Packaging Audit
of
Billingsgate Fish Market

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Consultancy report

Packaging audit of Billingsgate fish market

Prepared for Sea Fish Industry Authority

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1 Introduction

This report covers the packaging audit of Billingsgate fish market by Pira International, as contracted by Sea Fish Industry Authority.

Billingsgate market was chose for the audit because the market demonstrates how complicated trading and packaging flows can be at UK fish markets.

2 Work objective

To identify key issues relating to the use of packaging at the market, particularly in view of the Packaging and Packaging Waste regulations.

3 Programme of work

Three visits were made to Billingsgate market (during normal operating hours) by Pira representatives.

The first visit served as an introduction to the market and allowed specific plans to be made for the second and third visits, which allowed a more detailed assessment of the market operation to be performed.

The visits consisted of visual assessment of the market function and packaging flow/usage, direct questioning of market stall operators, examination of incoming packed product, examination of the market waste disposal operation and isolation of available data already held by the market for use in calculating packaging flows.

4 Audit findings and discussion

The findings of the audit are described and discussed in two parts below. Section 4.1 relates to packaging and packaging waste legislation issues as they affect merchants and businesses at the market.

Section 4.2 relates to the general issue of waste disposal at the market, not directly related to the legislation, but pertinent to the market operation. This includes general trends in packaging waste disposal, which may be of significance to the market in the longer term.

Appendix A at the back of this report details the market packaging flows as established during the audit and the calculations made that form the basis of the following discussion of packaging use at Billingsgate.

4.1 Packaging legislation issues

The UK implementation of the Packaging and packaging waste directive (62/94/EC) may be considered in two parts. The first part is labelled the Producer Responsibility Obligations and relates to packaging waste. The second part is labelled the Essential Requirements and relates to packaging itself.

Producer Responsibility Obligations

- The Producer Responsibility legislation in the UK affects any business which 'handles' packaging, subject to compliance with two 'thresholds', as follows:

1. the business must 'handle' 50 tons or more of packaging per annum
2. the business must have an annual turnover of £2 million or more.

Businesses are deemed to handle packaging if they perform any one of four specific operations as follows:

1. manufacture of packaging raw materials
2. conversion of packaging materials
3. packing or filling of packaging
4. final selling of packaging (which is sold as a matter of course when product is sold).

Thus any business performing any of the four specified operations upon 50 tons or more of packaging (or performing any combination of the operations on a total of 50 tons or more of packaging), with a turnover of £2 million or more, will be obligated with respect to the Producer Responsibilities.

Examples of the four specified packaging 'handling' operations are as follows:

Manufacture of raw materials:
Production of plastic pellets from oil (for later use in the manufacture of plastic bags). Production of paper from wood pulp (for later use in the manufacture of corrugated fibreboard).

Conversion of packaging materials:
Manufacture of plastic bags, plastic bottles or expanded polystyrene boxes (from plastic pellets). Manufacture of corrugated boxes (from reels of paper).

Packaging or filling of packaging:
Packing of fresh or frozen fish into expanded polystyrene or fibreboard boxes.

Final selling:
The final sale of the pack may be defined as the sale beyond which pack and product are separated. For example, when carton of fish fingers are purchased by a member of the public in a supermarket, beyond that purchase the fish fingers do not undergo a further sale in their carton – the fish fingers and the carton become separated in the home. However, when fish packed in to an expanded polystyrene box are sold from a processor to a market trader, if the market trader then sells the fish (to a hotel, for example) and the fish remain inside their EPS box, the processor is not the final seller of the packaging (but the market trader is).

- Calculations indicate that the estimated total weight of packaging handled by the market's smallest merchant is 7 tons per annum and the estimated weight handled by the market's largest merchant is 43 tons per annum (which is relatively close to the 50 ton threshold).

That the calculation method is based on a number of assumptions means that the true figure for the larger merchants could pass the threshold. For the largest merchant, our packaging use weight estimate is only 17% short of the threshold value.

