# Quality and Safety Requirements for Fishing Harbours and Landing Centers

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## Introduction

A fishing harbour is a stretch of water body providing safe anchorage of fishing vessels, executing activities like landing, handling, processing and marketing of fish, facilitating meeting of buyers, sellers and service providers thus making it a point of convergence between production and trade.

## Fishing harbour development in India

Until 1950, there were about 1,300 fish landing centres scattered along the Indian coastline. Most centers were open beaches, where basic facilities for landing and disposal of the catch were not available. It was during the second Five-Year Plan, that the assistance of the FAO was availed of in identifying suitable landing sites and deciding on the nature of facilities to be provided. The increase in number of mechanized fishing boats and the establishment of freezing and exporting units necessitated the need for better landing facilities. By 1975 the construction of fishing harbours at major and minor ports and provision of landing facilities at various sites were taken up. The initial approach was to provide limited landing and berthing facilities such as a jetty, deepening of the entrance channel, provision of a breakwater, market hall, guide lights, etc. Such facilities were provided at about 90 sites, the most important of which are Porbander, Mangrol, Veraval, Navabunder and Jaffrabad in Gujarat, Karwar in Karnataka, Ponnani, Baliapatnam, Mopla Bay, Beypore, Azhicode and Vizhinjam in Kerala, Rameswaram, Nagapatnam, Cuddalore and Tuticorin in Tamil Nadu, Kakinada in Andhra Pradesh and Chandipur in Orissa.

Pre-Investment Survey of Fishing Harbours (PISFH) was established in 1968, with UNDP special fund assistance initially for a period of five years, the subsequent two years by SIDA and thereafter it has been a national project fully funded by the Government of India. With the establishment of the PISFH project at Bangalore, detailed surveys were undertaken and designs were prepared for the construction of large, self-contained fishing harbours, usually with components such as breakwater, navigation lights, dredged channel and basin, jetties, wharves, auction halls, slipways, boat and net repair sheds, public utilities, electricity, water supply, sewerage, drainage, approach roads and back-up space for fish-based industries, such as ice plants, processing plants, cold storages, etc. On the basis of pre investment surveys and evaluation, investment decisions were made and the work of construction entrusted to the various state governments. The Govt. of India has been providing financial assistance ranging from 50–100% of total costs to implementing agencies. Responsibility for the construction, management and maintenance of the facilities is however held by the respective State Governments, Union Territories and Port Trusts. The National Fisheries Development Board also extends 100 percent financial assistance for modification, repair and renovation. An attempt to upgrade fishing harbours to international standards was also made by FAO, through the

Technical Cooperation Project (TCP/IND/3102 A) in two fishing harbours, Dhamara fishing harbour in Orissa and Mangrol fishing harbour in Gujarat from 2007 to 2009 (BOBP 2011). Today, India has 9 major fishing harbours, 48 minor fishing harbours and 780 landing centers besides a lot of small unrecognized landing centers.

**Classification and Management of Fishing harbours**

The classification of fishing harbours in India follows the pattern of classification of commercial ports which are classified as major ports and minor ports. Major ports are under the control of GoI and are regulated under the major ports trust act. Minor ports are for commercial activities of the maritime states and are under the control of the respective state Government. Following a similar pattern there are three categories of harbour facilities in India for fishing vessels. Major fishing harbours for use by fishing vessels going on deep sea fishing, minor fishing harbours developed under the respective state departments and fish landing centres where fishing or fish transport vessels discharge the fish and are usually under the control of the local bodies.

Though efforts were made to upgrade physical and infrastructural requirements at fishing harbours, many of them are not properly maintained due to various reasons. Consequently, the sanitary and hygienic conditions in the harbours fall below the internationally accepted standards and fish leaving the harbours are of low quality. Implementation of a Food safety management system (FSMS) based on HACCP is believed to solve these issues.

