Lochinver
Port Quality Audit

Confidential Report No. CR157

February 1999

Sea Fish Industry Authority
Seafish Technology

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M. Myers
M. Emberton
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SEAFISH

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Summary

This report presents the findings of a Quality Audit of the fishing port of Lochinver that examined: the quality of raw material supplies to the port, standards of physical infrastructure, operating practices and management controls.

The bulk of the fish supplied to the auction market was of reasonable freshness quality scoring on average 8.5 TRS. Some landings however scored as low as 6.0 TRS which given further unavoidable quality losses through distribution would be unacceptable upon consumption. The quality of landings for consignment was generally lower, with an average of 7.6 TRS. Great care would be required in the onward distribution to deliver this fish in good marketable condition.

The new development provides more than adequate facility in terms of capacity for landing and sale of fish. The market, however, has already suffered considerable damage both internally and externally by mechanised handling operations. The grading shed requires extensive upgrading. Recommendation is made for various repairs to the fabric of the market, grading shed and the finger jetty.

Recommendations are also made for the introduction of documented cleaning schedules, on improved grading systems, standards of hygiene and an improvement in communications between the Council and the trade.

1. Introduction

The increasing demands of the corporate food sector and the requirements of food safety legislation have given impetus to the need to raise quality and operating standards within the fish industry. This was recognised by the Industry Task Force that identified the port sector as a potential weak link in the production and distribution chain.

In response to the recommendations of the Task Force, Seafish introduced an initiative targeted at raising standards by means of port quality audits. The audits examine and report on the:

- quality of fish supplies to the port
- physical infrastructure
- operating practices
- management controls

Recommendations for improvements are made and action is then encouraged at local level.

The audits focus primarily on the workings of the fish market. They cover the operations from landings at the quayside (or overland deliveries to the market) to the despatch of fish from the market after sale. They do not cover standards on fishing vessels (other than in the quality of fish supplied to the market) or within fish factories. They do however report where conflicts arise between the activities of different sectors within or around the environs of the fish market, its quays and roads. The report is confidential to the trade and is not for publication.

This document presents the findings of a quality audit of the port of Lochinver undertaken during June 1998. It was carried out with the full co-operation and participation of catchers, salespersons, buyers, merchants and the owners, Highland Council.

2. Survey Procedures

The survey took place between the 21-27 June. Fish quality assessment was carried out by a small team of Seafish technologists.

Wherever possible, the assessment was made as soon as the fish were landed with boxes selected from the first caught fish and the last caught fish of the trip. Fish were taken from throughout each box or bin and assessment was made of:

- freshness (using the Torry Sensory Assessment System (Appendix 1))
- gutting and washing
- temperature and icing practice
- box weights and box filling practice
- damage to fish

Note was also made of the trip length and any vessel operating practices or equipment which may have affected quality (e.g. fishroom insulation/chilling, fish handling systems, washing/gutting machines, etc.).

Assessment of the standards of physical infrastructure, operating practices and management controls was undertaken using a structured approach. This included observations on site and discussions with a wide range of port staff and users.

3. Fish Supplies

3.1 Sampling Achieved

In all, 12 vessel landings were sampled from 11 different vessels using the gears outlined in Table 1.

Table 1 - Fishing techniques employed

Number of Vessels	Gear
2	Trawl
6	Otter Trawl
2	Long Line
1	Static Net

A total of 63 samples were examined. These include a wide variety of species as outlined in Table 2.

Table 2 - Range of species sampled

Number of Samples	Species
	Whitefish
15	Ling
5	Haddock
5	Cod
4	Plaice
3	Skate
3	Witch
2	Hake
1	Megrim
1	Whiting
1	Sol
3	Mixed
	Deep Water Species
4	Grenadier
2	Cardinal
2	Col
2	Red
1	Blue Ling
1	Mor
	Shellfish
4	

The vessels sampled worked a range of trip lengths from 2 days to 14 days as shown in Table 3.

Table 3 - Range of trip lengths worked

Number of Vessels	Days at Sea
2	2.0
2	4.0
1	5.0
1	6.0
2	8.5
1	12.0
2	14.0

Of the 63 samples examined, 50 were landed in boxes and 13 were landed in bulk bins.

At the time of the audit their were four distinct marketing channels in operation: 31 boxes were examined on the auction market; the 4 boxes of sampled were being sold to a Scottish contract buyer; the remaining 28 samples (mostly deep water species) were graded and re-boxed for consignment to continental buyers. There were also fish which were being directly consigned to the continent, ex-vessel, without any prior on-shore grading and re-boxing. These were (mostly hake) caught by liners and netters, which were landed directly into refrigerated transport bound for Spanish markets. Unfortunately we could not get access to conduct quality sampling on these fish. Our observations and comments on this sales channel are therefore limited to landing and despatch practices.

3.2 Freshness Quality

For details of TRS scoring and its relationship with eating quality and EU grades see Appendix 1.

The average and range of freshness quality scores for the samples are shown in Table 4.

Table 4 - Freshness quality scores and trip length

	TRS Score			Trip length (days)
	Average	Max	Min	Average
Fish				
Auction Market	8.5	9.5	6.0	4.4
Graded and Consigned	7.6	9.0	6.0	10.2
Shellfish				
Nephrops*	4.4	4.5	4.0	2.0

* Nephrops are scored against a maximum of 5

Fish sold through the auction scored a reasonable average of 8.5. The maximum of 9.5 is typical for last-caught fish. However the lowest scores of 6 identify fish which have already fallen to the threshold of consumer acceptability. Given further unavoidable quality losses through, processing, distribution and retail this fish will be well below standards of acceptability on consumption. The two boxes containing the poorest fish are discussed under Section 3.3: Washing and Gutting. Fish landed of this quality should not be traded and can only harm the vessels' and ports reputations.

The average scores for the graded and consigned fish indicate good care of the catch for the trip lengths worked. Again the maximum scores will originate from the last-caught fish. However, given that these fish are generally destined for continental buyers, the average score of 7.6 TRS indicates that premium care in transport would be required to deliver these fish in marketable condition. The poorest scores came from line caught ling which had only been top-iced at sea.