- Indicative annual turnover data supplied by the London Fish Merchants' Association (Billingsgate) Ltd during March 2000 (and historical data sourced from a Sea Fish Industry Authority Billingsgate Consultancy Report) highlights that turnover at the market ranges from £0.5 million for smaller merchants to well over £2 million for large merchants.

- Calculations indicate that the majority of merchants do not approach the threshold value of 50 tons of packaging handled per year (per merchant) and thus the Producer Responsibility legislation will not apply to those merchants (even if merchant turnover exceeds the threshold of £2 million).

  Where businesses are not obligated under the legislation, packaging waste is only an issue when considering the costs associated with organising and performing general waste disposal (there are no additional charges or actions required by law).

  However, the market study highlights that a percentage of merchants may well exceed both turnover and packaging weight thresholds, and perform the specified handling operations, and thus will be obligated under the Producer Responsibility part of the directive.

  Specific details of the actual obligations and the actions required by merchants who are obligated under Producer Responsibility falls outside the scope of this report.

  The complexity of trading in the industry and tracing pack/product ownership is likely to make calculation of obligation a difficult task for obligated merchants.

  It is suggested that a periodic check be made that the Producer Responsibility Obligation thresholds have not been updated by the Environment Agency.

Essential Requirements

- The Essential Requirements apply to all packaging without exception (there are no threshold conditions for inclusion).

  The Essential Requirements define particular design features that all packaging must incorporate in order to minimise the impact of packaging on the environment. The requirements are:

  1. Packaging must be minimised by weight and volume (in other words the pack must be as light and as small as is possible), whilst not compromising pack fitness for purpose
  2. Packaging must be recoverable (by materials recycling, incineration with energy recovery, or by biodegradation/composting)
  3. Presence of noxious and hazardous substances must be minimised (such that these are minimised with respect to leachate and ash arising from packaging disposal)
  4. The sum of lead, mercury, cadmium and hexavalent chromium must not exceed 100 parts per million.

- In the UK the onus for demonstrating compliance with the Essential Requirements is placed on the packer/filler, brand owner or importer of the product.

  In general terms within the industry, the packer/fillers are those businesses packing fish either at sea or at the docks. A brand owner is the business whose name and logo appear on packaged fish at point of sale. An importer is the business first taking ownership of product brought into the UK (for example a business whose activity is purchasing and importing prawns from Asia).

  Within the market itself there is little packing/filling, brand ownership or importation; most product is purchased pre-packed, bought within the UK and sold at the market in the same packaging as received by the merchants at the market. Thus for the majority of merchants within the market there is no obligation under the Essential Requirements and no further action is required.

However, some merchants may be performing these functions on a small scale, and technically they are obligated under the Essential Requirements. If a merchant re-packs fish (in order to consolidate stock for storage or to facilitate easier sale of small non-bulk customer orders) and the original packaging is discarded, then the merchant becomes obligated under the Essential Requirements as a packer/filler for the new packaging used.

- In the UK the Essential Requirements are being policed by Trading Standards. Currently Trading Standards are focusing on consumer packaging primarily sold through large retail outlets. Commercial and industrial packaging has not yet been addressed and is therefore considered low risk.

  Specific details of the actual obligations and the actions required by merchants who are obligated under the Essential Requirements falls outside the scope of this report.

4.2 General waste disposal issues

- On a normal day approximately 2 tons of packaging enters the market and 1.7 tons of packaging are collected for disposal. However, the total daily weight of rubbish collected on the market site is 3.3 tons.

- The deficit between packaging entering the market versus weight of rubbish collected is large. The deficit may be accounted for in a number of ways related to market function which are unavoidable:

  1. On site café rubbish
  2. On site building repair waste rubble
  3. Rubbish generated by on site chicken and potato sales
  4. A small amount of fish waste is disposed of as normal market refuse.