**Leagal Background**

Section 8.9 of the FAO Code of Conduct for Responsible Fisheries1 outlines the duties and obligations of States with respect to the design and construction of harbours and landing places, as well as the establishment of an institutional framework for the selection or improvement of sites for harbours. The guidance to States is elaborated in Annex VI of the FAO Technical Guidelines for Responsible Fisheries, No.1, Fishing Operations, which sets out the procedures for the development and management of harbours and landing places for fishing vessels.2 Annex VI provides, among others, the standard procedures for management, environmental auditing, design criteria and education and training. The EU legislations dealing with food safety management systems are regulation 852/2004 and regulation 853/2004. The former is primarily concerned with the management and implementation of quality and food safety assurance regimes in food production including the application of HACCP principles. Section VIII of the directive (regulation 853/2004) is concerned particularly with fishery products. The other EU regulation that has relevance is regulation No 854/2004 "laying down specific rules for the organization of official controls on products of animal origin intended for human consumption".

**History of food safety and Origin of HACCP**

Food Safety is defined as providing assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use (WHO 1995). The worldwide evaluation and reorganization of food inspection and control systems geared towards improving efficiencies, rationalizing human resources and introducing risk analysis-based approaches resulted in the convergence towards the necessity to implement a preventative approach instead of the traditional approach that relied heavily on end-product sampling and

inspection and that is HACCP. HACCP is an internationally recognized food safety management system and many countries have made it mandatory in their food production sector.

In India, compulsory quality control was first introduced for fish and fishery products meant for export under the export quality control and inspection Act 1963. The in-process quality control (IPQC) system introduced in 1997 followed by the modified in-process quality control (MIPQC) system, Self Certification (SC) scheme introduced in the late eighties and the HACCP based system, the "Quality Assurance and Monitoring System" (QAMS) which came under the Export of Fresh, Frozen and Processed Fish and Fishery Products (Quality Control, Inspection and Monitoring) Rules (1995) and founded on the then existing IPQC system by incorporating the requirements of both USFDA and the EU Directive 91/493 were all developments in the quality and safety front by India to keep in par with the developed nations. However, all these compulsory quality control systems implemented in the seafood export units could exercise controls from raw material purchase only, ignoring the primary landing centers which forced the exporters to take care of the quality of the fish they purchase. Many of them have own arrangements with the vessel owners. The Food Safety and Standards Act, 2006 consolidates the laws relating to food and established the Food safety and Standards Authority of India for ensuring availability of safe and wholesome food for human consumption and requires the need for HACCP system to be adopted by the food production and retail outlets in the country.

**The Pre- Requisite Programs**

The HACCP which was originally designed as a food safety management system, further expanded in practice to include the quality and hygiene parameters also, reducing the effectiveness of HACCP as a food safety control mechanism which resulted in the genesis of a new concept, the Pre- requisite programs(PRP). The WHO has defined PRP as the "Practices and conditions needed prior to and during the implementation of HACCP and which are essential for food safety". These programs include areas such as supplier control, temperature monitoring, personal hygiene standards, cleaning and sanitation programs, proper facility-design practices, equipment maintenance, and cross-contamination control and pest control programs. PRPs control the operational conditions within a food establishment allowing for environmental conditions that are favorable for the production of safe food.

**Safety and Quality Management System**

The introduction of the two concepts HACCP and PRP, created big confusion in companies regarding their relations, how they should be managed etc. mainly because of negative guideline factors and lack of understanding. In some countries, initially, it has been the practice to include quality issues and hygiene issues in HACCP plans which, in fact has led to the over complication of HACCP. The inclusion of CCPs in HACCP which are not true CCPs caused major problems in practice. Some companies developed both PRP and HACCP plans, yet failed to link the two systems. The HACCP evaluators found that here, the issues are either duplicated or missed due to assumptions that one or the other system already covers them. At this juncture, another school of thought evolved which indicated that the PRP can be used to work effectively with HACCP and a better approach is to control significant hazards with the HACCP plan and to keep generalized quality and hygiene issues to the PRP where they are less likely to cloud the HACCP plan or divert attention from the essential controls, the CCPs. The solution to overcome all such problems was

recommended to be through the use of an integrated approach of management of safety and quality in a total quality management system. Consequently a few workers suggested a quality management system which takes into consideration all the controlling points, the safety hazards addressed through the HACCP system and the quality and hygiene issues met with through the PRP and can be achieved by managing both HACCP and PRP within a quality management system such as ISO 9000.

