

**Findings of a Basic Water &
Effluent Survey Carried Out at
French Fish Limited**

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**Sea Fish Industry Authority
Seafish Technology**

**Findings of a Brief Water and Effluent Survey
carried out at French Fish Limited**

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1. Introduction

As part of the North East Scotland Strategic Study, Seafish has been involved in briefly visiting representative companies in the region to survey water use and effluent production. The purpose of these visits is to estimate the general reductions in both water use and effluent strength which could be made by introducing waste minimisation. This report summarises the findings of the brief visit to the French Fish Limited carried out on 5th May 1999.

These brief visits of approximately half day duration only provide an initial indication of the water and effluent problems of each business and of what can be done about those problems. Few measurements of water usage and none of effluent strength were made, but the visits have enabled comparison with other businesses where detailed water and effluent audits and further work have been carried out. The problems and the required waste minimisation measures are often common to many businesses.

Some obvious problems and appropriate waste minimisation measures have been identified in this report, but this should not be considered as a substitute for the extensive water and effluent audit and the implementation of a targeted waste minimisation programme as recommended in the Seafish document "Guidance for Fish Processors on Water and Effluent Minimisation".



2. Background Information

French Fish Limited is a white fish primary processor with about 12 employees. The main processes carried out are:

Hand filleting
Mechanised skinning
Cleaning
Packing

3. Process Operations

3.1 Hand Filleting

3.1.1 Water Use

Poor practices and wastage of water were not evident during the visit. Management controls/current practices should be maintained to ensure the current level water consumption is maintained and opportunities for any further reductions identified.

3.1.2 Effluent Production

Problem areas:

- Trimmings are flicked into the central box/tub and left soaking which increases the strength of the effluent discharge to drain.
- A significant amount of waste ends up on the floor, with a significant proportion entering the drain, increasing the strength of the effluent and future Mogden calculated trade effluent charges. Waste ends up on the floor as a result of filleters missing the waste collection boxes and from waste falling off the cutting board.

Recommendations:

- Waste should not be flicked into the water. Instead it should be deposited into a suitable container, either close enough to the cutting board or by using a simple chute arrangement to keep waste off the floor (see Seafish Guidelines).

3.2 Machine Skinning

3.2.1 Water Use

Problem areas:

- Water is left on when not in use.
- The flow rate to the Townsend machine was estimated to be excessive.

Recommendations:

- Ensure the water supply is turned off when not in use. Consider installing an easily accessible valve on the water supply to the machine, so that it can be easily turned off. Alternatively, a foot operated control (or similar) could be used.
- Check water flow rates to the machines are in line with manufacturer recommendations. Reduce the flow rate further if practicable. Install a flow regulator to maintain a fixed flow.

3.2.2 Effluent Production

Problem areas:

- Water washes through the skins in the catch basket beneath the machine, increasing the strength of the effluent.
- The catch basket is only emptied when full, resulting in waste overflowing and ending up on the floor.

Recommendations:

- Install a wedge wire separator chute (see Seafish Guidelines) to prevent water washing through the skins. In trials with a Baader 51 skinning machine, this reduced effluent strength and costs by 60% and 50% respectively.
- Ensure catch baskets are aligned properly to catch all waste and empty regularly to prevent waste ending up on the floor.

3.3 Cleaning

Although cleaning was not observed, some problems can be identified and recommendations made on information supplied.

3.3.1 Water Use

Problem areas:

- Barrels of water (approximately 0.5m³) are tipped over the floor to rinse down after processing. This wastes a significant volume of water.

Recommendations:

- Effective cleaning is an essential part of maintaining hygiene. All waste material should be picked up off the floor and put into waste containers. Using tubs of water is not an effective way of cleaning. Hoses should be used but these must be fitted with adjustable trigger action spray nozzles to conserve water. If the water pressure is insufficient, this can be improved with the installation of a booster pump.

3.3.2 Effluent Production

Problems:

- Waste on the floor is left for long periods of time, being broken up underfoot. This adds to the strength of the effluent.

Recommendations:

- Waste should be shovelled up regularly.

3.4 Drainage and Drain Catch Baskets

Problem areas:

- Catch baskets are not fitted in the drains in the main processing area.

Recommendations:

- Install effective wedge wire catch baskets in all processing area drains (see Seafish Guidelines). In trials in other white fish premises these catch baskets have reduced effluent strength by about 50%

4. Conclusions

4.1 Water Use

Based on the brief survey, water is not wasted in filleting but is wasted in skinning and cleaning. The following table outlines the findings and areas for reduction.