- However, the weight of collected rubbish is partially accounted for by factors related to market function, which may be avoidable if better practice were employed within the market:

  1. Ice is regularly collected in waste EPS cases
  2. Corrugated board is often water soaked when disposed.

- In addition to this, it was observed during the audit that a considerable weight of rubbish is collected that is totally unrelated to the market function. Market skips on the perimeter of the site are regularly used as a dump for household and garden waste.

  It is estimated that a significant weight of rubbish collected (and associated disposal cost) is accounted for by illegal dumping and poor practice (poor practice includes the disposal of ice and corrugated board whose weight is significantly increased as a result of being sodden).

5 Discussion and recommendations

5.1 Packaging legislation issues

Producer Responsibility Obligations

- There is a need for larger merchants at Billingsgate to formally identify whether or not they are obligated under the Producer Responsibility part of the legislation. Further consultation with the London Fish Merchants' Association (Billingsgate) Ltd should take place in order to assist in identifying liable businesses at the market.

- In the longer term it is also important for medium sized merchants at Billingsgate (who probably do not exceed the packaging use threshold, but do exceed the turnover threshold) to assemble supporting information to demonstrate exemption from the Producer Responsibility legislation.

  Even though these businesses do not exceed the packaging use threshold they may be investigated by the Environment Agency, triggered on the basis of their turnover exceeding £2 million. The Environment Agency could request the supporting documentation which demonstrates exemption from the legislation.

- It is recommended that an easy to use guide be drawn up such that merchants have assistance in establishing whether or not they are obligated under the Producer Responsibilities.
  This would include a method to estimate annual packaging use (it is assumed that merchants have their turnover figures readily available).

Much of the information required in writing this guide has been established through the market audit; Appendix B includes information relating to assessing packaging use – this could well form the basis of a guide.

- Following this, if a sufficient number of merchants are obligated, it is recommended that a second guide be compiled relating to the Producer Responsibility legislation itself, such that those merchants who are obligated have assistance in understanding the legislation and in taking the resultant necessary action.

Essential Requirements

- There is a need for all merchants at Billingsgate to formally identify whether or not they are obligated under the Essential Requirements part of the legislation.

It is recommended that an easy to use guide be drawn up such that merchants have assistance in performing this task.

Following this, if a sufficient number of merchants are obligated, it is recommended that a second guide be compiled relating to the Essential Requirements legislation itself, such that those merchants who are obligated have assistance in understanding the legislation and in taking the resultant necessary action.

Overview of guides

- This report forms part of a broader piece of work that Pira have been contracted by Sea Fish to undertake; the broader piece of work involves a review of the Packaging and packaging waste legislation in terms of the whole UK fish products supply chain. It is suggested that any guides be considered in the context of the whole chain review work.

In addition, it may be prudent to restrict guidance work on the Essential Requirements to just a preliminary level in the short terms until enforcement within the industrial and commercial sectors becomes a focus of Trading Standards.

5.2 General waste disposal issues

- Although the weight of waste produced by the market is large, the total costs of disposal through the local waste disposal tip is not excessive at the present time.

  This having been said, these costs might be reduced if the Market Authority were to take advantage of any cost saving opportunities which become available to it. In addition there is a long-term trend towards increased cost of waste disposal by landfill as landfill taxation is likely to rise.

  Further to this, costs related to recovery and recycling of plastics are currently significantly higher than those for board packaging and this trend is likely to continue (or become even more significant) in the future.

- To reduce the weight of waste, in the short term it may be prudent for the market authorities to reinforce best practice within the market relating to non-tipping of ice inside cases.

  It is also worth the market authority or Traders Association assessing means of maintaining corrugated board as dry as possible prior to disposal.

- In addition to this, the illegal dumping of rubbish on the site needs to be addressed. Although monitoring of this is difficult, possible means should be evaluated (use of current on-site video camera system, current on-site security team, signage (threat of prosecution for illegal dumping), etc).

- The long-term availability to the Market of the current waste disposal tip or transfer station is not known. The Market should be mindful of this and periodically review its plans for refuse and waste disposal for the medium and long term, including the identification of materials suitable for recycling and/or incineration. (The industry at large should be actively seeking environmentally improved packaging materials suitable for the fish business). Waste disposal costs are currently on the increase and this trend is likely to continue.