**Food Safety from the 'Net to Plate'**

The 'Net to Plate' concept with respect to capture fisheries is similar to the 'Farm to Table' concept in the case of culture fisheries. The present international markets demands that the fish sold is traceable not only to its country of origin but also the waters it was fished-in and the entire post-harvest infrastructure which handled the exported product viz; the vessel which landed the product, the harbour which handled the product and the entire cold chain; and inspection procedures are also expected to include harvest area, fishing vessels, landing sites, auction hall, transport facilities and the staff involved in these operations. Whether or not required by international regulations, good practices and conditions with regard to food safety should be in place as part of any operation. Safe food handling is the responsibility of each and every person in the food handling chain and negligence in any of these stations can have serious consequences on the final quality and safety outcome of the product. The fishermen, the primary processors, the retailers, all should take care to see that the food is kept safe as long as it is under their control. Moreover, the product should reach the end user within the shortest possible time. Therefore, it becomes significant and the need of the hour to assure food safety conditions in capture fisheries; onboard the vessel, in fishing harbours and landing centers, and the subsequent stages. All possible strategies for controlling the hazards present at the level of primary production should be adopted to ensure the safety of the consumer. Several countries have come up with guidelines for Assuring Food Safety Conditions in Capture Fisheries. Export Inspection Council (EIC) of India has has laid down regulations for the proper maintenance of hygiene and cleanliness for handling fish for export on board vessel and in the landing centres in parity with the international regulations. Document No EIC/F & FP/Ex.Inst./March/2012/Issue 4 ; Appendix D Deals With Requirements For Approval Of The Landing Centers / Fishing Harbours. / Auction Centers; Appendix E Requirements For Approval Of Fishing Vessels; Appendix- F , General Requirments For Approval Of Factory Vessels For Processing Fish & Fishery Products For Export And Appendix – G, General Requirments For Approval Of Freezer Vessles For Processing Fishery Products For Export (Annex 1).

**Food safety management system (FSMS) based on HACCP in Capture Fisheries**

HACCP is a science-based system that aims to prevent food safety problems from occurring rather than having to react to non-compliance of the finished product. The HACCP system accomplishes this by identifying specific hazards and implementing control measures. Prior to the application of HACCP to any segment of the product-processing chain, that segment must be supported by PRPs. The establishment of PRPs will allow the HACCP team to focus on the HACCP application to food safety hazards that are directly applicable to the product and the process selected, without undue consideration and repetition of hazards from the surrounding environment. The PRPs would be specific to the individual establishment or vessel and would

require monitoring and evaluation to ensure their continued effectiveness. PRP assures quality, whereas HACCP assures quality and safety.

The application of the HACCP system begins with the development of HACCP plan. It is a systematic process, a sequence of twelve tasks has been described, in which after the first five steps, the seven basic principles of HACCP are included (CAC, 1997).

The process flow chart is a sequential listing of all the processing steps in the production process. In other words, it is a schematic and systematic presentation of the sequence and interactions of the steps and indicates the direction of movement of the process or product. With respect to implementation of HACCP, the subsequent documentations can be based on the flow chart.

Hazard is a biological, chemical or physical agent or factor that cause an adverse health effect (NACMCF 1992). For the purpose of HACCP, hazards only refer to the conditions or contaminations in food that can cause illness or injury to the consumers. An important aid to hazard analysis is the process flow chart which documents all the major steps in the operation. Hazard analysis involves the identification of hazards and assessment of the severity of the hazard. The severity of hazards and the probability of their occurrence is evaluated according to the epidemiological data about the foodstuff. Assessment of risk and severity makes the hazard analysis quantitative and thereby informative. Risk expresses the chance of a hazard occurring whereas severity relates to the magnitude of the hazard. “Risk” in relation to any article of food means the probability of an adverse effect on the health of consumers of such food and the severity of that effect consequential to a food hazard. “Risk analysis” in relation to any article of food means a process of consisting of three components, i.e, risk assessment, risk management and risk communication. “Risk assessment” means a scientifically based process consisting of the following steps:Hazard identification, Hazard characterization, Exposure assessment and Risk characterization. All the activities associated with harvesting, handling and storage on board, transportation to the harbor, unloading, handling, auction and storage in the harbor etc. should be evaluated. Activities like sorting, grading, washing etc. are classed as low risk; freezing, filleting etc. are classed as medium risk whereas cooking is considered as a high risk activity and in such cases more strict controls are required. “Risk communication” means the interactive exchange of information and opinions throughout the risk analysis process concerning risks, risk related factors and risk perceptions, among all involved and interested parties including the explanation of risk assessment findings and the basis of risk management decisions. “Risk management” means the process of evaluating policy alternatives in consultation with all interested parties considering risk assessment and other factors relevant for the protection of health of consumers and for the promotion of fair trade practices and even selecting appropriate prevention and control options.

