitizing hands and boots.

The area of the office/room is determined by reference to the areas of those obtained in the other fishing ports. The number of offices/rooms/workshops is determined by considering the buyers' requests.



Photo 8.12 Examples of buyer's workshop, Les Sables-d'Olonne, France

The buyers' offices/rooms are usually located on the ground floor of the main building, or on the first floor (if the main building is a two-story structure). A separate building for the buyers' offices/rooms may also be located adjacent to the main building of the auction hall. The buyers' workshops are usually located on the ground floor of the main building, or a separate building for the buyers' workshops may also be located adjacent to the main building of the auction hall.

(8) Storage for machinery, equipment, etc.

Machinery and equipment shall be cleaned after each use. After the day's use is completed, cleaned and sanitized, the machinery and equipment are stored where they are used, in a designated area or storage. For forklifts, a power supply shall be provided in the storage area or in the storage. Utensils for weighing, display, cleaning and other operations shall also be stored in the same manner.

8.3.2 Environment and sanitation

(1) Drainage system

(Type of waste water)

The main waste water generated in fishing ports is as follows:

- Hold water and other run-off water on the apron from scoop nets and fish pumps during landing catch from fishing boats;
- Water used to clean the quay apron and truck yard before and after unloading catch from fishing vessels and trucks;
- Water used in the washing, sorting, grading, weighing and display of fish and fishery products;
- Water used in live fish tanks to display and sell live fish;
- Water used to wash floors, machinery and equipment in the main building of the auction hall;
- Water used to washing fish boxes and tanks; and
- Water used by buyers for primary processing at their workshops.

(Source of waste water)

The fish processing complex generates a large amount of waste water with various qualities, which depend on the type of processing. The waste water must be treated by the individual processors within the complex or by the complex as a whole.

The amount and quality of waste water discharged from the main building of the auction hall depends on the amount of fish and fishery products, the type of fish, the type of fishery, the method of landing, the method of washing, sorting, grading, weighing, the type of sale, etc., and also varies greatly with the season.

(Treatment methods)

The treatment method of wastewater varies depending on the amount generated and the degree of load, but in general, coarse suspended solids and oil and grease in the waste water are removed as much as possible at the source using screens, precipitation tanks, etc., and the waste water is discharged. The waste water containing any quantity of fish waste (e.g. blood water) must be treated. After primary treatment such as dissolved air flotation (DAF) or DAF with chemicals, secondary treatment with biological treatment, and advanced treatment if necessary, the water is discharged into the sea or other water in or out of the fishing port.

(Drainage system)

The drainage system shall have a sufficient drainage function and shall be located on the floor of the areas/rooms (i.e. washing, sorting, grading, weighing, display and auction areas/rooms) where water is used for washing. The system must be adequately and easily maintained. Drain ditches and floor drains

must be protected against blockages caused by foreign matter such as waste packaging materials. The system shall be piped so as not to contaminate fish by the backflow sewage and capable of being properly discharged from the premises. Piping shall also have sufficient capacity and be located in an appropriate position. The suitable foul drainage system shall be provided for waste water and sewage from lavatories, restaurant, etc. and shall discharge to a treatment plant or to a municipal main drainage system, if available.

(2) Waste storage

Containers, storage areas or storage facilities where waste is stored shall be impermeable and of sufficient capacity, easy to clean, and designed to prevent leakage of dirty liquids and odours.

(3) Climate control (temperature, humidity and air movement)

The auction hall shall be equipped with a ventilation system capable of providing an adequate supply of fresh air in an appropriate position, with temperature and humidity control as required. The hall contains a large volume of air which is costing to handle. The system must therefore be correctly designed and installed. As it is also related to the building structure, more details are given in **9.1. 2**.

(4) Hand and boot washing and sanitizing facilities

The access of people and vehicles to and from the main building of the auction hall, especially hygiene controlled areas/rooms such as washing, sorting, grading, weighing, display and auction areas/rooms, freezing and refrigeration facilities, buyers' workshops for primary processing must be strictly controlled. Therefore, hand and boot washing and sanitizing facilities, and as necessary air shower rooms for removing dust, fine debris and hair from clothing shall be installed before the first access points. The taps shall be of the structure to prevent recontamination of the hands after washing. As it is closely related to the control of entry and exit, more details are given in **9.1. 1**.

