Understand how to control fish/shellfish defrosting

Learner
Workbook

Title:	Understand how to control fish/shellfish defrosting
Level:	2
Credit value:	2

Learning outcomes ***The learner will understand:***	**Assessment criteria** ***The learner can:***
1. Know what the requirements are for defrosting fish/shellfish	1.1 Outline the facilities and methods required to defrost fish 1.2 Describe the process requirements for the controlled defrosting of fish 1.3 Describe the labelling and traceability arrangements for the defrosting of fish 1.4 State why it is important to work within limits of own authority and competence 1.5 Describe how to carry out and the importance of recording, reporting and communicating.
2. Know how to prepare to defrost fish/shellfish	2.1 State how to obtain and interpret the defrosting specifications 2.2 Describe how to prepare defrosting facilities for operation.
3. Know how to defrost fish/shellfish	3.1 Describe how to assess the quality of frozen fish and fish products 3.2 State why it is important to monitor the fish defrosting process 3.3 Describe how defrosted fish should be handled to maintain condition and quality 3.4 State why it is important to follow organisational procedures 3.5 Describe the handling methods that

	maintain the condition of fish.
4. Know how to finish the defrosting process	4.1 Describe the common quality problems and their likely causes 4.2 Outline the action to take when the process specification is not met 4.3 State why it is important to dispose of waste according to specified procedures.

Achieving the Unit

The following information will support you with the knowledge requirements to help you achieve this unit.

Whilst the booklet provides a good source of information, it is not exhaustive. We recommend that you research information yourself via the internet or at your local library. Useful sources of information include the Sea Fish Industry Authority (www.seafish.org) and the Seafood Training Academy (www.seafoodacademy.org).

Seafish has published a 45 page technical document, *Seafood Thawing SR598*, which is available from the Seafish publications database on the Seafish website.

While working through this pack you will have to refer to certain company documents, discuss issues with your colleagues and write in responses. Usually we have left space for your written responses. If there isn't enough space then feel free to add extra blank pages, post it notes etc

Good Luck!

Lee Cooper
Seafish

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Unit Details

Unit Number:

Unit Qualification Number:

Title: Understand how to control fish/shellfish defrosting

Level: 2

Credit Value: 2

Unit Aims

This unit supports workforce development for those who control fish or shellfish defrosting, according to job role, in a fish/shellfish processing or related business.

The unit is designed for use primarily by operatives and others who carry out these workplace activities. The aim of the unit is to assess knowledge and understanding to recognised National Occupational Standards.

The purpose of this learners Workbook is to provide information and guidance to enable learners to acquire an appropriate level of understanding of defrosting fish and shellfish operations.

CONTENTS

Section 1 - Introduction and background to fish and shellfish defrosting methods.

Section 2 - The process requirements for the controlled defrosting of fish or shellfish.

Section 3 - Quality, Labelling and Traceability.

Section 4 - Additional resources

SECTION ONE

INTRODUCTION AND BACKGROUND

The UK seafood industry uses a large quantity of frozen fish and shellfish every year. Much of this product requires defrosting (or thawing) before further processing or use.

Companies typically thaw seafood in-house using a range of different methods. These vary from using water, air or steam through to microwave and radio frequency systems.

The type of thawing method used is dependent on many factors including cost, throughput, timescale, size, efficiency and effect on quality amongst other things.

With the use of frozen supplies, particularly frozen imports, controlled thawing of seafood is an important process undertaken by many seafood processors in the UK. Other sectors, notably fish friers, also thaw seafood but on a smaller scale

There are many benefits of using frozen seafood including: an excellent eating quality; it enables variability issues in the supply chain to be resolved; and frozen seafood has a longer shelf-life than fresh/chilled products. Some of these benefits can be lost if the freezing, cold storage or thawing processes are poorly managed.

In order to produce the best quality thawed product, it is important for businesses and seafood operatives to understand the thawing process and ensure their systems are as effective as possible. This section provides a summary of relevant information on thawing.