Process	Estimated current water use/day (m ³)	Reduced volume (m ³)	Changes
Filleting	1.8	1.8	None
Skinning	4.8	3.36	Regulate flow Turn off when not in use
Cleaning	2.5	1.08	Use trigger spray guns
Domestic	0.5	0.42	Fit cistern bags
Total	9.6	6.66	

It is estimated that introducing these changes would result in a reduction of approximately 31% of current water consumption.

4.2 Effluent Production

When the Mogden formula comes into effect it will be particularly important to reduce the strength of the effluent generated. Filleting is the main source of high strength effluent discharged from the site. Waste should not be left soaking in the filleting tubs or be dropped onto the floor and be crushed underfoot and should not be allowed to pass into the drains.

It is estimated that a 50% reduction in effluent strength could be achieved by implementing the waste minimisation measures outlined in this report and in the Seafish Guidelines.



Appendix I

Estimates of the Cost of Waste Minimisation

It must be recognised that there are costs associated with waste minimisation. These costs must be included in the strategic study as well as the savings made from minimising water supply and effluent discharge bills.

The costs can be broadly divided into the direct costs associated with modifying or installing new equipment and carrying out new working practices; and the indirect costs of training staff, carrying out water and effluent audits and monitoring performance. These indirect costs are very largely a matter of staff time.

Experience suggests that significant reductions in water use and effluent strength can be made at no or low cost and over a short timescale — for example by turning off the water at break times and by shovelling waste up off the floor rather than flushing it down into the drains — but that further savings may require further study and investment in equipment and will take longer to deliver.

Based on the brief visits to each of the sample businesses, the costs of carrying out the recommended waste minimisation measures have been estimated. It must be emphasised that these estimates can only be considered as gross approximations for the purpose of establishing indicative levels of cost for the strategic study. Indeed the estimates include the costs of training key personnel and carrying out a detailed water and effluent audit of each business; and only after that has been done can the required waste minimisation measures and costs be specified more precisely.

The costs have been calculated on the following basis:

Time Period

It is assumed that training, waste audits and waste minimisation measures are all carried out during a period of one year. The capital costs involved may be discounted over a larger period in the strategic study. Some of the costs, e.g. of carrying out the new practices, will be repeated in subsequent years.

Physical Changes

New items — generally based on knowledge of actual levels of cost from manufacturers/fabricators for Seafish work.

Modifications — generally based on knowledge of actual levels of cost from fabricators for Seafish work.

Installation — it is crudely assumed that the cost of installing new equipment will be equal to the purchase price of the equipment.

Staff Time Costs

Time — based on estimates of the staff time necessary to carry out the task.

Costs — based on employment costs for the appropriate category of staff taken from the 1995 Seafish Processors Survey, with a factor of 1.084 for inflation. This includes NI, tax, etc.

Audit Costs

Staff Time Required — based on Seafish experience of carrying out detailed audits.

Metering and Sample Analysis — based on costs of purchasing meters and taking samples to the extent appropriate for each type and scale of business from Seafish experience of carrying out detailed audits.

Training Costs

Waste Champion — based on Seafish Training Division time estimates for training suitable person and providing the necessary training materials.

Staff Training (by Waste Champion) — based on each of the staff receiving two hours basic training.

Although all of the above has been accounted for, it may be the case that businesses have suitable maintenance personnel to carry out much of the modification/installation work themselves and that significant parts of the various staff time costs involved in waste minimisation (e.g. for training) can be absorbed by businesses without increasing total wage costs.

Estimated Costs of Implementing Waste Minimisation

Recommendations	Cost of purchase and installation (£)
Manual Filleting	
Turn off water when not in use	0
Flow regulators on water points	40
Bench modifications – introduce guards and waste chutes	420
Mechanised Skinning	
Install a flow regulator	20
Install a solenoid valve	140
Introduce a separator waste chute	400
Introduce guards to ensure correct placement of catch basket	40
Cleaning	
Use trigger sprays on open hosepipes	90
Regularly squeegee all areas throughout the day*	800
Develop and manage an effective cleaning schedule*	85
Drainage and Catch Baskets	
Smaller aperture drain covers	70
Separator catch baskets	600
Subtotal	2,705
Introduction of Waste Management Programme*	
Obtain management commitment	170
Establish action plan	
Designate project responsibility	
Allocate resources	
Carry out initial water and effluent audit	380
Select appropriate waste minimisation measures	850
Implement waste minimisation programme	255
Train all personnel	1719
Monitor and review programme	425
Subtotal	3,799
Overall Total	6,504

* involves mainly the cost of personnel time over one year