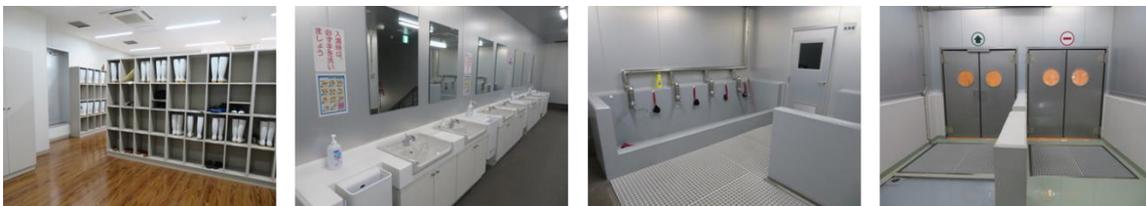


Photo 8.13 Examples of hand and boot washing and sanitizing facilities, Misaki, Japan

(5) Veterinary laboratory

The auction hall shall be approved by the competent authorities, have a hygiene officer who meets certain requirements and carry out the necessary inspections, as a necessary public health measure for food safety for consumers. In the EU, identification and health marks, the oval-shaped markings, are found on food products of animal origin in the European Community, required by European Union food safety regulations. The mark identifies the processing establishment that produced and packaged the product and that is therefore responsible for its hygiene status. The mark can function as a monitoring and tracking aid for food safety and customs inspectors, and each food processing facility dealing with food products of animal origin is required to keep records of its trading partners and their approval numbers, both for buying and selling. Through sales in the auction hall, the mark is printed on the label of each lot and on the bill to the buyer and the invoice to the seller.

In accordance with **Regulation (EC) No 882/2004 of the European Parliament and of the Council**, the competent authority shall approve the auction hall and appoint a qualified veterinarian to act in such a capacity. Test facilities shall be controlled to minimize risk of fish and fishery product contamination. Microbiology laboratories shall be designed, located and operated so as to prevent contamination of people, building and facilities, machinery and equipment, and fish and fishery products. They shall not open directly on to the hygiene controlled areas/rooms of the main building.

(6) Facilities to prevent birds and animals from infesting

The facilities to prevent the infestation of birds, rats, insects, etc. and facilities to exterminate them shall be provided in the main building of the auction hall, if necessary. Measures to prevent birds from entering the main building of the auction hall may include hanging nets under the roofs and eaves of the main building and the roof of the quay.



Photo 8.14 Examples of bird-preventing net, Minamisanriku, Japan

(7) Cleaning and Sanitizing

The areas/rooms for operations from receiving to dispatching or transporting fish and fishery products shall be cleaned before and after each use. Machinery, equipment and utensils shall also be cleaned and sanitized before and after each use, and they shall be stored where they are used, in a designated area/room or storage.



Photo 8.15 Examples of cleaning and setting in order, Minamisanriku, Japan

8.3.3 Social welfare service

The following facilities could be necessary for the social and welfare service to the users (i.e. buyers, transporters, distributors, suppliers, etc.) of the auction hall:

- Dressing room
- Training and meeting room
- Lounge
- First aid facilities
- Coffee and snack bar, canteen, and restaurants
- Bank
- Lavatory

(Lavatory)

A good potable water shall be supplied to maintain hygienic conditions in the lavatory. Design of sanitary fixtures and disposal systems shall minimize the risk of contamination by use of sensor-type taps, disposable towels and pedal operated bins. Lavatories shall be conveniently located but physically separated from washing, sorting & grading, weighing, display and auction areas and storage. Lavatories shall be provided in proportion to the number of users (i.e. market personnel, buyers, etc.).



Peterhead, UK



Ofunato, Japan

Photo 8.16 Examples of cafeteria and lounge

8.4 Collaboration with tourism, education and learning

As the auction hall may be a tourist attraction and a place of education and learning for the local community, it can contribute to the regional promotion through welcoming tourists and local residents in collaboration with tourism, education & learning, and in a way that does not affect the hygiene operations and safe fish & fishery products.

The following facilities could be necessary for the collaboration:

- Exhibition room;
- Training/meeting room;
- Tour passage;
- Restaurant;
- Observation deck; and
- Lavatory.

If the auction hall is to be a two-story structure, it is advisable to provide the above facilities on the 1st floor. Photo 8.17 shows the example of collaboration with tourism at Guilvinec, France. The local tourism whose building is adjacent to the auction hall provides the market guide and exhibits.



Photo 8.17 Collaboration with tourism, Guilvinec, France

9. Structural and material requirements

From a public health perspective in particular, there are requirements for auction hall structures and the materials they use.