Only four boxes of Nephrops were available for sampling. This small sample scored reasonably well but due to its size it cannot be assumed to be representative of all landings into Lochinver.

3.3 Gutting and Washing

Spoilage of fish after death is caused by enzymic and bacteriological action, particularly in the gut cavity. By removing the gut contents and washing the fish, the rate of spoilage is reduced. It must however, be done efficiently or the bacteria from the gut cavity can spread to the cut flesh and promote spoilage.

48 samples of gutted fish were assessed for effective gutting. The results are shown in Table 5.

Table 5 - Gutting results

	Number of Samples	Gutting Results Good	Average	Poor
Fish				
Auction Market	27	20	7	0
Graded and Consigned	21	20	1	0

Overall, the gutting observed amongst auction market fish was to a reasonably high standard. Gutting assessed in graded and consigned fish was almost exclusively to a high standard. We found no badly gutted fish at all during the audit.

49 samples of fish and 4 samples of Nephrops were assessed for proper washing. The results are shown in Table 6.

Table 6 - Washing results

	Number of Samples	Washing Results Good	Average	Poor
White Fish				
Auction Market	28	23	3	2
Graded and Consigned	21	17	1	3
Shellfish				
Nephrops	4	4	0	0

Standards of washing for auction market and consigned fish were generally good. However, we found some badly washed fish amongst both groups. The poorly washed samples of fish from the auction market had deteriorated badly and achieved unacceptably low TRS scores, given the trip lengths worked (2 and 6 days respectively).

The three poorly washed samples amongst the consigned fish were ling from a line vessel. Two of these samples scored only 6.5 TRS which again is unacceptable to the consumer.

3.4 Temperature Control

Temperature control is by far the most significant factor affecting the rate of deterioration of fish. Typically white fish remains acceptable for about 10-12 days after capture when well iced. However this can be reduced to 1-2 days if left unprotected at summer ambient temperatures. The audits are deliberately conducted during the summer months when warm temperatures help to reveal any weaknesses in fish handling practices.

Sample temperatures were taken as soon as possible after landing. Ambient air temperatures during the sampling sessions ranged between 11-19°C.

The results of temperature sampling are shown in Table 7.

Table 7 - Temperatures of fish sampled

	Temperatures (deg C)		
	Average	Maximum	Minimum
White Fish			
Auction Market	1.9	9.6	-0.8
Graded and Consigned	0.3	6.4	-1.5
Shellfish			
Nephrops	9.4	19.1	1.7

The average temperature of the fish offered for sale in the auction market (1.9°C) shows that most fish had been chilled prior to landing. However, Seafish research has shown that by using good icing and boxing practice it is possible to pull the temperature down to less than 1°C within a few hours of capture. Consequently, these data suggest that icing and boxing practice could be improved. The maximum temperature of 9.6 °C was measured in last-caught fish. The minimum of -0.8 °C is typical of fish from chilled fishrooms.

The fish for grading and consigning were mostly landed in shallow bins and when tipped we saw that these fish had been generously iced. Consequently the average temperature of these fish was lower than the auction market fish, at a more acceptable 0.3 °C. The maximum temperature among the consigned fish was observed amongst line caught ling which had been separated from their ice and tipped from their original boxes into bulk bins at the quayside. The bins were then transported to the market hall for inspection by interested buyers. It is probable that the high temperatures are due to the removal of ice.

It was noticed that the consigned fish were re-boxed and top iced only after grading. Given that these fish were bound for the continent, top icing could be inadequate to maintain low temperature should the fish be exposed to unexpected delays or poor transport practice.

The average temperatures derived from our Nephrops sample show that icing practice was poor, despite the high value of this species. This is an inherent problem caused by the need to trade on the net weight of prawns in a box, and these results are typical of most Nephrops landings in the UK. Although Nephrops landed with little ice make the sales transaction simpler and quicker, overall the Nephrops industry is losing money through un-necessary early spoilage.

3.5 Box Filling

Boxing practice at sea has a critical effect upon fish quality. Fish should be aligned within the box to prevent distortion, with belly cavities downwards to facilitate drainage. To prevent crushing and to allow sufficient ice to cool the fish or Nephrops, boxes must not be overfilled.

The most common box observed at Lochinver was the Chep 70 litre stack-only type. For this box Seafish recommend a maximum of 50 kg of white fish, 22 kg of Nephrops tails and 19 kg of whole Nephrops.

The net weights of 13 full boxes of fish and 3 full boxes of whole Nephrops were weighed and the results are shown in Figure 1.

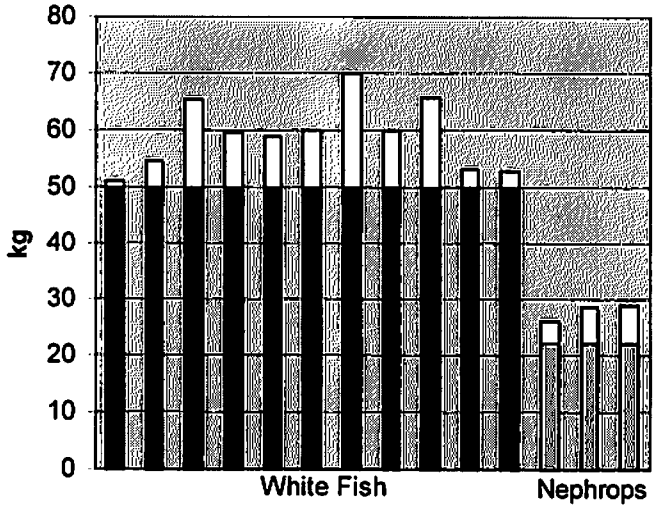


Figure 1 - Box overfilling

The overall average weight of fish found in a box was 57.9 kg; which is +1.6% over the accepted 57 kg port standard and well within the 5% legal tolerances of EU fish marketing regulations.

With regard to good boxing practice however the average weight of fish in a box is 15.8% over the recommended 50 kg above which there is danger of physical damage through crushing and loss of freshness caused by insufficient ice.