A CCP must be identified for each hazard identified during the hazard analysis step. To aid in deciding what operations are CCPs a decision tree has been developed (CAC 1997). To be a CCP, an operation must be such that appropriate action will prevent, control or minimize the hazard. If a hazard can be controlled at more than one place, the most effective place to control it must be chosen. Examples of control measures are listed below:

1. Biological hazards- Time/ temperature control, thermal processing, cooling and freezing, hygienic practices, source control, drying, addition of salt or other preservatives etc.

2. Chemical hazards – Source control (vendor certification and raw materials testing) and production control (proper use and application of food additives etc.)
3. Physical hazards – Source control, production control, use of metal detectors, UV light etc.

Critical limit is the criteria which separates acceptability from unacceptability. Hence they must be associated with a factor which can be measured and monitored on a routine basis. Monitoring should be undertaken by persons involved in the operation which involves making visual observations, sensory evaluations, taking physical measurements and testing of samples. It should be specified as to who will perform monitoring, what will be monitored, how monitoring will be done and when monitoring will be done.

Corrective Action Procedures must be taken to rectify the situation and get the process back under control, when monitoring indicates deviation from the specified range or critical limits. All suspected products should be placed on hold until its safety is ensured. Corrective action is also important in the point of view of its importance in reviewing the process and preventing the recurrence of the deviation and the hazard.

The verification process assists in improving the HACCP system and determines whether the HACCP system achieves its goals. The questions which may be asked during the verification process include whether the correct CCPs are selected, have effective criteria for control been specified, are there control measures in place, are the monitoring activities effective, etc.

Record keeping assists in carrying out verification activities, trouble shooting, data analysis for production improvements and to review production history. Records like HACCP plan, Product traceability, records of CCPs monitoring, corrective action, nature of coding, analytical details etc. should be properly documented.

**Pre-harvest and post-harvest hazards**

Pre-harvest hazards can be classified into the following

1. Biological hazards- Microbes, parasites, toxigenic animals,
2. Chemical hazards – Natural toxins, pesticides, heavy metals, antibiotic residues, cleaning compounds,
3. Physical hazards – Stones, sand, mud, bones, metal fragments, glass.
4. Environmental hazards – Prohibited/endangered sps/area, undersize

The most significant pre harvest hazards are marine biotoxins (ciguatoxin, PSP, DSP etc.) which are often heat-stable. Molluscan shellfish are filter feeders and toxins associated with the phytoplankton can accumulate and become concentrated in the bivalve molluscs. Scientific data has shown that when algal blooms producing marine biotoxins are present in harvest areas, toxins may accumulate in fish at a hazardous level and the only possible control measure is to follow good monitoring practices, check the identity of the used species.

Harvesting of endangered sps and/ or from prohibited areas, catching of undersize fish etc. are all matters connected with food security issues and should not be mistaken for food safety issue. For U.S. federal waters, no molluscan shellfish may be harvested from waters that are closed to harvesting by an agency of the federal government. All molluscan shellfish must have

been harvested from waters authorized for harvesting by a shellfish control authority. All containers of molluscan shellfish received from a harvester must bear a tag that discloses the date and place they were harvested (by state and site), type and quantity of shellfish, and information on the harvester or the harvester's vessel (i.e., the identification number assigned to the harvester by the shellfish control authority, the name of the harvester or the name or registration number of the harvester's vessel).

**Harvest**

**Onboard the Vessel**

There are separate definitions and hence regulatory requirements for traditional, freezer and factory vessels in the Regulation ((EC) No. 853/2004). Hence it is important to classify the vessel correctly. Traditional vessels are generally classed as low risk, and therefore, have fewer food safety requirements. Fishermen are exempt from the seafood HACCP regulation. However, although the legislation simplifies food safety requirements, it places a greater responsibility on the skippers or owners to ensure that the necessary measures are in place to assure food safety onboard their vessels. In some countries, therefore, the primary processors, who are generally the processors that off-load fish from the harvest vessels, demand recorded observations like video from the fishermen which focuses on the efforts taken by the primary processor as well as serves as a recorded proof of good harvest vessel practices and activities.