WHY FREEZE FISH AND SHELLFISH?

The process of commercial freezing as a means of preserving seafood has been established since the early 1900's. The main reasons for freezing seafood are:

- As a means of long term preservation and storage, it greatly extends the shelf-life of seafood products.
- With a longer shelf-life seafood products can be distributed throughout the world.

- It enables a seafood processor to retain a supply of seafood that can be used throughout the year, reducing the seasonal fluctuations that exist in the fresh-chilled (not-previously frozen) sector.

- In some cases, it is used as an aid to processing, particularly in de-shelling prawns or *Nephrops* tails.

- It enables consumers to have greater choice of seafood throughout the year.

WHAT IS DEFROSTING?

Defrosting is the process of changing a product from a frozen state to an unfrozen one. It involves transferring heat to a frozen product to melt the ice that was formed within the flesh during the freezing process. The point at which ice crystals are converted back to water occurs completely when the temperature throughout the seafood reaches -1^{o}C. The time required to melt all the ice in the frozen seafood is the thawing time.

Throughout this learning pack we will use the terms ‘thawing’ and ‘defrosting’ to mean the same thing as there is no practical difference between the two. There is a related term called tempering. Tempering is the slight warming of frozen product so that it remains frozen, but at the higher temperature it will be easier to cut or to coat in batter. Typical tempering temperatures are –5^{o}C to –10^{o}C

KEY FACTS ABOUT TEMPERATURES

The food safety ‘Danger Zone’	from	5 ^{o}C to 63 ^{o}C
Melting point of ice		0 ^{o}C
Seafood is frozen	below	-1 ^{o}C
Typical domestic or retail freezer	about	-18 ^{o}C
Distribution cold store	around	-22 ^{o}C
Freezer transport		- 18 ^{o}C
Main Cold storage	below	-29 ^{o}C

HOW ARE FISH AND SHELLFISH DEFROSTED IN THE UK?

The most common methods used in industry include water or air based systems. There are a range of systems available, with varying degrees of mechanisation and effectiveness. The system used will vary depending on the product, size of company and extent of use of frozen supplies. The main methods currently used include:

WATER THAWING

Defrosting using water is one of the most common methods used. A range of systems using either immersion in tanks or spraying with water are common methods for whole or H&G frozen fish, and some shellfish.

Immersion in tanks is usually an ad-hoc method, involving putting frozen seafood into a tank of water, installing a hosepipe to distribute water into the tank and leaving the water supply running either overnight or until the seafood has thawed. This is often an ineffective and uncontrolled method of thawing seafood. Two examples of such immersion systems are shown below.

Fig ? - Examples of two simple immersion water thawing systems

Block frozen H&G

Loose frozen H&G

What do you think are the advantages and disadvantages of this simple immersion approach to thawing? List up to three of each.

Advantages	Disadvantages
1. 2. 3.	1. 2. 3.

A better system is to use spray systems with overhead sprays or a sprinkler system directed onto frozen blocks. Some companies have dedicated rooms where this is undertaken overnight in hygienic conditions. Other companies use the production area and lay blocks of fish out on the floor or on fish boxes before using sprinklers to distribute water over the frozen blocks.

Figure 5? - An example of a simple spray water system for thawing fish blocks

What do you think are the advantages and disadvantages of this simple water spray approach to thawing?

List up to three of each.

Advantages	Disadvantages
1. 2. 3.	1. 2. 3.

CURRENT STILL AIR THAWING TECHNIQUES

Thawing in still air involves placing frozen seafood at either room or chill temperatures (below 4^{o}C) to ensure a slow thawing rate. In practice, this is often undertaken overnight at room temperature, or can be undertaken in a chill store or refrigerator over a prolonged period of time.