On average the boxes of Nephrops were overfilled by 47%.

Despite the levels of overfilling of boxes there was little sign of any physical damage either to fish or Nephrops but this may have been at the expense of freshness if insufficient ice was used.

4. Physical Infrastructures

4.1 Background

In the late 1980's Lochinver experienced a substantial increase in landings but the ability of the port to cater for continued growth was threatened by constraints of inadequate infrastructures. In recognition of the significance of the port, both locally and to highland region, the owners Highland Council, commissioned Mackay Consultants and Seafish to undertake an appraisal of their development plans.

The study confirmed problems of berthage, inadequate areas for on-shore operations and lack of provision of facilities for marketing and transport of landings and supported plans for major works.

With financial assistance from the ERDF and Caithness and Sutherland Enterprise work was completed in 1992 at a cost of £6.7 million. 110,000 tonnes of rock were blasted from the surrounding hills to build a new breakwater and create a level area of land for infrastructure development. A new and larger fish market was constructed on a 200m landing quay and a new 240m finger jetty provided berthage for bunkering and lay-by. The development also provided new gear stores, net mending shed, fuel storage and delivery system and improved road access. The new development is shown in Figure 2.

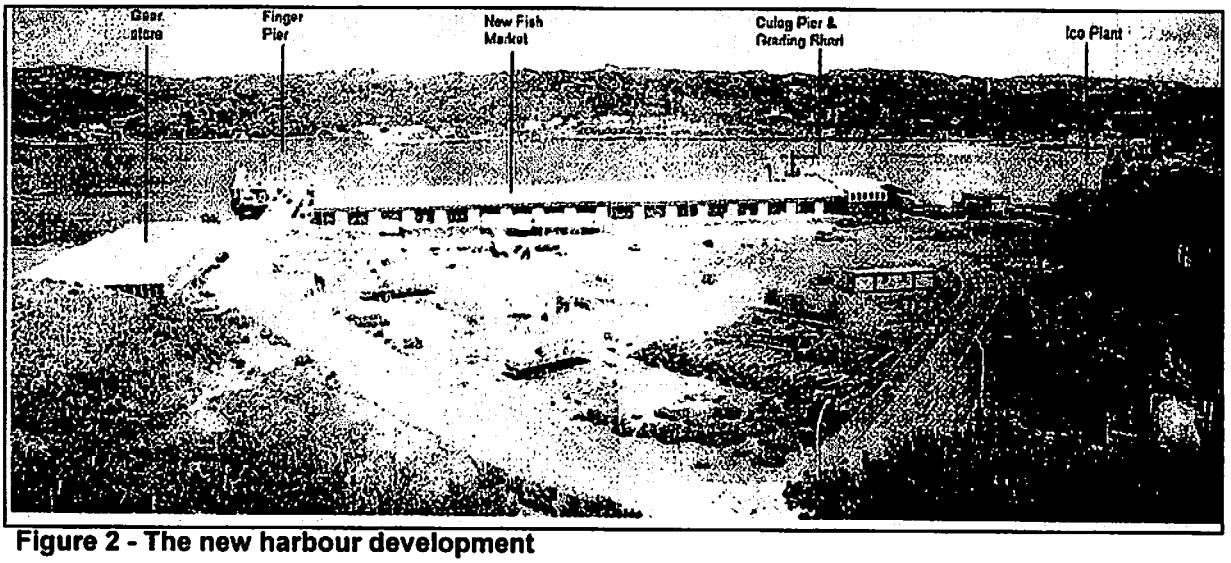


Figure 2 - The new harbour development

The old fish market has been adapted for use as a fish grading and re-packing shed largely serving Spanish and French vessels working deep water grounds between North West Ireland and Norway. The bulk of their landings are consigned back to their home markets.

4.2 Operating Quays and Equipment

4.2.1 New Fish Market Quay

The new 200 metres of quay at the fish market allows direct transfer of landings to the fish market and is more than adequate for existing trade. It has good depth of water and an apron width sufficient for access by road transport. Lighting of the apron is provided by spotlights over each market door that give good illumination of the doorways but not of the quay edge/face. The market quay has no drainage system but is graded to the dock. The quay and apron are well maintained and in good condition.

4.2.2 Culag Pier

Vessels landing to the grading and re-packing facility provided within the old market on Culag Pier use the West Quay. This deep-water berth allows them to land directly to the building. The East Quay is of shallower depth and is used for lay-by of smaller vessels.

Figure 3 - The quaysides of the Culag Pier are in need of repair

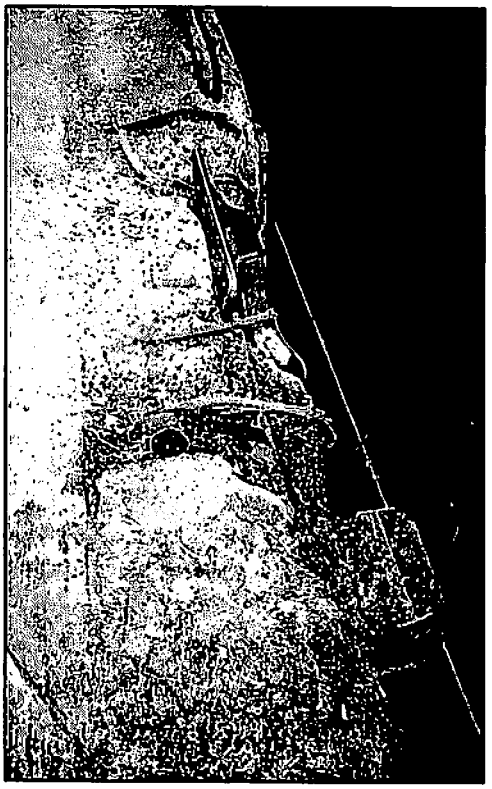


Figure 4 - Damage to the quay and quay apron

The aprons of the pier are narrow and in poor condition (Figure No. 3). There is no drainage system. Ladders, rails and fenders have suffered serious damage and are in need of attention. (Figure No. 4). A survey commissioned by Highland Council has revealed that the piles supporting the pier are corroded in the inter-tidal zone and remedial work is planned to address these structural problems and repair of the aprons and fittings.

