Fisheries Transport Systems

AQS325

5. Week

Carry by freezing

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

Frozen fish delivered to a destination where they are to be sold immediately are likely to be consumed within a few hours and no harm is done if they are partially thawed on arrival at their destination.

The frozen fish may in fact be carried in uninsulated containers depending on how long the journey takes. Enclosed vehicles, however, should be used or at least a cover provided to protect the fish from direct sunlight.

An insulated vehicle will be required for long journeys depending on the initial temperature of the fish, whether the vehicle is fully or partly loaded, the size of the load, the insulation quality and thickness, the degree of air ingress and the local climatic conditions. A local trial will ascertain the maximum range attainable.

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Frozen fish that are to be transferred to other cold stores must be transported in an insulated vehicle preferably with some form of refrigeration equipment to maintain the air space at a temperature of approximately -20°C. The following lists refrigeration methods that may be used:

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Mechanical refrigeration using either wall coolers or forced convection coolers blowing air throughout the storage space. In some cases, a jacketed system for distributing the air is employed. This is the most common system.

Rechargeable eutectic plates.

Solid or liquid carbon dioxide or liquid nitrogen can be used with a total loss system.

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The cost of a vehicle complete with a mechanical refrigeration system suitable for maintaining a temperature of -20°C would be approximately US $110,000.

This vehicle would be suitable for transporting 15t of frozen produce. The price is the 1993 figure for delivery to a UK port.

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Prior to loading, the vehicle or container should be precooled and the loading should proceed quickly.

Palletized loading and the formation of a scaled connection between the vehicle and cold store are both helpful in keeping the temperature rise at this stage to a minimum.

The size of a package affects the speed at which it warms; the smaller the pack the greater is its surface area in relation to its volume and the quicker it warms. Laboratory measurements made on a single consumer pack and on a carton of the same packs. Packaging the product in a master carton will clearly reduce the temperature rise during handling outside a refrigerated space.

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Fish at the edges and corners of the load will warm more quickly than those at the centre of the load during unrefrigerated transport, and the extent of this temperature difference is not often appreciated by the operator. Theresult of temperature measurements made across the middle of a load in an uninsulated container.

The temperature rise was almost entirely in the outer 300 mm layer of the load which in this case was packed firmly against the container wall without an airspace. It must be remembered that the outer 300 mm layer represents a considerable part of the total load.

For example, in a container measuring 5 x 2 x 2m almost 60 percent of the load would be located within 300 mm of the wall.

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The above temperature measurements were made during the transport of frozen fish in a temperate climate where the ambient temperature was about 16°C.

The results clearly show the effects of bulk, size and position in a load on the rate of warming when no refrigeration is used. The differences will be even greater in warmer climates.

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