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Marine *Newslink*

DECEMBER 2021

FEATURE ARTICLE
Fish & Frozen Seafood

PHOTO(S) OF THE MONTH
Fish

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BACK-TO-BASICS
Question of the month

Fish is a highly perishable food which needs proper handling and preservation if it is to have a long shelf life and retain a desirable quality and nutritional value. The central concern of fish processing is to prevent fish from deteriorating.

The term fish processing refers to the processes associated with fish and fish products between the time fish are caught or harvested and the time the final product is delivered to the customer. Although the term refers specifically to fish, in practice it is extended to cover any aquatic organisms harvested for commercial purposes, whether caught in wild fisheries or harvested from aquaculture or fish farming.

Larger fish processing companies often operate their own fishing fleets or farming operations. The products of the fish industry are usually sold to grocery chains or to intermediaries. Fish are highly perishable. A central concern of fish processing is to prevent fish from deteriorating and this remains an underlying concern during other processing operations.

Fish processing can be subdivided into fish handling, which is the preliminary processing of raw fish and the manufacture of fish products. Another natural subdivision is into primary processing involved in the filleting and freezing of fresh fish for onward distribution to fresh fish retail and catering outlets, and the secondary processing that produces chilled, frozen and canned products for the retail and catering trades.

The most obvious method for preserving the quality of fish is to keep them alive until they are ready for cooking and consuming. For thousands of years, China achieved this through the aquaculture of carp. Other methods used to preserve fish and fish products include:

- The control of temperature using ice, refrigeration or freezing
- The control of water activity by drying, salting, smoking or freeze-drying
- The physical control of microbial loads through microwave heating or ionizing irradiation
- The chemical control of microbial loads by adding acids
- Oxygen deprivation, such as vacuum packing

Usually more than one of these methods is used. When chilled or frozen fish or fish products are transported by road, rail, sea or air, the cold chain must be maintained. This requires insulated containers or transport vehicles and adequate refrigeration. Modern shipping containers can combine refrigeration with a controlled atmosphere.

When fish are captured or harvested for commercial purposes, they need some pre-processing so they can be delivered to the next part of the marketing chain in a fresh and undamaged condition. This means, for example, that fish caught by a fishing vessel need handling so they can be stored safely until the boat lands the fish on shore. Typical handling processes are:

- Transferring the catch from the fishing gear (such as a trawl, net or fishing line) to the fishing vessel
- Holding the catch for further handling
- Sorting and grading
- Bleeding, gutting and washing
- Chilling
- Storing the chilled fish
- Unloading, or landing the fish when the fishing vessel returns to port

If the temperature is decreased, the metabolic activity in the fish from microbial or autolytic processes can be reduced or stopped. This is achieved by refrigeration where the temperature is brought to about 0°C or freezing where the temperature is dropped below -18°C. On fishing vessels, the fish are refrigerated mechanically by circulating cold air or by packing the fish in boxes with ice. Forage fish, which are often caught in large numbers are usually chilled with refrigerated or chilled seawater. Once chilled or frozen, the fish need further cooling to maintain the low temperature. There are key issues with fish cold store design and management, such as how large and energy efficient they are and the way they are insulated and palletized.