4.2.3 Finger Pier

The new finger pier provides 240 metres of berthing space and facilities for taking fuel and water. Damage to the concrete margins of the pier has been remedied with the installation of steel fairings but the steps on the west side of the pier are in need of attention.

4.2.4 Unloading and Quayside Handling

Landings to both the new market and the (Culag) grading shed are made using the vessels own gear (Figure No. 5). Where landings are consigned, a portable loading-platform of suitable height, may be used on the quay to receive boxes and transfer them direct to road transport.

Forklift trucks and hand-pallet trucks are used for handling landings to and within the market and grading shed. The diesel-powered truck used in the grading shed is not suited for use in a food environment (Figure No. 6).

Figure 5 - Unloading of bins

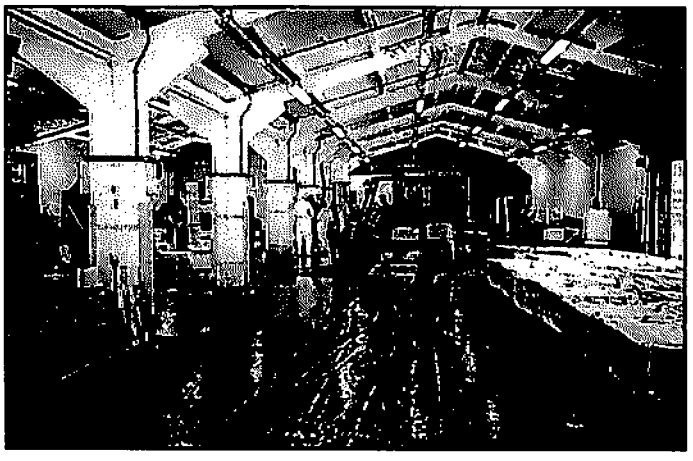


Figure 6 - Diesel truck used in the grading shed

4.3 New Fish Market

The new fish market was constructed to EU hygiene standards and provides 2,500 square metres of floor area for handling and sales. It has more than adequate capacity for current levels of sales. It is not mechanically chilled but work has just started with the installation of a modular chill store within it. The facility will allow vessels to land at their convenience as fish will be able to be kept chilled until laid out for sale. It could also be used by buyers to hold purchases in the event of any delay in the arrival

of onward transport. Temporary chilled storage in the form of refrigerated trailer units is provided by the Lochinver Fish Selling Company.

The building is steel framed with brick and block walls and has a corrugated plastic-coated steel roof. During the audit the roof was leaking with rainwater falling onto the market floor and on internal light fittings posing both a hygiene and safety hazard. On the ground floor there is; an entrance that provides access to the market floor, toilets, a bonded store and a canteen and kitchen. On the first floor there are offices for the Harbour Master and vessel agencies.

Although it is a relatively new structure it has suffered considerable damage both internally and externally by mechanised handling operations. Many of the doors, canopies, door architecture, and brick surrounds are damaged. (Figure Nos. 7,8 & 9).

Figures 7,8 and 9 - Damage to building structures

To the rear of the market differential settlement between foundation slabs has given rise to a step of 3-4 cms between the levels of the market floor and the loading bay that has resulted in maintenance problems with electric pallet trucks. Remedial work was being undertaken at the time of the audit .

The market floor and the landing quay areas are not equipped with any mains drainage system but are graded to the dock (possibly in breach of environmental legislation?). The areas around the quayside doorways however were poorly drained, with standing water from meltwater or washdown. This has caused the wooden doors and frames of many of the fire-exits to swell making them difficult to open. In addition most of the doorway stays are bent and inoperative. (Figure 10).

Figure 10 - Damage to the doorway stays

Many of the hose reels along the south side of the market have been damaged by misuse. (Figure No. 11).

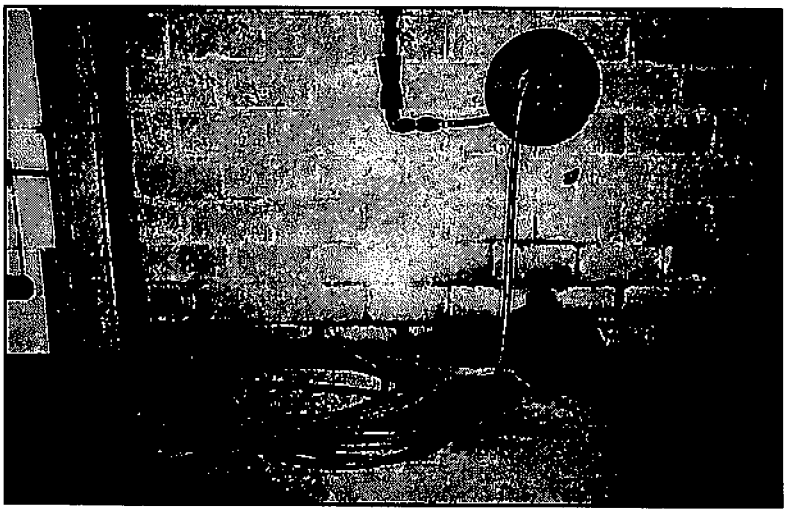


Figure 11 - Damage to hose reels

There are no handwash facilities on the market floor. Facilities are available however in the toilet and washrooms situated at the western end of the building. They are spacious and well equipped although some of the sanitary ware fittings are damaged (Figure No. 12). There are no facilities at the eastern end of the market.