Alternative waste management options are briefly discussed in Appendix C, at the back of this report.

In addition, landfill tax funding could be available to help implement landfill diversion projects; this is a subject for further discussion.

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Appendix A

Methodologies employed

During the first market visit, the outline of the packaging flows model was established. The second visit to the market allowed a more detailed assessment of packaging flows in order to quantify packaging usage within the model. The approach employed in quantifying packaging use in the market is described in sections A.1 to A.6 below. The packaging flows model is presented at the end of Appendix A in section A.7.

It was clear that fresh incoming fish was packed almost entirely in expanded polystyrene and frozen fish in corrugated or solid fibreboard. Fresh and frozen deliveries were handled separately on the site.

Other packaging materials were in use, but in extremely small quantities. These included wood, string bags, plastic film (in bag form) and plastic twine.

It was also established that the market operates on 5 days: Tuesday to Saturday. In addition, it was found that tonnage of fish handled was fairly consistent Wednesday to Saturday, but with volumes on Tuesday being twice that of the normal daily average. See table 1 below.

Table1: Daily average total tonnage of fish received by the market

Day	Total tonnage
Tuesday	98
Wednesday	55
Thursday	54
Friday	47
Saturday	44
Mean (Wed. to Sat. only)	50

Note: The market serves a separate function on Sundays as a shellfish market. The scope of the study did not include the Sunday shellfish operation so it is not included in this report. Where appropriate, the Sunday operation has been factored out of calculations made.

A.1 Incoming fresh fish

Copy delivery notes for one day of trade were collected at the market. For each delivery these notes detail the number of EPS cases delivered and the filled case weights (10 cases weighing 5kg each, for example). These notes were used to establish the total number of EPS cases received at the market versus filled case weight (see table 2).

Known empty packaging weights for a range of filled EPS cases were obtained (see table 3) and used to calculate the total weight of EPS packaging received by the market for the day (table 4).

Table 2: Total number of EPS cases received in one day

Filled case weight	Total number received
0.5 stone	1532
1 stone	1371
2 stone	462
3 stone	64
4 stone	57
10kg	886
15kg	51
Other	200

Table 3: Empty EPS case weights

Filled case weight	Empty EPS case weight/kg
0.5 stone	0.17
1 stone	0.20
2 stone	0.40
3 stone	0.60
4 stone	0.75
10kg	0.315
15kg	0.322
Other*	0.25

* Empty case weight for 'others' was averaged at 0.25kg

Table 4: Total weight of EPS received

Filled case weight	Total number received	Empty EPS case weight/kg	Weight of EPS received/kg
0.5 stone	1532	0.17	261
1 stone	1371	0.20	274
2 stone	462	0.40	189
3 stone	64	0.60	39
4 stone	57	0.75	43
10kg	886	0.315	284
15kg	51	0.322	17
Other	200	0.25	50

Total weight received = 1157kg.

Based on the data shown in Table 1, the market handles six times this normal daily weight (1157kg) each week. Thus the market receives 350 tons of EPS each year.

A.2 Incoming frozen fish

Frozen fish is handled in two ways on receipt; it is either transferred directly into a freezer store or it is dispatched immediately for customer collection. The majority of frozen product is transferred directly to the freezer store (staff at the market estimated this majority to be 90%).

A booking record of stock entering the freezer store for one week was obtained from the market. As per incoming fresh fish, this record shows the number of cases and the filled case weights (see table 5).

Empty corrugated and solid board case weights were not available. However, empty case weights were calculated based on an average corrugated/solid board construction and on a calculation of the area of material required for the various case sizes in use (see table 6). Case dimensions were measured during the audit for the range of filled case weights.

Empty case weights were combined with the number of cases received in order to establish the total weight of fibreboard transferred to the freezer store during the week (table 7).