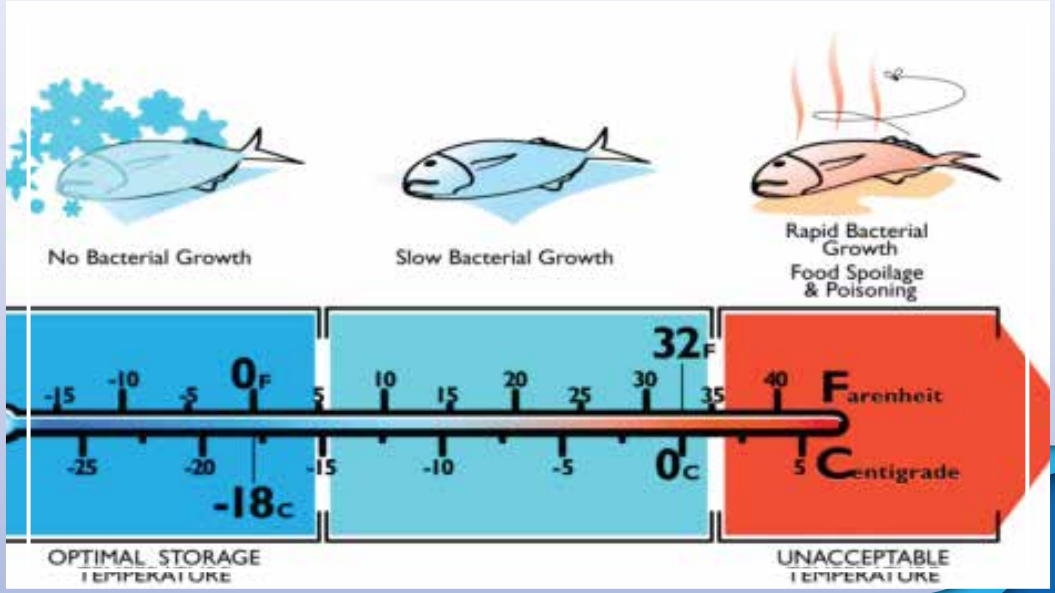
An effective method of preserving the freshness of fish is to chill with ice by distributing ice uniformly around the fish. It has become safest & most widely used since the development of mechanical refrigeration, which makes ice easy and cheap to produce.

Ice is produced in various shapes; crushed ice and ice flakes, plates, tubes and blocks are commonly used to cool fish.

Particularly effective is slurry ice made from micro crystals of ice formed and suspended within a solution of water and a freezing point depressant, such as common salt.

Mixing with ice or chilling has limitations as a method of preserving the quality of newly caught fish. The more commercially important species of white fish, e.g., cod, haddock, hake, etc., cannot be kept in a reasonably fresh condition for more than 10-12 days from the time of catching when stowed in crushed ice. In the cases of herrings and similar fatty fish the period is even shorter. The quality of frozen fish can be adversely affected by very slow freezing and in the case of 'unglazed' fish, storage at too high a temperature will affect the fish. It should be borne in mind that the most perfect of cold storage conditions cannot improve the quality of the fish, it can only fix the quality at the time of freezing.

If the fish is put into cold store within a short period after catching there should be no deterioration due to cold storage. If, however, the raw material is not so fresh, or is stale, some deterioration must be expected even under the best conditions of cold storage. Spoilage may occur if thawed fish is refrozen. Temporary rises in temperature above -18°C may lead to effective storage times being reduced.



Quite often fish is sent on long voyages at temperatures in the region of -10°C. Shipment under such conditions would limit the storage life of the fish, and on long voyages such fish would be reaching a state of inedibility. To avoid this, the core temperature of the fish at time of loading should be below -18°C. For fish with a large fat content, e.g., herring, the loading temperature should be at least -21°C. These temperatures should be maintained throughout the voyage. Temperatures of -30°C are essential if fish are to be kept for a period of many months in the same condition as when they were caught.

A more recent development is pumpable ice technology. Pumpable ice flows like water and because it is homogeneous, it cools fish faster than fresh water solid ice methods and eliminates freeze burns. It complies with HACCP* and ISO food safety and public health standards and uses less energy than conventional fresh water solid ice technologies.

SHIPMENT / STORAGE

Fish can be transported by any means of transportation and is heavily traded internationally. It can be shipped Live, Fresh, Frozen, Cured and Canned. Live, Fresh and Frozen fish need special care.

- **Live Fish**

When live fish are transported, they need oxygen but the carbon dioxide and ammonia that result from respiration must not be allowed to build up. Most fish transported live are placed in water supersaturated with oxygen. The fish are often "conditioned" (starved) before they are transported to reduce their metabolism and increase packing density and the water can be cooled to further reduce metabolism. Live crustaceans can be packed in wet sawdust to keep the air humid.