9.1 Doors, walls, and partitions

9.1.1 Control of the entry and exit of people and vehicles

The control of the access of people and vehicles to and from the main building of the auction hall, especially hygiene controlled areas/rooms can be facilitated by proper planning of the loading and unloading areas and entrances to and exits from the washing, sorting, grading, weighing, display and auction areas and freezing and refrigeration facilities. Entrances shall be equipped with facilities for washing and sterilizing hands and boots, and as necessary air shower rooms for removing dust, fine debris and hair from clothing. Air showers are HEPA*-filtered, high-speed jets of air that are applied directly to the surface of people or materials being carried in order to remove dust particles. To facilitate the control of only authorized and after washing and sterilizing person's access, their identifications and washing and sterilizing can be automatically confirmed and the opening of the door dedicated to the entrance can be linked to its confirmation (see **Chapter 4H**). Exits and entrances shall not share to control the risk of contamination caused by people's crossing.

For vehicles, the entrance to the premise of the fishing port or auction hall can be equipped with automatic identification system and facilities for washing and sterilizing tires to ensure automatic control of entry (see **Chapter 4H**). Vehicles are allowed to enter the quay for loading and truck dock for unloading and loading. Forklifts and carts are used to carry fish and fishery products in containers inside and outside the main building of the auction hall and only electric ones shall be used inside the building. Where forklifts enter and exit the building, tire washing facilities, transparent curtain walls or double entry/exit structures can be placed.

*HEPA: High Efficiency Particulate Air

9.1.2 Climate control (temperature, humidity and air movement)

Control of the temperature while fish and fishery products are on display and in auction is essential to the preservation of quality and hygiene for sale and subsequent distribution.

The following requirements arise from the above:

- (a) Adequately insulated areas to allow temperatures to be controlled particularly for display and auction; and
- (b) Freezing and refrigeration facilities for temporary storage before auction and loading into trucks for transportation.

Air movement over fresh fish can cause drying. Therefore, the ventilation system must avoid direct draughts by use of deflectors at blowing ports and limit air movement to a certain speed. Doors must be kept closed to prevent wind and warm air from blowing through. Exposure of doors and walls to direct sunlight shall be minimized by the use of canopies and eaves.

9.1.3 Materials and surface finishes

The use of aluminium, stainless, PVC or polyurethane profiles and extrusions is recommended although the latter may prove relatively expensive due to their limited market penetration.

Materials which may be adversely affected by the damp and saline environment which prevails in auction halls and freezing and refrigeration facilities shall be avoided. Timber, unless in laminated and sealed form, is not suitable nor are ferrous metals which will corrode unless specially treated. It is false to use cheaper painted steel faced sandwich panels which may corrode and result in breakdown of insulation and cause contamination and maintenance problems.

Internal finishes to partitions and wall must be sanitary and easily cleaned. Exposed stone, brick or block shall be avoided, as shall any finish containing joints or porous materials. Surfaces must be suitable for daily cleaning.

Damaged surfaces can pose health risks as well as maintenance problems. Protective angles shall be provided to exterior wall corners and crash barriers and bollards positioned to minimize damage to doors and wall finishes by handling machinery and equipment, etc. Particular care shall be taken when specifying and designing the details of structural members, exterior materials and partitioning panels.

Interior walls shall be made of impermeable material and have good drainage so that their surfaces can be easily washed and disinfected (hereinafter referred to as "cleaning"), and shall have their structures that facilitate cleaning. The interior walls shall be lined with impermeable material from the floor to a height at which they can be easily contaminated. However, materials other than impermeable materials may be used if it is found that there are no hindrances to public health, taking into consideration the fish and fishery products handled and their handling manner.

9.1.4 Control of condensation and corrosion risk

The environment inside the auction hall, especially refrigerated or chilled areas/rooms and cold storage can be very aggressive, prone to condensation and the risk of corrosion. Insulation systems must be designed to allow adequate ventilation to voids and to ensure that any condensation which may form behind panels or in enclosed voids can drain away. A particular problem can develop in areas which are only refrigerated part of the time.

In such areas structural members of reinforced concrete or steel can attract heavy condensation when refrigeration is turned off, particularly in humid climates. This can lead to accelerated rates of corrosion. In the case of reinforced concrete, this problem can be minimized by covering the steel with 50mm or more of high-density concrete. Considerations may also be given to the use of laminated timber beams which offer high strength and good resistance to moist environments.

The area right above the place where fish is handled shall have a structure or equipment that prevents dew condensation, prevents the formation of mould due to condensation, and provides adequate ventilation to prevent contamination of fish by water droplets due to dew condensation.