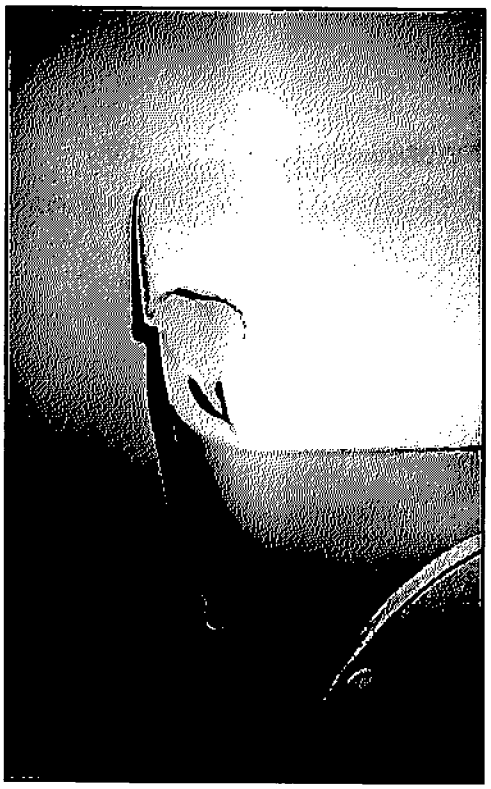


Figure 12 - Damage to toilet facilities

4.4 Grading Shed

The Grading Shed (formerly the old fish market) has a brick outer wall, and a corrugated sheet steel roof supported by concrete frames and piers. The north end is two storeys high and provides office accommodation, toilets and a rest room.

Localised staining and mould growth on the walls would indicate that the roof may be in need of attention although no leaks were found during the audit. The floor area is drained by falls to outlets through the external walls and over the quay apron to the dock. It is unhygienic and possibly in breach of environmental legislation. The epoxy floor coating laid over the concrete sub-surface is lifting in places and in need of repair. The poor surface results in puddles particularly along the walls. It is also very smooth and can be hazardous.

Space within the grading shed is limited and the building has suffered similar damage to the fish market building from mechanised handling operations. The doorway into which bins of fish are landed from vessels has been damaged by the vessels landing gear and the dispatch door has suffered from damage by forklift trucks. The internal piers are likewise damaged.

4.5 Market Equipment

4.5.1 Fish Market Equipment

Most fish sold by auction is sorted and graded at sea and sold as standardised boxes, and other than forklift and pallet trucks, and platform scales for check-weighing, there is no requirement for sorting and weighing equipment. Balance scales are provided for determining the 'count' of Nephrops supported on unhygienic wooden boxes. (Figure 13).

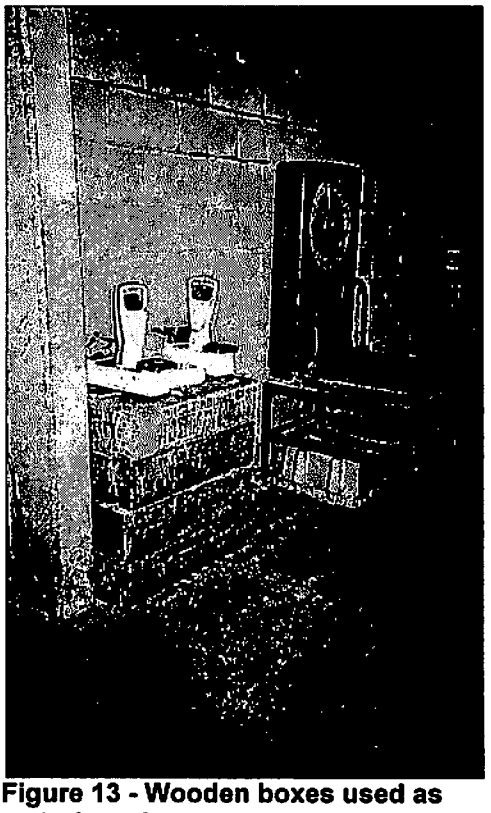


Figure 13 - Wooden boxes used as a platform for weighing equipment

4.5.2 Grading Shed Equipment

Within the grading shed convenient to the landing doorway is a grading conveyor used mostly for sorting and grading deep-water species. The conveyor is feed by a tipper mechanism that empties tubs via a chute. The regulation of supply of fish to the grading operatives however is poor. Electronic scales are used to weigh off re-boxed fish prior to icing.

4.6 Cleaning Equipment and Waste Facilities

Water hoses are provided in both the fish market and grading shed for purposes of wash-down although many have been damaged by misuse. Problems of supply of water to the grading shed should be resolved by plans to connect into the system serving the new market.

There is no dedicated box washing facility in Lochinver. Consigned boxes are cleaned on the East Coast and returned to the box pool operated by CHEP and stored to the rear of the Culag Pier. A hand-held pressure washer is used in the grading shed for cleaning tubs, boxes and plant.

Euro-bins are provided on the market for general wastes and a skip provided to the rear of the market at the loading bay (since the audit it is understood that a second skip has been provided). There is a waste oil facility of 3000 gallons capacity that is serviced by a specialist contractor.

4.7 Ice, Water and Fuel Supplies

4.7.1 Ice Supply

Adequate supplies of good quality flake ice are available from a plant adjacent to the Culag Pier. It has production capacity for up to 40 tonnes per day and storage capacity for 100 tonnes. Access to the plant however is restricted by the depth of water alongside and large vessels are serviced on the finger pier that involves transfer of one tonne bags by fork lift and an elevator. The process can take up to 4 hours.

4.7.2 Water Supply

Water supplies to vessels are available at the market, the north end of the Culag Pier and on the Finger Pier.

4.7.3 Fuel Supply

Fuel supplies may be taken at the north end of the Culag Pier and on the Finger Pier.

4.8 Transport

The standard of transport used in the removal of fish from the market and the grading shed was high, with no use of open flat-bed type of vehicles. All the trucker vehicles were insulated and refrigerated.

5. Operating Practices

5.1 Landing and Handling

Landing and handling operations generally cause no problem, with landings transferred to the market or grading shed with little delay or exposure to contamination. Many boats delay landing until shortly before the sale to minimize the period in which fish lies unchilled. Diesel forklifts however were observed in use in both the market and the grading shed, and a flatbed vehicle in the market. Diesel and petrol driven vehicles should be excluded from both areas.

Consigned fish is usually landed direct to road containers without any delay.