- **By Air**

Over five percent of the global fish production is transported by air. Air transport needs special care in preparation and handling and careful scheduling. Airline transport hubs often require cargo transfers under their own tight schedules. This can influence when the product is delivered, and consequently the condition it is in when it is delivered. The air shipment of leaking seafood packages causes corrosion damage to aircraft, and each year, in the US, requires millions of dollars to repair the damage. Most airlines prefer fish that is packed in dry ice or gel, and not packed in ice.

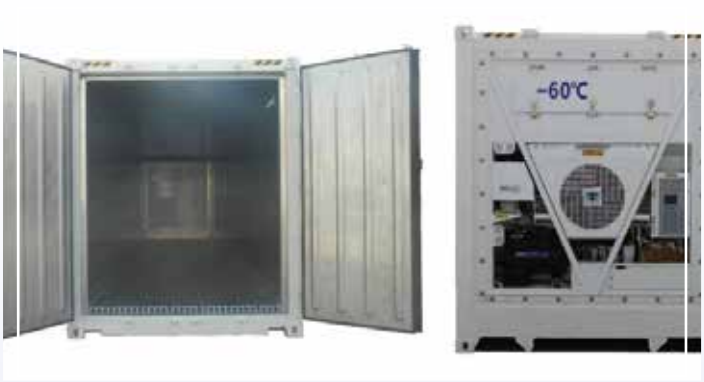
- **By Land or Sea**

The most challenging aspect of fish transportation by sea or by road is the maintenance of the cold chain, for fresh, chilled and frozen products and the optimisation of the packing and stowage density.

Maintaining the cold chain requires the use of insulated containers or transport vehicles and adequate quantities of coolants or mechanical refrigeration. Continuous temperature monitors are used to provide evidence that the cold chain has not been broken during transportation. Excellent development in food packaging and handling allows rapid and efficient loading, transport and unloading of fish and fishery products by road or by sea. Also, transport of fish by sea allows for the use of special containers that carry fish under vacuum, modified or controlled atmosphere, combined with refrigeration.

- **Container transport**

Super Freeze Containers (SFC) can transport goods at a temperature of -60 ° C.



- **Transhipment**

The freezing chain must be strictly adhered to during transhipment, as this is the only way to preserve the shelf life and quality of the fish. In damp weather (rain, snow), the cargo must be protected from moisture, as this can lead to a loss of quality. The best quality fish is that frozen by a rapid freezing process, which results in the only very small ice crystals formation.

Unlike large crystals, these do not rupture the cell walls and thus do not result in the loss of cell fluids (drip) on thawing.

Fresh fish criteria are unobtrusive odour, firm and resilient flesh, brilliant red colour of gills, bright, glossy colour, glossy black pupils.

If fish is not properly deep-frozen at the required core temperature upon loading, it will spoil during a long voyage. Checks must accordingly be carried out during loading. Properly deep-frozen fish sounds like wood when struck. The core temperature should be measured for each batch by drilling a hole into the middle of the fish and measuring the temperature with a meat thermometer.

Occasionally, fish is delivered which, after freezing, has been exposed to higher temperatures. Such incorrect storage results in depreciation and may be recognized by the formation of frost on the cartons. Fish covered with a thick layer of ice or with brown discoloration or freezer burn should be rejected, prior to loading.

The duration of storage for various types of fish is as follows:

Designation	Temperature	Rel. Humidity	Max. duration of storage
Frozen oily fish	-28 - -18°C	90 - 95%	8 months
Frozen lean fish	-20°C	90 - 95%	12 months
Frozen filleted fish	-28 - -23°C	90%	6 - 9 months

Frozen fish which has been stored for an excessively long period has a dry, straw-like texture and poor flavour and is described as freezer damaged.

At temperatures of -62°C, the "eutectic point" (EP) is reached, whereby all the water in the cells of the product is completely frozen and all microbial decomposition brought to a standstill, i.e., at temperatures of below -62°C it is possible to transport or store foodstuffs for an "infinite" period without loss of quality.