FORCED AIR THAWING SYSTEMS

Many companies are thawing significant quantities of seafood and require a greater degree of control over their process. As such many companies have invested in dedicated mechanised equipment for defrosting. Typically these incorporate the use of warm air or steam forced into a sealed unit that is programmed to run for a specific period of time. Typically, seafood is placed onto racks to facilitate the distribution of warm air. In the more sophisticated steam based systems, the seafood is loaded onto a conveyor in a single layer and steam is distributed over the product. Steam based systems are more typically used for shellfish or high value products.

Figure 6 - Example of a forced air thawing system

Fish on storage racks awaiting loading

A forced air thawing unit in operation

What do you think are the advantages and disadvantages of forced air defrosters?
List three of each.

Advantages	Disadvantages
1. 2. 3.	1. 2. 3.

OTHER THAWING SYSTEMS

Other thawing systems available include vacuum, microwave, radio-frequency and electrical heating based systems.

Vacuum thawing systems

Vacuum thawing systems consist of airtight chambers into which the seafood is loaded on racks or trolleys. A vacuum is produced in the chamber and water in a reservoir within the base of the chamber is heated to produce water vapour. This vapour condenses on the cold surface of the fish, allowing the heat released to be absorbed by the fish. After a period of time, the fish will thaw completely. The product and system temperature can be controlled by regulating the pressure within the chamber.

Microwave thawing systems

Microwave thawing systems, although very rapid, have limitations. Parts of the food product can become overheated or cooked, while other parts remain frozen. For part-frozen products, there is also the possibility of runaway heating, where parts of the food which have thawed will absorb much more energy compared to those that are still frozen. This makes microwave thawing systems extremely difficult to control. Microwave systems are not ideally suited to the thawing of large frozen fish blocks, although microwave systems are widely used for tempering. Tempering

raises the temperature of frozen blocks to just below the freezing point (between $-5^{o}C$ and $-10^{o}C$) and is done to facilitate cutting and further processing of the product.

Radio frequency systems

The frozen product is placed between two parallel electrodes and alternating radio-frequency energy is applied to the electrodes. Temperature rise within the product is relatively uniform, the degree of uniformity being dependent on the size and composition of the product. Radio-frequency systems are available in both batch and continuous formats. Batch RF systems operate from 40 to 350 kg/hour, whilst continuous RF systems can operate from 900 to 3000 kg/hour.

Electrical heating

Blocks of frozen fish are placed between two parallel plates, across which a high frequency alternating voltage is applied. If the blocks are of uniform thickness, composition and temperature, and the voltage and frequency sufficiently high, heat is produced within the blocks. However in less than ideal conditions, such as if the blocks are irregularly shaped, localised overheating of the product can occur.

Ultra High Pressure

A relatively novel process involves the use of high pressures during freezing and thawing. The use of very high pressures has the effect of lowering the temperature that ice crystals form at. This results in virtually no damage within the seafood flesh as a result of the freezing process, with little drip loss[1] or texture changes on defrosting.

[1] See Section Three - Quality

ACTIVITY

Investigate what system is used in your company[2] and list what you think are the reasons why this system is used.

Discuss your findings with an appropriate person[3] in the company and record your conclusions below.

Type of defrosting method:

What is it used to defrost?

What quantity can be defrosted in 24hrs?

Advantages:

Disadvantages:

What conclusion do you arrive at regarding the suitability of the method/equipment?

Can you suggest any improvements?

[2] If more than one system is in operation, choose the one you can access the easiest.
[3] Such as your mentor or line manager.

PROBLEMS WITH CURRENT THAWING PRACTICES

The problems encountered with current thawing systems are numerous. They are mainly evident in 'DIY' water or air based systems that companies develop themselves.