Table 5: Total number of fibreboard cases received in one week

Filled case weight/kg	Total number of cases received
3	1309
5	2696
8	2620
10	2548
14	317
20	816
25	14

Table 6: Calculated weight of empty cases

Filled case weight/kg	Calculated area of material for this case size/m²	Typical board weight/kg per m²	Calculated empty case weight/kg
3	0.41	0.55	0.23
5	0.55	0.91*	0.50
8 to 10	0.73	0.55	0.40
14	0.90	0.55	0.50
20	1.10	1.00	1.10
25	1.70	1.00	1.70

* The typical weight of the 5kg case material has been increased to account for the fact that a proportion of 5kg cases are solid board (much heavier than single wall corrugated)

Table 7: Total weight of fibreboard transferred to freezer store in one week

Filled case weight	Total number received	Typical empty board case weight/kg	Weight of fibreboard received/kg
3	1309	0.23	301
5	2696	0.50	1348
8	2620	0.40	1048
10	2548	0.40	1019
14	317	0.50	159
20	816	1.10	898
25	14	1.70	24

Total weight received = 4797kg.

The resultant weekly total board weight was factored to allow for the estimated 10% of product that does not enter the freezer store, increasing the weekly total to 5327kg. Subsequently the average daily intake for a normal market day is 888kg and the total annual weight of board received by the market is 266 tons.

A.3 Additional empty packaging

The majority of fish sales are by complete EPS or board case and thus little additional packaging is required to distribute the product from the market to the point of use.

However, where customers purchase only small quantities of fish (less than a complete case) the merchants require additional packaging to facilitate sales.

Commonly small quantities of fish are sold in plastic film bags or unused EPS (or fibreboard) packaging. During the visit to the market only a few stocks of additional empty EPS and board packaging were observed. A small quantity of empty corrugated board packaging was noted in the incoming fresh fish area, but the volume was insignificant, and only one merchant was observed with a stock of additional EPS cases.

Where small quantity sales occur (where outgoing product is sold in bags) empty used EPS cases accumulate at the end of the day's trading. Reuse of used EPS cases was observed, but this practice was not widespread.

In conclusion, it is considered that the quantity of additional empty packaging entering the market is not significant when compared to the amount of filled packaging received.

A.4 Waste

On site, refuse and waste packaging (as opposed to fish waste matter) is placed in large covered wheeled bins which are collected from locations around the site and mechanically lifted/tipped into a refuse collection vehicle (which has compaction capability). The collection vehicle makes a number of trips to tip at a nearby transfer station operated by the Local Authority. In total there are over 70 wheeled bins on site.

The waste clear up operation starts with emptying the bins around the perimeter of the site (car parks and incoming fish areas). This results in the first tipping of the site waste truck at the local waste collection facility.

This is followed by clearing/sweeping of the market trading floor itself and the subsequent emptying of the large wheeled plastic bins located around the trading area. The second tipping of the waste truck results from this.

Later in the day, as perimeter bins refill during ongoing clear up, third and fourth tippings are made by the waste truck. The third and fourth tippings relate to waste packaging material which is brought back on site by delivery vans which have finished their fish deliveries, packaging produced by consolidation of stock after trading and the final site sweepings.

Waste is not sorted on site. In general terms, waste consists of used EPS and board, a small quantity of fish product, broken wooden pallets, water and ice, plastic film, wooden packs and rubbish from the on site cafes. In addition, waste totally unrelated to the market was found in the wheeled bins: bags of garden rubbish, scrap wood, building rubble, a lavatory seat, a car battery and a Christmas tree. According to the waste disposal team on the site, dumping of these other items on site is not unusual.

The market is charged a waste disposal fee based on the weight of waste deposited. Records of the total daily weight of waste were obtained for a period of 1 month (October 1999). From this data the

average weight of collected waste was calculated for each of the waste truck tippings. These are shown in table 8 below.

