Fisheries Transport Systems

AQS325

4. Week

Carry by cooled store

Weeks	Topics
1. Week	Carry fish by iced water
2. Week	Carrying the fishes by cooled sea water
3. Week	Carry fishes with ice
4. Week	Carry by cooled store
5. Week	Carry by freezing
6. Week	Carry by salt
7. Week	Fish transport: rules
8. Week	Carry alive fish
9. Week	Carry alive fish with oxygwn
10. Week	Carry alive crustacean
11. Week	Carry alive larvae
12. Week	Carrying equipment
13. Week	Carry by frigorific track
14. Week	Carry fishes long distance

One of the methods closely allied to chilling is freezing. There are many factors to be taken into account when considering the differences between chilling and freezing of fish products for various markets. Both chilling and freezing operations can produce stable products and the choice of one or the other depends on many factors.

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Advantages and disadvantages of chilling and freezing

Chilling	Freezing
Short-term storage (up to one month maximum for some species, only a few days for others)	Long-term storage (a year or more for some species)
Storage temperature 0 °C	Storage temperature well below zero, e.g. -30 °C
Relatively cheap	Relatively costly
Product resembles fresh fish	If poorly done can badly affect quality
Relatively low-tech	Relatively high tech
Low skills required	High skills required
Portable refrigeration	Generally static operations

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The most common means of chilling is by the use of ice. Other means are chilled water, ice slurries (of both seawater and freshwater), and refrigerated seawater (RSW). For the full benefits of chilling to be realized, it is essential to maintain chill temperatures throughout the different fish-handling operations.

Although ice can preserve fish for some time, it is still a relatively short-term means of preservation when compared to freezing, canning, salting or drying, for instance. When used properly it can keep fish fresh so that it is attractive in the market place.

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The use of ice for preserving fish and fishery products has proved to be an effective handling method on board fishing vessels for the following reasons:

Ice is available in many fishing areas or ports.

Purchasing patterns can be varied according to need (e.g. block ice of different sizes is frequently manufactured, and crushed, small or fragmentary ice ready for use is sold by weight).

Ice has a very high cooling capacity.

Ice is harmless, and in general relatively cheap.

Ice can maintain a very definite temperature.

Ice can keep fish moist and as it melts it can wash surface bacteria from the fish.

Ice can be moved from place to place and its refrigeration effect can be taken to wherever it is needed.

Ice can be made on shore and used at sea.

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However, packing fish in ice on board small fishing vessels, whether in boxes, shelves or pounds, is a labour-intensive task and other methods have been introduced to reduce the time and labour required. Among these, the most widely used are RSW and CSW. RSW is labour saving and an acceptable chilling method, but requires onboard mechanical refrigeration, pumping and filtering systems. It is also a relatively costly system. In CSW systems, sufficient ice is carried on a fishing voyage and mixed first with seawater before fish are added to the ice and water slurry.

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Both these systems offer the advantages of quick chilling, reduced physical damage to the fish and quicker handling with less labour. However, they require more specialized installations on board and have usually only been found suitable where large volumes of fish need to be handled in a short time period, for instance when handling small pelagics on board purse seine vessels.

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A typical comparison of temperature profiles for a medium-size round fish chilled in crushed ice, RSW and ice slurry is shown in Figure 1.1. According to these data, the fastest and most efficient chilling medium is ice slurry followed by RSW. The ice chilling rate is the lowest due to reduced contact of ice with the fish (an air layer surrounding the fish was created during ice meltage). To ensure maximum contact of ice with the fish, proper selection of the size of ice particles and good stowage practices are needed. The rate of chilling is governed by:

the size, shape and thickness of fish;

the method of stowage;

adequate mixing of ice, water and fish (in ice slurries);

adequate contact of ice with the fish;

the size of the ice particles.

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