Fish, usually packaged in plastic-film is transported in cartons or boxes. Oily types of fish should, if possible, be vacuum packaged in an oxygen-impermeable film as there is a risk of rancidity due to the high oil content. Ultra-low temperature refrigerated containers are capable of transporting goods at a temperature of -60°C. It is essential to maintain the freezing chain during cargo handling as this is the only way to maintain the storage life and quality of the fish.

Since, as a result of the high protein and water content, autolytic processes still proceed at temperatures as low as -10°C, frozen fish must always be at a temperature of below -18°C. Holds/containers must be appropriately precooled prior to loading. They should be approximately at a temperature of at least -18°C. The required travel temperature should be maintained at all times because it is only in this way that the activity of microorganisms comes to a standstill and enzymatic degradation processes are largely suppressed. Temperature measurements must be performed and recorded at regular intervals. If the specified temperature and humidity conditions are maintained, microorganisms constitute no risk as their activity comes to a standstill at approx. -10°C.

The travel temperature must be maintained constantly as variations in temperature may result in recrystallization, resulting in growth of the ice crystals. Variations in temperature are associated with continual slight thawing and refreezing. Since small ice crystals have a higher vapor pressure than larger ones, they will melt more rapidly when the temperature rises, while on cooling the same effect means that the water is preferentially deposited as ice on the larger ice crystals.

This consequently brings about growth of the ice crystals, as a result of which the rapidly frozen fish increasingly takes on the appearance of slowly frozen fish on storage. The large ice crystals rupture the cell walls, as a result of which, on thawing, cell fluids (drip) escape, giving rise to a distinct reduction in utility value.

Temperatures lower than specified are not generally harmful, but they should be maintained throughout all the transport operations as there is otherwise a risk of recrystallization.

Higher relative humidity may be permitted for frozen goods because the low temperatures mean that microbial growth is no longer possible. Relative humidity in the hold/container should be kept at 95% in order to prevent the surface of the fish from drying out (freezer burn), an effect which may also be counteracted by plastic film packaging.

Care must be taken to ensure that the gills have been removed from tuna as they may undergo spoilage even at low temperatures. Sea and freshwater fish may be attacked by internal parasitic worms. Filleted fish must not contain any parasites. As a basic principle, a veterinary certificate is required for transport operations.

DAMAGE TO FISH

Damage to fish is often due to their not being sound and properly cured before loading. Too much heat can cause development of 'skin heat' (boiled, burned) distinguished by loosening of the skin. This type of damage may occur on wet-salted or partly dried fish.
Wet-salted and dried fish may develop a disease known variously as 'Pink', 'Pink Eye' or 'Red-mite'. It may be caused by humidity, etc., but is commonly stated to exist in certain salts. Pink discoloration is inherent and may appear during curing or transit.

These organisms do not grow below a temperature of approx. 5°C, but the rate of growth is very sensitive to temperatures above this figure. Tails and fins of sun-cured fish may resemble glue to the touch due to over-exposure to the sun.

Dried fish is sometimes used as a fertiliser, and when shipped for this purpose, if wetted, should be spread and dried promptly; the nitrogen content should not then be affected.

QUALITY OF PRODUCTS

Quality of frozen fishery cargoes usually fall into one or both of two categories:

- Abnormal and offensive odours, flavours or texture, or any other defects that will influence the consumer's perception of quality.
- Physical damage affecting the process ability or merchantability of the product (can occur during the freezing process, though more usually happens during handling of the frozen product).

Quality defects in both categories can arise during handling, processing and storage of the product before delivery to the vessel, during loading into the ship's holds and while the product is stored on the reefer. Loss of quality can occur both before and after freezing. However, the nature of the defects differs in the two circumstances and an experienced assessor should be able to distinguish between them.

- **Loss of quality before freezing**

Fish of all kinds are notorious for the speed at which they spoil (even when chilled) and for the unpleasant nature of the spoiled product. Spoilage affects the appearance, odour and flavour of the product.

Freezing halts, the spoilage process and fixes the quality as it was at the time of freezing. When frozen products are thawed out, the quality can be no better than it was at the time of freezing. If defects in the quality of frozen fishery products at time of delivery are shown to be a consequence of spoilage, then no blame can be attached to the carrier of the frozen goods unless the product had thawed out during the voyage.