Some boxed fish landed by liners and netters at the market quay was tipped into bulk bins on the quay, sold on the market and then transferred to the Grading Shed for grading and weighing. This would seem to involve an unnecessary degree of double handling and mixing of quality grades.

5.2 Grading and Weighing

Grading and weighing of whitefish species sold on the market is generally undertaken at sea. Prawns are also graded at sea but are check-weighed on the market to determine the count and to make up weight. Other than the conditions of hygiene and cleaning of equipment used no problems were noted.

The difficulty in regulating the supply of fish to the grading conveyor in the grading shed has led the operatives to break up masses of fish and ice by paddling them with their feet (Figure No. 14). This unacceptable practice has been encouraged by the poor design of the feed system.

Figure 14 - Paddling of fish by operatives

5.3 Storage and Display for Sale

The area provided within the new market means that there are few operational problems associated with laying out fish for sale even when displayed unstacked. Greater advantage could be made of the space however by leaving more access around boxes to encourage buyers not to walk over them. The chill store under construction on the market will allow greater flexibility with regard to landing times while maintaining product quality.

5.4 Temperature Control

5.4.1 Grading Shed

As no mechanical chilling is available within the Grading Shed, temperature control can only be achieved by good icing practice and keeping warm air out of the building as much as possible. Unfortunately the main doors of the building were left open during grading operations in an attempt to disperse the noxious exhausts of the diesel truck used in handling.

Given that there is no chilled holding facility for storage prior to dispatch and the fact that much of the fish is to be consigned long distances, icing after grading and weighing could be improved. It is current practice only to top ice the fish. Recommended practice is to ice throughout the box.

5.4.2 Fish Market

As with the Grading Shed, no chilled holding facility was available within the market (at the time of the audit). Better discipline was evident however in respect of keeping doors shut when not in use. Re-icing of fish on display on the market could be improved.

5.5 Sales

Lack of local buying power and problems of remoteness from main processing centres has led to the situation where many landings are consigned for sale, particularly landings by the deep-water visiting fleet. Auction sales on the market are conducted by Lochinver Selling Co (Denholms). In common with other north-west ports it is an evening sale (18.30 hrs) and is by the traditional 'shout' method. Prawns are sold on contract or by private treaty. The sale was conducted swiftly and efficiently and the fish immediately transferred after to refrigerated transport using electric pallet trucks.

Plans by Highland Council to introduce electric trading were strongly resisted by north-east merchants and are currently on hold pending study by appointed consultants. The plan targeted visiting deep-water vessels currently consigning their landings back to Spain and France. It featured local 'clock' sales that would have been networked or linked to remote buyers. In theory this would have given UK merchants greater opportunity to bid for landings currently denied them by consignment for sale in their home ports. North-East merchants however were fearful that the introduction of a clock would open up the market, that it would be extended to traditional species and that they would suffer from the competition. The Sales Agency was also suspicious of the Councils intentions and critical of their consultation and planning.

5.6 Standards of Cleaning and Hygiene

The standards of cleaning and hygiene in both the market and the grading shed could be considerably improved. The main sales area of the market was maintained clean and tidy but the toilet/washroom and the kitchen/canteen areas were not (Figure No. 15).

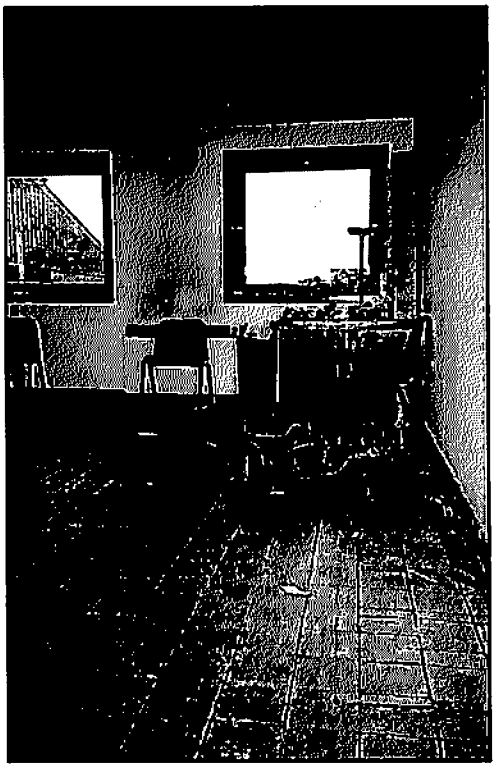


Figure 15 - Dirty and untidy staff facilities

The walls of the grading shed were dirty and mould stained. The floors of both buildings appeared dirty due to the use of fork lift trucks with rubber compound tyres (The port management are currently considering the purchase of a floor-scrubbing machine to overcome this problem). The practice of using diesel trucks in both buildings should cease, as should the temporary storage of lubricating oils and other equipment not associated with fish handling and sales.

Ice tubs and the equipment used for the handling, sorting, grading and weighing etc in both the grading shed and fish market was generally very poorly cleaned.

No signs were observed of infestation by pests in either buildings.

Standards of dress and personal hygiene were fair.

Standing and walking on fish boxes should be stopped.

6. Organization and Management

Lochinver Harbour is owned by Highland Council, being administered by their Roads and Transport Department and managed locally by their appointed Harbour Master. He is supported by an assistant, a secretary and a cleaner/maintenance person. Fish sales, ice, engineering support and other ancillary services are in private ownership. Fuel is under the control of the Council.

A Port Users Group exists to provide for communication between the Council and local trade interests. It would appear however that it meets infrequently and that the relationship between the Council and the Sales Agency particularly has become strained.

The Council supports the Scottish Seafood Project code of practice and regular local buyers are signatories to it but it is not rigidly enforced. Pest control is contracted to a specialist company as need arises. Responsibility for Environmental Health matters is covered by the Environmental Health Officer based in Dingwall on the East Coast who makes occasional impromptu visits.

A formal Waste Management Plan has been drafted and submitted to the MCA for approval but there is no documented cleaning schedule for the market building, grading shed or dock estate. A weekly maintenance/defect report is submitted by the Harbour Master to the Council.

