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HANDLING FRESH FISH

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1. On the Vessel

Precautionary measures required in handling fish aboard fishing vessels depend largely upon two factors. Of most importance will be the length of time required to transport the fish to shore and the temperature of the fish during transit. Naturally, where fishing grounds are hundreds or thousands of miles from the point where the fish are to be landed, or where tropical climates prevail, great care in providing adequate refrigeration is necessary. The second and less obvious factor includes the species of fish and method by which it is caught. Small fish always are more difficult to keep in good condition than large ones. Thus fish such as halibut or tuna will keep much better than herring or smelt if similar storage conditions are used. Furthermore, methods of catching which permit the least alteration in the fish during catching provide fish of the best keeping quality. Fish caught in traps or purse seines are of best quality immediately after catching since there has been a minimum opportunity for bruising or other damage. Methods of catching which allow the fish to struggle excessively provide a catch of decreased keeping quality. Fish caught in gill nets often struggle for many hours from the time they are caught in the nets until taken aboard the fishing vessel. Such fish during their struggle have prematurely gone into rigor mortis and under such conditions rigor does not persist for normal duration, and keeping quality is diminished. Fortunately gill-net fishing always takes place reasonably close to the point where the fish are landed, so that fish taken by this method are generally in excellent condition. Fish caught in otter trawls have not only struggled considerably but also may be bruised, both factors tending to reduce keeping quality.

Upon being taken aboard the fishing vessel, some species are dressed and others stowed whole. In general, autolytic changes are greatly retarded by dressing the fish while bacterial decomposition is not greatly affected, but the latter is apt to be increased somewhat for dressed fish. Fish which have been

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feeding just before they are caught are most likely to undergo autolytic decomposition, apparently containing enzymes associated with the digestive process which are of greater activity than those in fish, which have not been feeding. Accordingly, where possible, fish which have been feeding are eviscerated as soon as they are taken aboard the fishing vessel. A good example of this practice is found in the salmon fishery. Chum, pink, coho, and sockeye salmon are taken largely near the end of the spawning migration at a time when the fish have not eaten food for a long time and these fish are landed whole. King salmon are taken throughout the year by trollers and since they often have been feeding, they are eviscerated before being landed.

Some species of fish which have been feeding when caught are very difficult to eviscerate. Such fish include those which are caught in huge quantities and which are quite small, as for instance, mackerel. In such cases, evisceration would interfere with fishing operations since the fish are taken aboard the vessel much faster than dressing operations can take place, and such fish are usually landed whole even though dressing them when caught would add considerably to their storage life.

Where any considerable time will elapse between catching and landing of the fish, the catch is iced as it is caught. For this purpose ice mechanically crushed, usually by passing blocks of ice through a crusher consisting of a rotating drum containing short spikes, is used. The crushed ice thus obtained consists of pieces up to the size of an egg. Such ice is used for all but the smallest, most delicate species in which case a special, finely crushed ice is employed which is obtained by using a crusher with more closely spaced picks in the rotating drum.

Fish and ice are mixed in widely varying proportions, depending upon species and size of fish, distance they are to be transported, and climatic conditions. Fish which will be landed within a few hours are generally stowed in the hold without ice. Those which require several days or more are carefully iced in bins, boards usually being placed between layers of fish and ice to prevent the weight of fish from crushing those at the bottom of the hold.

Where considerable handling of the fish aboard the fishing vessel takes place in such operations as dressing, icing, and stowing in the hold, a sharp tined fork is sometimes used. This practice is to be discouraged since each time the fork penetrates the flesh, bacteria present in large quantities at the surface and in the slime are given a chance to penetrate within the flesh at the point where the tine enters the fish. Since several fisheries are conducted without the use of such forks at all it should be possible to dispense with them completely and thus increase the quality of the fish considerably. At any rate where forks are used great care should be taken to use them only on the heads of the fish where bacterial contamination is of less importance.

2. At the Fish Port

Upon arrival at the fishing port, the fish are unloaded either on elevators, often of the endless chain, bucket type which can be lowered to the level of the

fishing vessel or scow, or by means of baskets operated by hoists from the fishing vessel hold to the wharf. Here the fish are usually first weighed and then carted to the fish house for dressing and packing for shipment.

3. Marketing

Fresh fish are generally marketed in one of the following ways: whole or round, in which the fish are not dressed in any way; gibbed, in which the gills and viscera are removed without slitting the belly cavity; eviscerated, in which the viscera are removed by slitting the belly cavity, but gills are usually left intact; dressed, in which head, fins, tail, and viscera are all removed; as split fish, where the fish is split down the backbone, head and viscera removed, the two halves held together by the belly wall being left intact; fillets, in which the flesh is cut into two boneless strips one from each side and either with or without the skin removed; butterfly fillets, where the two fillets are left adhering together at the backbone; sticks consisting of uniform width sections of fillets; and steaks consisting of cross-section slices of fish cut at right angles to the backbone and about one-half inch thick.

Fish are usually packed directly in the same kind of crushed ice as is used on the fishing vessel, although with some small, delicate species, shaved ice (known sometimes in the fisheries as "dry ice" but not to be confused with carbon dioxide dry ice) is employed. The amount of ice used will depend on climate and distance to be shipped. Fillets or steaks were formerly packed in tin containers but since the tin shortage has become acute wooden, or, in some cases, waxed cardboard boxes containing 10- to 25-lb. fillets and sometimes lined with moisture-proof paper are employed. These boxes are then packed in large wooden boxes of crushed ice. Whole fish are packed in large wooden boxes of crushed ice; however, no standard size of box is prevalent in the industry. Wooden barrels are also being used though not so much as formerly. Fish are shipped by rail (usually express) or by truck. In the former case the fish are placed either in refrigerated cars having ice bunkers at each end or in the regular express cars. In the latter case the boxes of fish are frequently covered with cubes of dry ice and the latter inclosed with insulated tarpaulins. This practice greatly reduces melting of ice and eliminates necessity for re-icing in transit.

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