- **Loss of quality during frozen storage**

Frozen fishery products are not completely stable in the frozen state and will deteriorate over time, resulting in changes in texture, odour and flavour of the product. Changes in texture are similar in character across most fishery products – the product becomes dry, stringy and tough. But changes in odour and flavour depend on the type of fishery product. Lean fish with low oil content (such as cod) develop the characteristic odours and flavours described as 'musty', 'cardboard', and 'wet dog', while fish with high oil contents (like tuna, herring and mackerel) develop rancid odours and flavour reminiscent of new leather, linseed oil or old-fashioned oil paints. Odour and flavour changed in frozen crustacean shellfish and cephalopods are similar to those in lean fish. Oily fish deteriorate faster and produce off-odours more quickly than lean fish during frozen storage.

The main factors influencing the rate at which fishery products deteriorate during frozen storage are temperature of storage and exposure to air. The lower the storage temperature, the slower the product deteriorates. The storage life of fishery products carried at -18°C ranges from 3 to 12 months. In general, storage life is halved for each 5°C rise in storage temperature. For example, a product with a storage life of 8 months at -18°C will have a storage life of 4 months at -13°C. Since ships' refrigeration systems can maintain products at temperatures below -18°C, and since voyages are generally less than a month long, there should be no significant loss of quality due to frozen storage-related defects during a voyage.

Rate of deterioration is also affected by exposure to air. Block-frozen products are usually protected by close wrapping with plastic film or by coating with a water glaze. To maintain quality, it is important that this cover, film or glaze is not damaged or lost.

Another defect arising during frozen storage is excessive loss of moisture from the product, which leads to general or localised dehydration known as freezer burn. The dehydration is signified by white patches which appear where glaze is lost or where there are tears or breaks in the protective wrapping. In unprotected material, dehydration occurs first in thin parts of the product such as the fins of whole fish and the tail ends of fillets, or at the corners of blocks. These dried areas do not re-hydrate when the product is thawed and are indicated by blemishes in the thawed product.

- **Physical damage to frozen products**

Physical damage takes a number of forms, but complaints about the quality of reefer cargoes are usually concerned with distortion or compression of the product. This kind of damage, which affects individually frozen fish or blocks of products, occurs when warm fishery products are subjected to pressure

When water is frozen it changes from a liquid to a hard solid ice at 0°C. Although fish typically contain 70-80% of water – the exact percentage depends on the species – the situation is more complicated than freezing water alone. Water in the fish tissues starts to freeze at about -1°C but at this point only a proportion of the water is converted to ice. Progressively, more water freezes as the temperature falls. At -18°C, the maximum temperature usually specified for carriage of frozen fish in reefers, around 90% of the water has turned to ice. It is very hard to deform fish at this temperature and below except under extremely high pressure.

If the product warms at all, some of the ice melts. The fish tissue holds an increasing proportion of liquid water and a decreasing proportion of ice as its temperature rises. As the proportion of ice decreases, the fish tissue, though still partly frozen, becomes softer and can be deformed by moderate pressure. For example, it is possible to deform the surface of a product at -7°C by pressing hard with the point of a pen, a temperature probe, or even a thumbnail.

At -3°C, 'frozen' fishery products are soft enough to deform and sag under their own weight. If the cargo in the hold of a reefer is stacked to a height of 4 or 5 metres, as is often the case, there is sufficient pressure to distort fish to some extent at -7°C, and to distort and compress fish considerably at -5°C or higher.

Individually frozen fish can be severely indented where they lie across eachother and tend to take up the shapes of the surfaces they are pressed against – ridged floor plates or edged structures in the hold. In an extreme case, a stack of fish can be compressed together into a solid mass, with almost no spaces between the fish. Blocks of products are squeezed, flattened and distorted and will extrude into gaps between cartons. They can also be indented by floor plates or pallet boards.

Frozen products at low temperatures are often brittle and prone to damage by rough handling.