Notification of landings and scheduling of larger vessels to the grading shed is good but advance information of landings to the auction is minimal.

7. Recommendations

7.1 Supplies

7.1.1 that those vessels producing quality scores below 7 TS should review the practice of working long trip-lengths and/or examine their fishroom practices of gutting, washing and icing.

7.1.2 producers should support efforts for the introduction of uniform/standard box weights that are compatible with good practice. Where fish is to be sold as 'standardised' boxes, producers should consider introducing weighing-at-sea where practicable.

7.1.3 greater efforts should be made by skippers and agents to improve the supply of forward information of landings to the market.

7.2 Physical Infrastructures

7.2.1 undertake various repairs to the fabric of the market, grading shed, quays and finger jetty.

7.2.2 improve the physical protection to doorways, wall pillars, canopies etc from damage by fork-lift truck or unloading operations.

7.2.3 undertake various repairs to fitments and fittings (fire-door stays, toilet sanitary ware, water hose-reels etc.)

7.2.4 consider a major refurbishment of the grading shed including; not only structural reinforcement but new drainage system, water supply, chilled holding and building structure. Alternatively consider the transfer of the operations to the fish market(?)

7.2.5 examine ways of improving the de-icing and feeding of fish in bins to the grading conveyor.

7.2.6 provide storage for miscellaneous items not compatible with market operations separate to the fish handling and sale area (lubricating oil etc).

7.2.7 replace wooden boxes used as support for the balances used to determine the 'count' of prawns with a more hygienic construction.

7.2.8 replace diesel trucks operating in the grading shed and market with electric or restrict their use to external operations.

7.2.9 consider the eventual relocation of the ice plant to a deep-water berth.

7.3 Operating Practices

7.3.1 when landing boxed fish do not aggregate them in large bins prior to sale unless of similar quality/size.

7.3.2 do not operate diesel trucks in the market or grading shed.

7.3.3 keep the market and grading shed doors closed when not actively in use.

7.3.4 Icing of repacked fish should be improved, in order to maintain quality during onward distribution.

7.3.5 improve the standards of cleaning of structures, plant and equipment.

7.3.6 improve standards of hygiene on the market (walking on boxes, smoking, drinking etc.)

7.4 Management Controls

7.4.1 consider ways of improving communications and contact between the port management and the trade through more regular 'User Group' meetings particularly with regard to strategic planning, standards of operations and issues of overlapping commercial interest.

7.4.2 display the agreed fish market code of practice prominently in the market and enforce it.

7.4.3 given the high level of damage caused to port structures by mechanical handling operations consider improved protection to vulnerable areas and the training/supervision of drivers.

7.4.4 develop and implement formal/documented cleaning-schedules to cover the market, grading shed and dock estate.

Appendix I

Torry Freshness Assessment Scoring System

Torry Freshness Assessment Scoring System

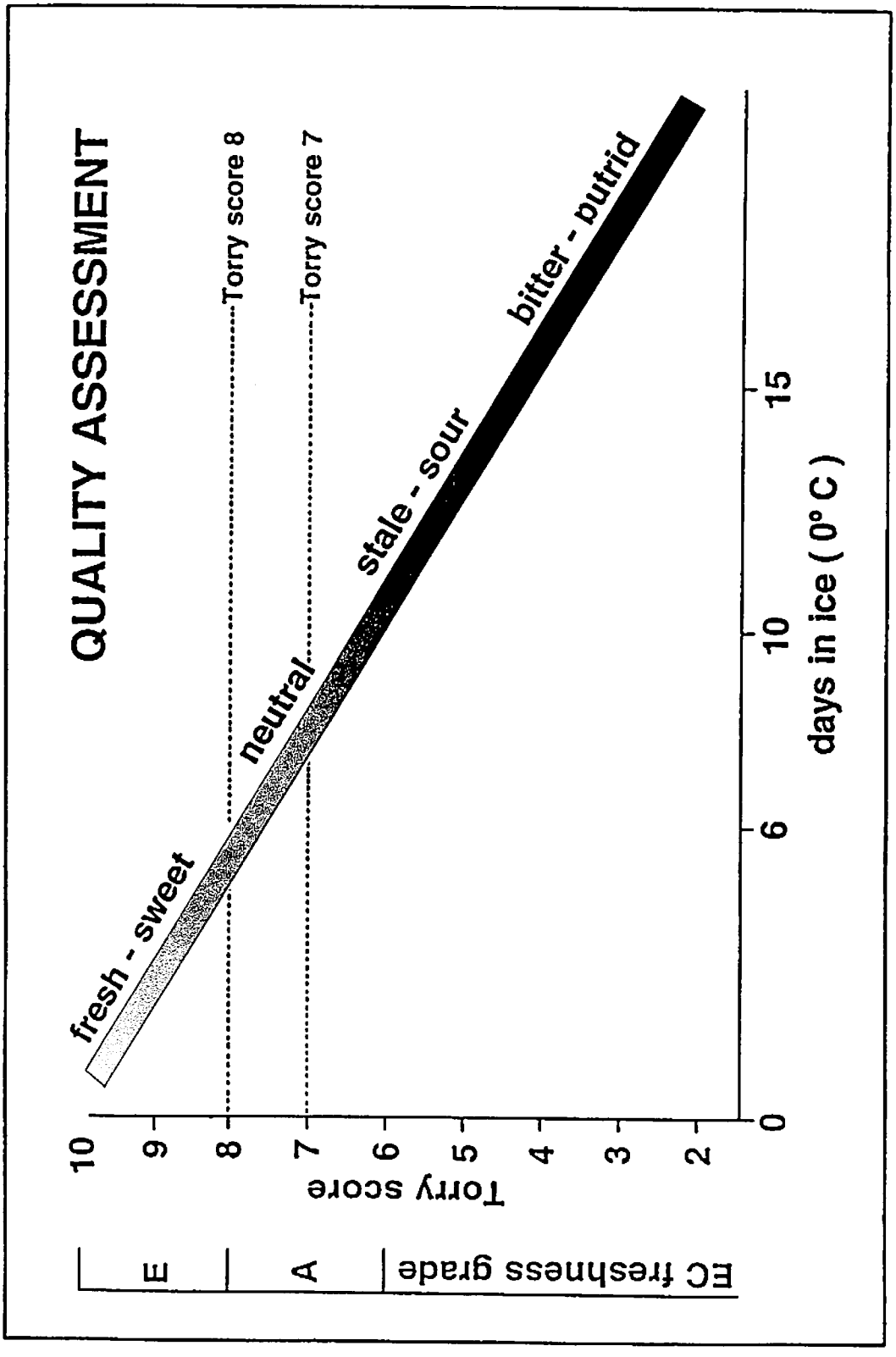
The Torry Freshness Scoring system judges freshness quality using external appearance and odours as indicators of freshness on a scale of zero to ten. Appendix I-ii shows the relationship between Torry Score, the number of days the fish is held in ice and the eating quality of white fish.