Table 8: Waste truck tippings

Waste truck tip	Mean weight/kg
1st – perimeter	822
2nd – trading hall	700
3rd – later clear up	1072
4th - later clear up	785

To establish the weight of packaging material being disposed, the contents of all the wheeled bins on site was assessed during the waste clear up operation. This visual assessment allowed the content of each bin to be estimated in terms of weight (for example, bin Number 7: 25% fibreboard, 50% EPS, 25% other, by weight).

This data allowed a total percentage of waste (by weight) to be estimated for each material, for each waste truck tipping. For example, of all the weight of waste collected in the 1st tipping (the perimeter bins) 31% was EPS by weight, and so on.

Using the mean weights of waste for each tipping (table 8), a total weight of waste for each material was established (for each tipping).

For example, for the first tipping (with 31% EPS by weight), 31% of the 822kg was EPS, which equals 255kg. Tables 9.1 to 9.4 below show this calculation for each of the four tippings.

Table 9.1: 1st tipping – perimeter bins (822kg)

Material	Estimated percentage of total weight of tipping	Resultant weight of material/kg
EPS	31	255
Fibreboard	27	222
Other	8	66
Other (chicken and potato)*	34	279

* This relates to unavoidable waste produced by on-site chicken and potato trading (mainly corrugated fibreboard and other rubbish)

Table 9.2: 2nd tipping – trading hall bins (700kg)

Material	Estimated percentage of total weight of tipping	Resultant weight of material/kg
EPS	44	308
Fibreboard	24	168
Other	32	224

Table 9.3: 3rd tipping – later clear up (1072kg)

Material	Estimated percentage of total weight of tipping	Resultant weight of material/kg
EPS	18	193
Fibreboard	23	247
Other	38	407
Other (chicken and potato)*	21	225

* This relates to unavoidable waste produced by on-site chicken and potato trading (mainly corrugated fibreboard and other rubbish)

Table 9.4: 4th tipping – later clear up (785kg)

Material	Estimated percentage of total weight of tipping	Resultant weight of material/kg
EPS	34	267
Fibreboard	5	39
Other	61	479

A.5 Outgoing product

During the market visit it was quickly realised that it was not possible to perform an audit of outgoing packed product purchased by customers or for onward delivery to customers after telephone sale: product is carried away by individual customers and by porters delivering product to awaiting vehicles, and outgoing loads are often mixed in terms of packaging. In addition, a number of consignments leave the market at any one time.

It was decided that the best way to establish the quantity of outgoing packaging by customer collection or porter delivery was by subtraction of the 'waste' figures from the 'incoming' figures.

A.6 Weight of packaging handled versus merchant size

The volumes of packaging handled by each merchant at Billingsgate were estimated using the packaging flows model.

The total annual weight of packaging passing through the market was established using the daily packaging flow figures. This total was then divided between the merchants in order to estimate the annual weight of packaging handled by each merchant.

As the size of the merchants' businesses vary, the division of total weight of packaging passing through the market was weighted such that larger businesses accounted for more of the packaging and smaller businesses less of the packaging.

To do this the size of a merchants business was scaled in relation to the floor area occupied within the market by that merchant: certain weighting values were given to those merchants with one shop, two shops, one stall, two stalls, one shop plus one stall, and so on. The relative size of each merchant was noted during the market audit.

For the calculation, a stall was taken as one 'area unit' and a shop as 'four area' units. Table 10 below shows the weighting factors calculated.

Table 10: Weighting factors for merchant sizes

Area of merchant	Number of merchants this size	Weighting factor (number of 'area units')
1 stall	10	1
2 stalls	12	2
3 stalls	5	3
4 stalls	2	4
1 shop	11	4
1 shop + 1 stall	3	5
1.5 shops + 2 stalls	1	8
2 shops	1	8
1.5 shops + 4 stalls	1	10
2.5 shops	1	10
3 shops	1	12

This shows that the area occupied by the largest business is 12 times that of the smallest business. Thus the weight of packaging handled by the largest business is approximately 12 times that of the smallest business.

The total market 'area' was calculated by adding the number of '1 stall' merchants (times their weighting factor) to the number of '2 stall' merchants (times their weighting factor) .... and so on. Thus:

total market area = (10 x 1) + (12 x 2) + (5 x 3) ..... = 164.