9.2 Roof and ceilings

Roof, ceiling and exterior walls shall be suitably insulated to allow control of internal temperature down to 0° C. Insulated sandwich type panels are recommended which may be used to form a false ceiling providing a void above, which can both improve overall insulation and provide space for running service ducts. The best orientation for skylights shall minimize the direct entry of strong sun light. Ceilings shall be made of materials that can be easily washed and disinfected (hereinafter referred to as "cleaning"), and shall have structures that facilitate cleaning.

9.3 Floors

Floors shall be made of impermeable material and have good drainage so that their surfaces can be easily washed and disinfected (hereinafter referred to as "cleaning, etc."), and shall have their structures that facilitate cleaning. However, materials other than impermeable materials may be used if it is found that there are no hindrances to public health, taking into consideration the fish and fishery products handled and their handling manner.

Floor finishes must be continuous and as far as practical, joint free. Surface must combine easily cleaned quality with non-slip properties. Various cement-based and resin-based systems are available with the required qualities. Care is necessary in detailing the junctions between walls and floors. Rounded joints are recommended to facilitate cleaning.

It is also advisable to avoid the use of finishing screeds as these tend to crack and spall, creating cleaning and maintenance problems. Adequate cross falls and drainage must be incorporated to ensure that ponding of water cannot occur. Cross falls must be sufficient to ensure good drainage but not so great as to hinder forklifts from moving a stack of boxes. A gradient of 1:75 may be taken as a guide.

9.4 Lighting facilities

Lighting facilities shall be capable of providing the necessary illumination to enable adequate operational work, inspection and cleaning to be carried out. Lighting quality is important in the sale of fish as quality is judged primarily by colour and appearance. Care should be taken to ensure even levels of illumination using modern luminaries which produce an optimum colour range. An illumination of 540 lux where fish is sorted & graded or inspected and 220 lux for other work areas may be taken as a guide.

Initial and maintenance costs of lighting facilities must be minimized. While the general standards of electrical fittings and wiring are suitable for the aggressive and damp environment, those suitable for exterior use are recommended.

References

Council Regulation (EEC) No 103/76

Article 1,4,5,6,8 Annex A, B

General Principles of Food Hygiene CXC 1-1969, Codex Alimentarius

Chapter 1 Good hygiene practices

Chapter 2 Hazard analysis and critical control point (HACCP) system and guidelines for its application

Regulation (EC) No 178/2002

Article 1 Scope

Article 5 Hazard analysis and critical control points

Regulation (EC) No 852/2004

Article 1 Scope

Article 5 Hazard analysis and critical control points

Annex

Food Safety Modernization Act (FSMA)

ISO/TS 22002-1:2009 Prerequisite Programmes on Food Safety

FAO, Quality and Quality Changes in Fresh Fish, 1995

9. Assurance of fresh fish quality

US Food and Drug Administration (FDA), Fish and Fishery Products Hazards and Controls Guidance Fourth Edition 2021

CHAPTER 2: Conducting a Hazard Analysis and Developing a HACCP Plan

Council Regulation (EC) No 104/2000

Article 4

Commission Regulation (EC) No 2065/2001

Chapter 3 Traceability and control

Article 8, 9

Council Regulation (EC) No 1224/2009

Article 14 Completion and submission of the fishing logbook

Article 15 Electronic completion and transmission of fishing logbook data

Article 16 Fishing vessels not subject to fishing logbook requirements

Article 17 Prior notification

Article 23 Completion and submission of the landing declaration

Article 24 Electronic completion and transmission of landing declaration data

Article 25 Vessels not subject to landing declaration requirements

Article 59 First sale of fisheries products

Article 60 Weighing of fishery products

Article 62 Completion and submission of sales notes

Article 63 Electronic completion and transmission of sales notes data

Article 64 Content of the sales notes

Article 65 Exemptions from sales notes requirements

Article 109 General principles for the analysis of data

Regulation (EU) No 1379/2013

Article 35 Mandatory information

Magnuson - Stevens Fishery Conservation and Management Act

Sec. 303. Contents of fishery management plans

CODE OF FEDERAL REGULATIONS

50 CFR § 648.7 - Recordkeeping and reporting requirements.

Council Regulation (EC) No 1005/2008

Chapter 3 Catch certification scheme for importation and exportation of fishery products

Article 12 Catch certificates

Article 14 Indirect importation of fishery products

Port State Measures Agreement (PSMA)

Seafood Import Monitoring Program (SIMP)

Code of Conduct for Responsible Fisheries

Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries

International Guidelines for Aquaculture and Inland Fisheries Certification

Regulation (EC) No 882/2004,