Fish are highly perishable foods and should be handled carefully and chilled without undue delay. Harvest vessels are the first and the most important segment in preventing scombrotoxin formation. As per FDA recommendations, whole, uneviscerated fish should be placed into the chilling medium not more than 9 hours after the fish dies. Removing the gills and guts of the fish eliminates a significant portion of the bacteria that cause scombrotoxin formation and hence the fish can safely be held longer before chilling, upto 12 hours after the fish dies.The time limit is shortened when either the water or air temperature are high because it takes longer to chill the fish and scombrotoxin forms more rapidly at higher temperatures.

**Table 1. FDA recommended time-to-chill limits**

| Water/air temp ($^0$Fahrenheit) | Type of product | Time to Chill(hours) |
|---|---|---|
| 40 | Whole,uneviscerated | 9 |
| >83 | Whole,uneviscerated | 6 |
| 40 | Whole,gutted | 12 |

Time of death is readily apparent when fish are captured alive and slaughtered aboard the fishing vessel. But, sometimes fish will die in the water before being brought aboard, in such cases, the fishermen will not know the precise time of death. A trawler will be landing live fish and so it is easy to arrive at the critical time to chill limit when the water temperatures are known, whereas in the case of other gears, the fishermen should record the time the net is fully deployed, the time the last fish from the net is safely stored in ice. The deployment of a longline typically take 3 to 4 hours, then allow a 6 hour soak, followed by another 3 to 5 hours to haul back the line. The time temp knowledge, type of gear used and method of capture are essential as the HACCP plan should include the time limit as part of the critical limit for the receiving critical

control point.

Since activities like sorting, grading, gutting, washing etc. performed on board the vessel are classed as low risk type, the food quality and safety can be achieved through the PRP plan. PRP which outlines the minimum requirements for a harvesting vessel prior to the application of HACCP are Vessel design and construction, Design and construction of equipment and utensils, Hygiene control programs such as Cleaning and disinfection, Water and ice, Pest control, waste management, Personal hygiene and health, traceability and recall procedures, training and documentation etc. HACCP approach requires food products to be prepared or processed in certified plants and establishments for which it is essential that the plant meets minimal requirements in terms of layout, design and construction, hygiene and sanitation. The EIC of India has formulated guidelines pertaining to requirements for fishing vessels and is presented below.

**Table 2. Requirements for approval of fishing vessels**

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| **1** | **Design and facilities.** |
| 1.1 | Vessels must be designed and constructed so as to avoid contamination of fishery products with |
| 1.2 | Surfaces with which fishery products come in contact must be of suitable corrosion-resistant material that is smooth, non-toxic and easy to clean |
| 1.3 | Vessels designed and equipped to preserve fresh fishery products for more than 24 hours shall<br>be equipped with holds, tanks or containers for the storage of fishery products at a temperature approaching that of melting ice. These holds shall be separated |
| 1.4 | The holds shall be designed to ensure that melt water cannot remain in contact with fishery products. Holds has to be properly separated from engine |
| 1.5 | Containers used for the storage of products shall be such as to ensure their preservation under |
| 1.6 | Equipment and material used for working fishery products shall be made of corrosion–resistant |
| 1.7 | In vessels equipped for chilling fishery products in cooled clean seawater, tanks must incorporate devices for achieving a uniform temperature throughout the tanks. Such devices must achieve a<br>chilling rate that ensures that the mix of fish and clean seawater reaches not |
| 1.8 | Fish receiving deck shall be smooth, clean and free from engine oil , grease, etc. |
| 1.9 | The artificial lights provided on the deck and in the hold shall have protective covers. |
| **2** | **Good hygienic practices** |
| 2.1 | Utmost care shall be taken while catching / storing / handling of fish to avoid injury / damage to the animal. Even if spiked instruments are used for the moving of large fish or fish which might |
| 2.2 | The fishery products should not be dumped directly on the deck. Clean food grade polythene |
| 2.3 | As soon as the fishery products are taken on board, they must be protected from contamination and from the effects of sun or any other source of heat |
| 2.4 | When the fishery products are washed, the water used must be either potable water or clean |
| 2.5 | It shall be ensured that equipment, containers and all the fish contact surfaces shall be periodically cleaned with potable water or clean seawater and |
| 2.6 | Fishery products other than those kept alive must undergo cold treatment as soon as possible after procurement, especially in case where the fishery products are to be stored for more than 8 hours on board |
| 2.7 | Ice used for chilling of products must be procured from EIA approved ice plants / establishments and shall be handled / stored hygienically to avoid |