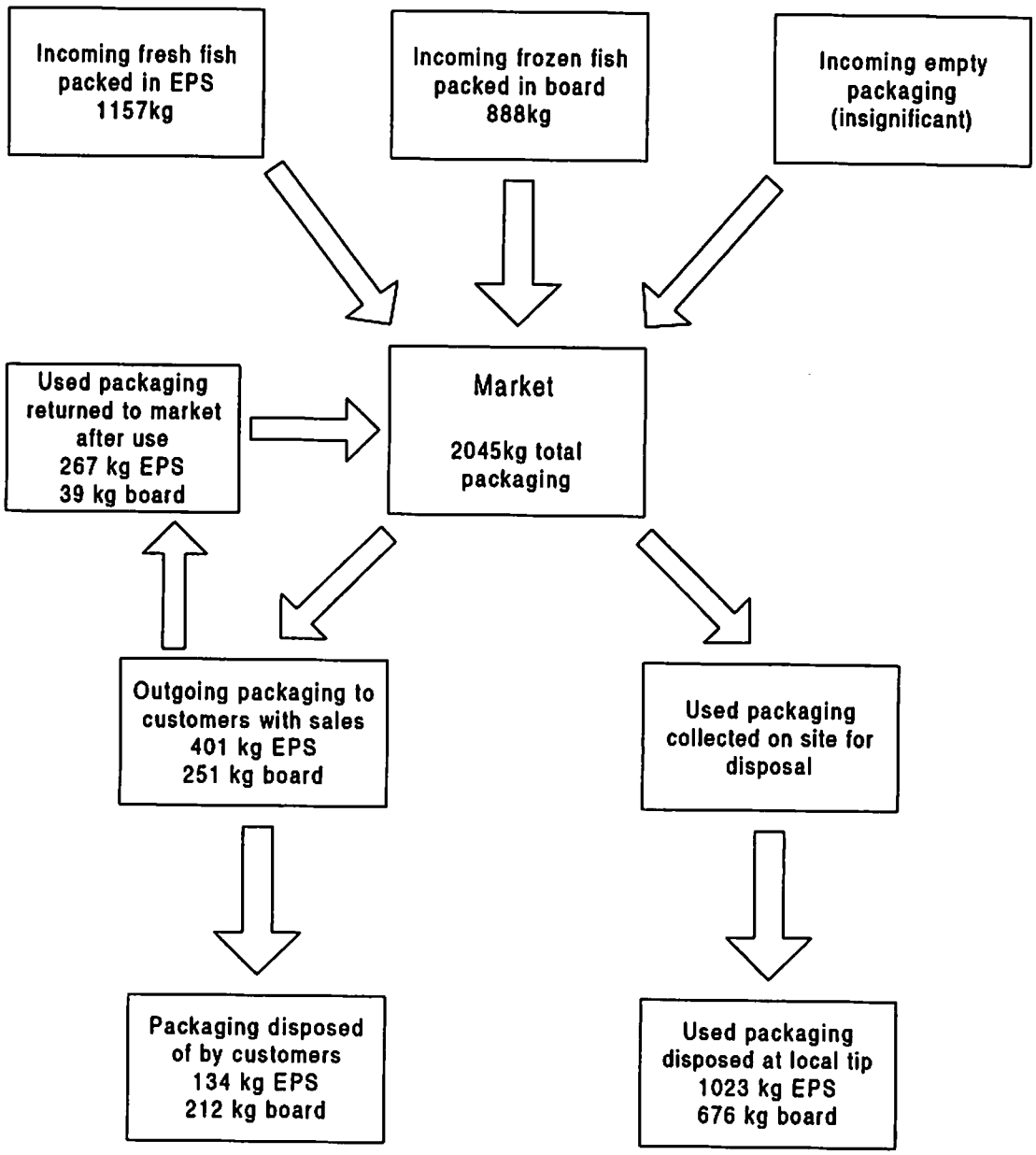
From this total market area, the fraction of weight of packaging handled by each merchant size is calculable: a merchant with a weighting factor of 2 (for example a '2 stall' merchant) handles 2/164 of all the market packaging.