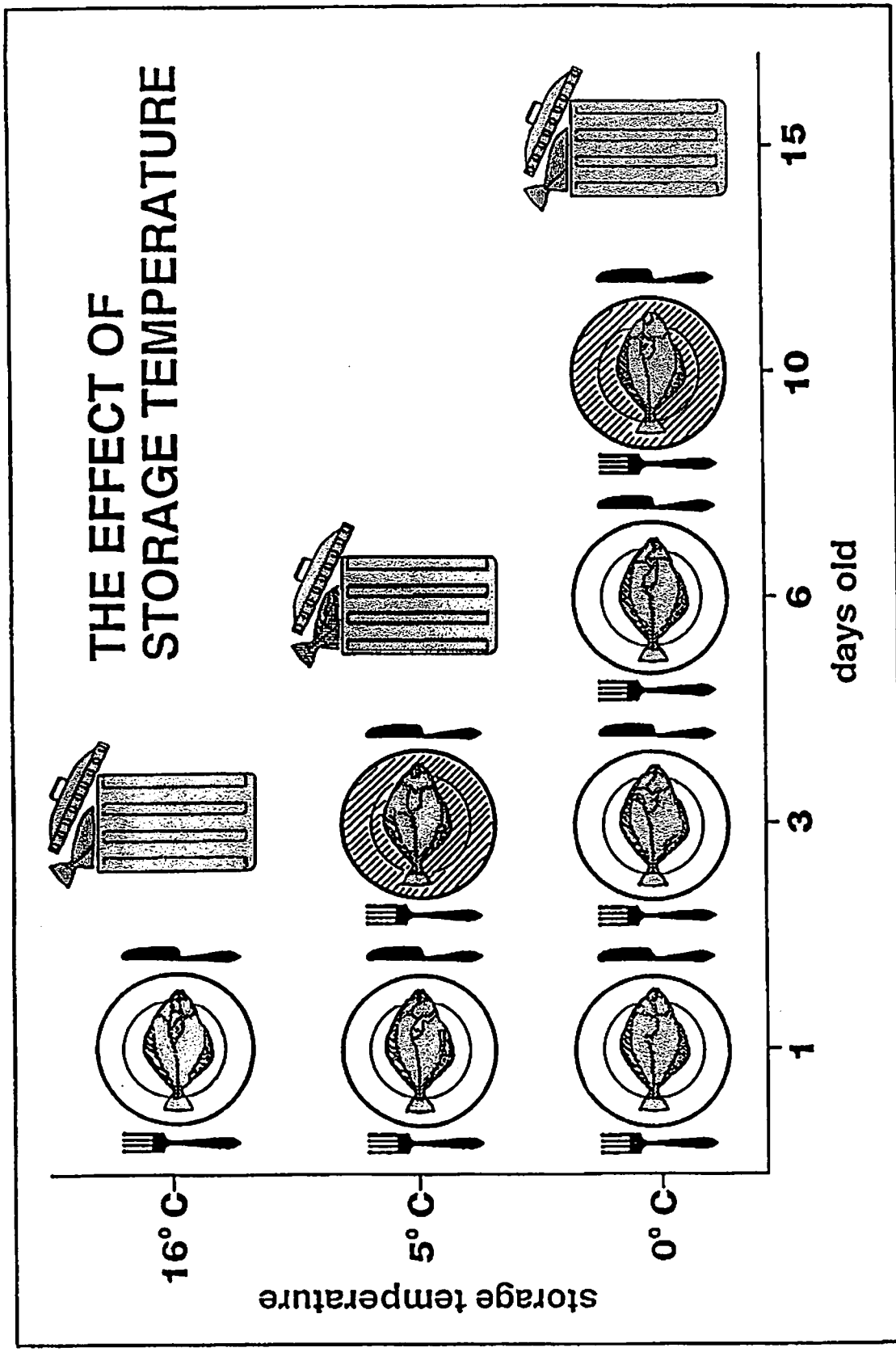
Seafish recommend that white fish sold on the market be of Torry Score 8 or above (EU freshness grade E) in order that the product reaching the consumer has a good chance of retaining sweet, desirable flavour and not have undesirable sour or bitter flavour.

Note that temperature control is by far the most significant factor affecting the rate of deterioration of fish and that at temperatures above that of melting ice, spoilage is greatly accelerated as described in Appendix I-iii.

Typically white fish remains acceptable for about 10-11 days after capture if well iced, but this can be reduced to a matter of a few days if left unprotected at summertime ambient temperatures.

For Nephrops fisheries quality is judged using external appearance and raw odours as indicators of freshness on a scale zero to five. Nephrops remain acceptable for consumption for up to eight days if they are held at the temperature of melting ice.


QUALITY ASSESSMENT
Torry score 8
Torry score 7
fresh - sweet
neutral
stale - sour
bitter - putrid
days in ice (0° C)
0
6
10
15
Torry score
10
9
8
7
6
5
4
3
2
EC freshness grade
E
A


THE EFFECT OF
STORAGE TEMPERATURE
storage temperature
16° C
5° C
0° C
1
3
6
10
15
days old