For example, tails are easily broken off whole fish and blocks can be shattered or chipped. Products can also be damaged by contamination. If oil or chemicals are spilled, they may penetrate the wrappings and affect the contents. When cartons and wrappings are torn, the contents are more vulnerable to both contamination and dehydration.

- **Pre-shipment inspection**

Loss of quality in fishery products can be caused by damage both before and after freezing. Carriage of frozen fish by sea is just one stage in a long sequence of processing, handling, distribution and storage operations – products can be damaged or decline in quality at any stage. Receivers of damaged cargoes of frozen fishery products might allege that loss of quality occurred solely while the material was in the charge of the shipowner. Pre-shipment inspection is therefore essential, to determine as far as possible the condition and quality of the product at the time of loading, and to note any circumstances that could lead to an exaggerated loss of quality during carriage in the vessel. Such information has an important bearing on any claim that loss of quality or damage occurred during carriage in the reefer. The inspection should consider the nature of the material, its packaging and its presentation.

- **Nature and integrity of packaging and wrapping**

Packaging is intended to protect the product from physical damage. The surveyor should record any damage to outer wrappings, particularly if the damage has caused exposure of the contents. Sometimes the packaging includes strapping, particularly where a carton contains individually wrapped, heavy products like blocks of fillets. The nature and integrity of any strapping should be noted.

Wrapping, which may or may not be supplemented by further packaging in a carton, is intended to prevent contamination and dehydration. Wrapping is only effective in protecting against dehydration if it is sealed or is closely applied to the product. The record should include details of the type and condition of any wrapping. The surveyor should note any staining of cartons and outer wrappings, including the character and nature of the stain – lubricating oil, fuel oil, water, fish juices, for example. Oils tend to be dark in colour and leave the wrappings soft, even when frozen; fish-juice stains are yellowish or reddish. The surveyor should note if the staining is extensive, covering all or most of the packaging or wrappings, or localised. When stains are localised, note whether they are predominantly on corners or edges of packages or on the sides.

- **Blemishes, stains and contamination of the product**

When the surface of the product is visible, it should be inspected for blemishes and contamination. Blemishes include surface damage to whole fish like abrasions and tears to the skin or splits in the flesh and surface damage to blocks such as patches of freezer burn. An attempt should be made to assess the proportion of the consignment affected. It is important to record any unusual discolouration or staining, and if possible, the nature of the defect, for example, blood or bloody brine (particularly on brine-frozen tuna), oil and chemicals.
The product should also be examined for contamination by dust, organic matter such as fish offal or vegetable debris, and any other foreign matter.

In all cases of blemishes or contamination, the inspecting surveyor should note the extent of the damage and estimate the proportion of the consignment affected.

- **Signs of thawing or partial thawing**

Sometimes claims are made against shipowners on the basis that a cargo had thawed or partially thawed during the voyage and had then frozen again to the stipulated carriage temperature. It is therefore important to check that a potential cargo does not show signs that it had thawed and refrozen before it had been presented for shipment. Such thawing or near thawing is often indicated by distortion of product shape and release of liquids from the product.

- **Distortion**

Distortion of whole or blocks of fish indicates that the material has thawed or partially thawed since freezing or was distorted during the freezing process. Individually frozen whole fish often have slight pressure marks formed during the freezing process. These minor distortions must be allowed for during examination of frozen products. The nature of the marks depends on the freezing process. For example, fish frozen in trays are slightly flattened or have indentations on one side where they have lain on the trays during freezing.

Blocks of fish should reflect the sharp angles and regular, geometrical shape of the tray or former in which they were frozen. Blocks of fish which have thawed whilst stored on pallets or in stacks show signs of slumping, bending, or compression, and material is often squeezed into spaces between blocks.

Restrains such as strappings and the framing of pallets and shelf supports cause indentations in the blocks of fish. Again, the inspecting surveyor should note the nature and extent of distortions.

- **Release of liquid**

Fish release liquid as they thaw. The surveyor should check for pools of liquid collecting within wrappings, and for signs that liquid has been squeezed from the blocks and has refrozen on the sides of the stack or on shelves and pallets. Staining of cartons is sometimes an indication that the contents have thawed and released liquid.