The total annual weight of packaging handled by the market is estimated at 584 tons.
Thus it follows that the merchant with a weighting factor of 2 (for example a 2 stall merchant) handles 584 x (2/164) tons of packaging = 7.1 tons per year. Table 11 below shows this calculation for each merchant size.

Table 11: Resultant weight of packaging handled versus merchant size

Area of merchant	Fraction of total weight of market packaging handled	Resultant weight of packaging handled/tons
1 stall	1/164	3.6
2 stalls	2/164	7.1
3 stalls	3/164	10.7
4 stalls	4/164	14.2
1 shop	4/164	14.2
1 shop + 1 stall	5/164	17.8
1.5 shops + 2 stalls	8/164	28.5
2 shops	8/164	28.5
1.5 shops + 4 stalls	10/164	35.6
2.5 shops	10/164	35.6
3 shops	12/164	42.7

A.7 Packaging flows model



Appendix B

Estimating packaging use

Based on the data gathered during the audit, typical case weights can be established for each packaging material (based on the most popular filled case weights). This provides an estimated weight of packaging per ton of fish. Estimated values are shown below:

EPS = 30kg per ton of fresh fish
Corrugated board = 50kg per ton of frozen fish
Solid board = 150kg per ton of frozen fish

A merchant must establish how many tons of fish has been handled by the business in the year (and the packaging formats used for fish received).

An account of the number of tons of fresh and frozen fish received in the year then allows the merchant to calculate the weight of packaging that has been handled, as follows:

Fresh fish in EPS

- Number of tons of fresh fish handled in the year = ?
- Mean weight of EPS packaging for 1 ton of fresh fish = 0.03 tons
- Weight of EPS handled = number of tons of fresh fish handled x weight of EPS packaging per ton

Example
A merchant handles 250 tons of fresh fish in EPS per year.
Total weight of EPS handled in the year = 250 x 0.03 = 7.5 tons.

Frozen fish in corrugated board

- Number of tons of frozen fish handled in corrugated in the year = ?
- Mean weight of corrugated board packaging for 1 ton of frozen fish = 0.05 tons
- Weight of corrugated board handled = number of tons of frozen fish handled x weight of corrugated board packaging per ton

Example
A merchant handles 180 tons of frozen fish in corrugated board per year.
Total weight of corrugated handled in the year = 180 x 0.05 = 9 tons.

Frozen fish in solid board

- Number of tons of frozen fish handled in solid board in the year = ?
- Mean weight of solid board packaging for 1 ton of frozen fish = 0.1 tons
- Weight of solid board handled = number of tons (frozen fish) x weight of solid board packaging per ton

Example
A merchant handles 160 tons of frozen fish in solid board per year.
Total weight of solid board handled in the year = 160 x 0.1 = 16 tons.

Total packaging use
Total = EPS + corrugated + solid

Total = 7.5 + 9 + 16
= 32.5 tons.

Therefore the 50 ton threshold set in the legislation is not exceeded and this trader would not be obligated.

Appendix C

Alternative waste management

Incineration

As an initial investigation into waste management by incineration, Pira contacted the SELCHP project (South East London Combined Heat and Power Consortium).

The primary role of the incinerator is to generate energy from domestic waste. Industrial and commercial waste may be handled, but it was found that disposal by this method is costly.

For waste delivered to the incinerator (already separated into plastic and board/wood) the costs of disposal are currently as follows:

Plastics: £250 per ton
Board: £44 per ton.

The scale of cost is clearly prohibitive and therefore incineration is unlikely to be a realistic option for the waste management for the market.

Materials Recycling

EPS recycling could be an option for the market and it worth further consideration. EPS recycling is currently undertaken by various EPS users within the white goods sector (washing machines, fridges, etc).