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| 2.8 | Staff assigned for handling of fishery products shall be required to maintain a high standard of cleanliness for themselves and their clothes. Persons liable to contaminate |
| 2.9 | Fishery products shall be handled / stored in hygienic manner to avoid |
| 2.10 | Cleaning products, toxic substances shall be stored in locked premises or cupboards. |
| 2.11 | Details of fishery products caught by the vessel and supplied to approved establishment(s) shall be given to hygiene inspector of landing site |

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**Post-harvest**
**Food Safety in Fishing harbours and landing Centers**

In a fishing harbor again, the activities carried out like sorting, grading, beheading, evisceration, washing, filleting, weighing, chilling, freezing, transporting etc. are classed as low and medium risk nature and hence achievement of food quality and safety can be achieved through strict adherence to the PRP plan. PRPs which outlines the minimum requirements for a major fishing harbour prior to the application of hazard analysis can broadly be classified into infrastructural, operational, auxillary and additional services. The infrastructural requirements are concerning location and surroundings, building and equipment, berthing facilities, landing quays, auction hall, chill room, toilets and rest place, pest control etc. water and ice, incoming fish, cleaning and maintenance, handling and storage, waste disposal, premises and house keeping are the operational PRPs. Workshop, net repairing yard, maintenance and repair, ice plant, fuel/oil pump, effluent treatment plant etc. are auxillary facilities while training, traceability, tracking and recall, surveillance and monitoring, documentation, internal audit and management review, security, control room, harbour management/monitoring cell, disaster management unit, etc. are managerial PRPs. A major harbour still can provide additional services like speciality production unit, dried fish storage, retail market, vehicles shed, laboratory, canteen, health center etc.

Meeting food export requirements has generally been a strong motivation to introduce the HACCP system. The system is also capable of accommodating changes introduced, such as progress in equipment design, improvements in processing procedures etc. Therefore, fish and fishery products being a highly valued export commodity, the HACCP system can be expected soon implemented in the fishing harbours in our country. The harvesting and post harvest handling and storage operations of fish in a fishing harbor includes many points where control is needed, but most of these are not critical. Hence most of these can be controlled through the PRPs. However, it goes without saying that HACCP is a process control approach, whereas the activities in a fishing harbor are much more than that. Guidelines formulated by EIC towards requirements for approval is given below.

**Table 3. Requirements for approval of the landing centers / fishing harbours / auction centers**

| **1** | **Premises & Infrastructural facilities.** |
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| 1.1 | The Landing Site / Fishing Harbour of fish and fishery products shall be located at a site ideal for the purpose and shall be free from undesirable smoke, dust, other pollutants and stagnant water.<br>The premises shall be kept clean. |