- **Temperature control during loading**

It is very important for maintaining quality that frozen fishery products be held at low temperatures at all times. Although it is inevitable that the product's temperature will rise during loading into the hold, the loading operations must be conducted so as to keep this rise to a minimum. The product's quality suffers not only due to the immediate rise in temperature as material is stowed in the hold, but also because of the time taken to bring the product back down to the required temperature after stowage. As far as possible, the cargo should be stuffed/loaded at, or below, the required temperature of carriage – typically around -18°C.

Any observations which indicate that cargo temperature is high, or that cargo was delivered in a damaged or deteriorated condition, should be supported as far as possible by further evidence. This evidence might include photographs taken during pre-shipment inspection or results of reports by cargo surveyors.

The mate's receipt should include any information on the nature of the consignment supplementary to the bill of lading, as well as details of any labels/marks/numbers.

RISK FACTORS AND LOSS PREVENTION

- **Temperature**

Frozen fish requires particular temperature, humidity / moisture and ventilation conditions. A written temperature order must be requested from the sender before loading begins. This order must be observed in any case throughout the entire transport chain.

As the autolytic processes still take place at -10 ° C due to the high protein and water content, frozen fish may only have temperatures below -18 ° C.
The holds / containers must be pre-cooled before loading begins. They should have a temperature of at least -18 ° C.

The required travel temperature should be observed in any case, as this is the only way to stop the activity of the microorganisms and severely restrict the enzymatic degradation processes. Temperature measurements are to be carried out and recorded at regular intervals.

- **Humidity**

A higher relative humidity can be permitted for frozen goods since microbe growth is no longer possible due to the low temperatures. The relative humidity in the hold / container should be kept at 95% in order to prevent the fish surfaces from drying out (freezer burn). Packaging made of plastic film can counteract this.

- **Odour**

Frozen fish has a very slightly unpleasant odour. It must always be stowed in a means of transport alone, as odour infections are always to be expected, even when packaging in plastic film and boxes. It is also very sensitive to odours and absorbs foreign odours very quickly.

- **Contamination**

Frozen fish is not contaminating but is extremely sensitive to contamination. The holds / containers must therefore be clean and hygienically impeccable. It is recommended to have the loading capacity of the hold / container confirmed by a surveyor.

- **Mechanical influences**

Boxed fish must be secured in the hold or container in such a way that it cannot change its position during transport. When transporting containers, it is also important that the goods are secured to the doors in such a way that they cannot fall out of the container when it is opened.

- **Toxicity / Hazards to health**

Some fish species contain natural toxins, such as the poison of the puffer fish or porcupine fish, which is not destroyed by cooking. Therefore, the poisonous body parts of these

fish must be removed immediately. In addition, it can lead to the formation of toxic breakdown products that can be dangerous for the human body.

- **Inherent loss**

During transport, a weight loss of approx. 1 - 2% can occur.

- **Pest infestation / Diseases**

If the relevant specifications regarding temperature and humidity are adhered to, there is no danger from microorganisms, as these cease to be active at approx. -10° C. In the case of tuna, make sure that the gills are cut out, as they can turn into rot even at low temperatures. Sea and freshwater fish can be infested with worms inside. Fish fillet must not have any parasites.
In principle, a veterinary certificate is required for transports.

PHOTOS OF THE MONTH

QUALITY AND SAFETY

HACCP

Fish processing highly involves very strict controls and measurements in order to ensure that all processing stages have been carried out hygienically. Thus, all fish processing companies are highly recommended to join a certain type of food safety system. One of the certifications that are commonly known is the *Hazard Analysis Critical Control Points (HACCP). Hazard Analysis and Critical Control Points.

HACCP is a system which identifies hazards and implements measures for their control. It was first developed in 1960 by NASA to ensure food safety for the manned space program. The main objectives of NASA were to prevent food safety problems and control food borne diseases. HACCP has been widely used by food industry since the late 1970 and now it is internationally recognized as the best system for ensuring food safety.