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| 1.2 | The layout and design of landing site / fishing harbour shall be such as to preclude contamination. Adequate working space shall be provided for hygienic handling of fishery products. |
| 1.3 | Suitable covering shall be given at the landing site / fishing harbour to protect fishery products from environmental hazards such as sun light, rain, wind blown dust etc. |
| 1.4 | Floor and walls shall be smooth and easy to clean and disinfect. The floor shall have sufficient<br>slope for proper drainage and to avoid stagnation of water. |
| 1.5 | Drainage lines of adequate size and slope shall be provided to remove waste water, the outlet of which shall not open to the sea near the landing berth. |
| 1.6 | Provision of adequate quantity of potable water or clean sea water shall be available in the landing sites for cleaning and sanitation. |
| 1.7 | There shall be provision for hygienic handling and storing of sufficient quantity of good quality ice. |
| 1.8 | Provision for crushing the ice hygienically shall be provided, as applicable. |
| 1.9 | Sufficient artificial lighting shall be provided and the lights shall be protected with suitable covering. |
| 1.10 | There shall be sanitary facilities at appropriate places for hand washing with sufficient number of washbasins, soap, disinfectants and single use hand towels. |
| 1.11 | Appropriate number of flush lavatories shall also be provided outside the landing sites / auction centers. |
| 1.12 | The utensils and equipment used to handle fish and fishery products shall be smooth and made of corrosion free material, which is easy to clean and disinfect and kept in a good state of repair and cleanliness. |
| 1.13 | Landing site shall be constructed in such a way to avoid entry of exhaust fumes from vehicles. |
| 1.14 | Suitable mechanism shall be adopted to prevent entry of birds / other pests inside the landing platform, auction areas and other storage areas. |
| 1.15 | There shall be a provision for lockable refrigerated storages for product declared unfit for human consumption and separate lockable refrigerated storage for detained fishery products. |
| **2.** | **Auction hall** |
| 2.1 | Preferably, separate auction hall(s) may be provided, which is well protected from the entry of pests/insects, for display and sale of fishery products. |
| 2.2 | Since, fishery products shall not be kept directly on floor, as far as possible, provision may be given for raised platforms for display of fishery products, which are smooth, easy to clean and disinfect. However, instead of raised platforms, any other suitable provision can be made so as to ensure that fishery |
| **3** | **Good Hygiene Practices** |

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| 3.1 | Landing sites / fishing harbours shall be maintained hygienically. Cleaning and sanitation shall be implemented at all areas of the landing site on a laid down frequency to avoid cross contamination. |
| 3.2 | Landing site / fishing harbour / auction center shall depute a responsible, experienced person, as hygiene inspector, to ensure the implementation of cleaning and sanitation effectively and good hygienic practices. Hygiene inspector shall ensure the quality of fishery products meant for export and also adequate icing of fishery products. |
| 3.3 | Floors, walls, partitions, ceilings, utensils, instruments and other food contact surfaces shall be kept in a satisfactory state of cleanliness and repair. |
| 3.4 | The premises and all the surfaces that come in contact with fishery products shall be cleaned before and after each sale. The crates / utensils shall also be cleaned and rinsed inside and outside with potable water or clean sea water and disinfected before use. |
| 3.5 | Detergents / disinfectants used shall not have adverse effect on the machinery, equipment and products. They shall be stored in a suitable place away from fish landing area. |
| 3.6 | Sign boards prohibiting smoking, spitting, eating, drinking etc. inside the landing sites shall be exhibited at prominent positions. |
| 3.7 | Fishery products shall be properly iced using good quality ice made up of potable water so as to maintain the core temperature of fishery products below 4ºC. Refrigerated room of adequate size |
| | for storing fishery products may be provided, if required. |
| 3.8 | Fishery products, ice, utensils etc. shall not be kept on the floor directly. |
| 3.9 | Proper waste management shall be adopted to remove solid and liquid wastes immediately after its formation so as to avoid cross contamination. |
| 3.10 | Adequate pest management system shall be developed to avoid entry of insects, rodents and other pests into the landing, auction and storage areas. Insecticides and other toxic chemicals shall be stored in lockable cupboards. |
| 3.11 | Separate area may be earmarked for storage of fishery products unfit for human consumption. |
| 3.12 | Workers engaged in handling fishery products shall maintain highest degree of cleanliness. They shall wash their hands properly before and after handling fishery products, ice and food contact surfaces. |
| 3.13 | Workers shall adopt good personal hygiene practices to avoid contamination of fishery products. |

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| 3.14 | Person responsible for hygiene shall ensure that employees are following personal hygiene practices strictly. |
| 3.15 | Unauthorized person(s) shall not be permitted to enter into the landing site / fishing harbour. |
| **4** | **Inspection and testing** |
| 4.1 | Person responsible for hygiene shall conduct random checking of fishery products meant for export for organoleptic / freshness factors, including the core temperature to ensure chilling of fishery products below 4ºC and maintain records. |
| **5** | **Monitoring and Record keeping** |
| 5.1 | Hygiene inspector shall maintain records of fishing vessels landed and variety-wise details of fishery products supplied by each vessel to the approved establishments. |
| 5.2 | He / she shall monitor the fishing vessels during berthing on a laid down frequency to assess the hygienic condition/ infrastructure of the vessel, quality/ quantity of ice used etc. and maintain records. |

(EIC/F&FP/ Ex.Inst./March/2012/Issue 4)

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