The Hazard Analysis and Critical Control Points (HACCP) system of assuring food safety and quality has now gained worldwide recognition as the most cost-effective and reliable system available. 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.

HACCP also establishes procedures for verifying that the system is working effectively. HACCP is a sufficiently flexible system to be successfully applied at all critical stages -- from harvesting of fish to reaching the consumer. For such a system to work successfully, all stakeholders must cooperate which entails increasing the national capacity for introducing and maintaining HACCP measures. The system's control authority needs to design and implement the system, ensuring that monitoring and corrective measures are put in place."

HACCP is endorsed by the:

- FAO (Food and Agriculture Organization)
- Codex Alimentarius (a commission of the United Nations)
- FDA (US Food and Drug Administration)
- European Union
- WHO (World Health Organization)

There are seven basic principles:

Principle 1: Conduct a hazard analysis.
Principle 2: After assessing all the processing steps, the Critical control point (CCP) is controlled. CCP are points which determine and control significant hazards in a food manufacturing process.

Principle 3: Set up critical limits in order to ensure that the hazard identified is being controlled effectively.
Principle 4: Establish a system so as to monitor the CCP.
Principle 5: Establish corrective actions where the critical limit has not been met. Appropriate actions need to be taken which can be on a short or long-term basis. All records must be sustained accurately.
Principle 6: Establish authentication procedures so as to confirm if the principles imposed by HACCP documents are being respected effectively and all records are being taken.
Principle 7: Analyze if the HACCP plan are working effectively.

ISO

The International Organization for Standardisation, ISO, is the worldwide federation of national standards bodies. ISO defines quality as "the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs."(ISO 8402). The quality of fish and fish products depends on safe and hygienic practices. Outbreaks of fish-borne illnesses are reduced if appropriate practices are followed when handling, manufacturing, refrigerating and transporting fish and fish products. Ensuring standards of quality and safety are high also minimizes the post-harvest losses."

BACK-TO-BASICS

QUESTION OF THE MONTH

Client had taken Institute Cargo Clause A - 2009 plus War & Strikes - 2009 cover for importing bulk cargo. The term of Imports was CFR. The information provided at time of writing the risk was that when the ship reaches destination port, the bulk cargo will be bagged in the cargo hold of ship & then discharged from ship. On arriving at destination port, ship failed its mandatory safety inspection and was asked to go to anchorage & carryout specific repairs. Client decided to offload the cargo by barges & then bag the cargo at jetty. During transfer by barges the bulk cargo was damaged by sea spray. Buyer of cargo refused to accept cargo citing wet damages. Client sought cargo damage claim under wet damages. Is the claim tenable?

LAST MONTH'S QUESTION

Insured was doing stock transfer between plant & their main warehouse. The truck was loaded with liquid raw material & finished goods. Next day, the transporter reported that there was attempted hijack by some miscreants and during the tussle with driver, miscreants lost control of the truck & it has met with an accident. One 20L container of liquid material leaked and damaged the primary packaging of some nearby finished goods cargo. However, the FG cargo itself was not damaged at all but only has oil stains on packaging. Rest of the cargo was undamaged. Client intimated claim for & asked for full value of stained cargo. What should be the stand of Insurer?

ANSWER

The insured cannot claim a total loss for the entire consignment as only the packing has been stained. The cargo is not damaged. As there is no damage to the cargo the costs of repacking can be covered only if the insurer had opted for the repacking clause. Costs of repacking can be covered as an extra expense only if the subject matter has been damaged which is not the case here.

Please send your replies/answers ONLY to: marine.newslink@tataaig.com

CORRECT ANSWERS SENT BY: (In order of replies received)

• Sohag Parikh	Cadila Healthcare Ltd., Ahmedabad
• V Ganesan	Marsh India Insurance Brokers Pvt. Ltd., Chennai
• Punit Pandya	The New India Assurance Co. Ltd., Surat
• Priten Khamar	Proclaim Insurance Surveyor
• Hema Raghav	Optima Insurance Brokers Pvt Ltd., New Delhi
• Ashish Sharma	Shree Cement Ltd., Ajmer
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