The main problems include:

Thawing system	Problems
Water	• Leaving the fish unprotected in the open air prior to thawing • Laying the frozen fish blocks out on the production area floor during thawing • Allowing seafood to fall to the floor as they separate • Leaving water running overnight, wasting resources • Water left running for hours after the seafood has thawed • Use of unsuitable equipment including garden sprinklers, insulated tubs and fish boxes • Thawing fillets in water leaving them to become waterlogged • No control over water temperature which varies throughout the year • No control or monitoring of product temperature • Generates a large volume of trade effluent • The need to provide product for the next day's production often with insufficient time, resulting in under thawed product and loss of yield • Over thawed product with loss of texture and freshness quality
Still air (ambient)	• Leaving the fish unprotected in the open air • Laying frozen fish blocks out on the production area floor • Allowing seafood to fall to the floor as it separates • No control or monitoring of product

	temperature • No control over air temperature which varies during the year
<u>Still air</u> (chill or refrigerator)	• Product unprotected leading to surface dehydration, particularly on fillets • Can take a long time to thaw in a chill or refrigerator leading to quality losses
<u>Forced air</u>	• Inadequate maintenance of equipment • Uneven air distribution in the unit creating hot-spots, resulting in cooked products • Programme times too long or short resulting in under or over thawed product

BETTER THAWING PRACTICES

Examples of simple good practices include:

- Water Spray Systems

Setting out frozen fish blocks on racks, or bars, above fish boxes. This helps to improve air circulation around the blocks and enables fish to fall into boxes, facilitating handling.

Fig ?- Fish placed on bars above boxes to improve air circulation and product handling

This system also has a uniform spray of water across all the blocks being thawed, so that rates of thawing are consistent. In this kind of spray system, 25kg fish blocks were thawed from –15^{o}C to 0^{o}C in 2 hours compared to 6 hours in a poorly designed system.

In winter months when water temperatures are low, the thawing process can be assisted by the use of air heaters in the thawing room, or by slightly increasing the temperature of the spray water.

- Air Defrost Systems

In simple air based thawing systems, improved practices include;

1. Putting seafood onto racks to facilitate air circulation around all surfaces.
2. Using fans to circulate air rather than relying on still air.
3. Use of dedicated rooms or areas where the ambient temperature can be properly controlled.

SECTION TWO

PROCESS REQUIREMENTS FOR THE CONTROLLED DEFROSTING OF FISH OR SHELLFISH

Each defrosting process will have its own specific requirements, but almost all defrosting processes will have common requirements.

Your chosen defrosting system is likely to have process requirements that fit under the following headings:

- Type, size and form of frozen product to be defrosted;
- The type of defrosting method to be used;
- The quantities to be defrosted by batch; in a working day etc;
- Temperature at start of process; target temperature at finish of process;
- Duration of defrosting process;
- Typical temperature curve during defrosting;
- Ambient temperatures; maximum and minimum temperatures acceptable;
- How frozen product is loaded into the defrosting system;
- How product is held during defrosting; use of any separation methods;
- Flow rates of water/air if applicable;
- Resting Time[4] after thawing and before product is ready for processing;
- Recording requirements.

[4] The time taken for the temperature to equalise throughout the product.

ACTIVITY

Obtain the standard operating procedure or process specification (SOP/PS) for your chosen defrosting operation. Using the specification tick off all the bullet points in the above list that are covered, and write in below any requirements we have missed from our list.

Missing requirements (from our list above) are:

While we have listed the process specifications for defrosting we have not described how you actually go about doing it – these are the Process Steps or stages that you follow in your job.

So, for your chosen product, list the steps in the process, along with any important requirements such as monitoring, recording, sampling, hygiene, HACCP etc. Base this list on what you actually do when defrosting the product.

Thawing Step/Action Taken	**Important Points**[5]

[5] For example, flow rates, temperatures, targets, monitoring procedures, handling methods etc.

Now look at the standard operating procedure or process specification and compare your notes with what is written into the SOP/PS. Does your list match up with the SOP/PS?

If you have any problems interpreting the specification or it is significantly different to the actual process being undertaken, then discuss it with your line manager.

Let's take a look at some of the details that may well appear in the SOP/PS for defrosting. The specification may include the following information and instructions about defrosting.

A. PREPARATION FOR DEFROSTING

1. Where the raw material is to be defrosted;
2. The type of raw material to be defrosted;
3. The quantity to be defrosted as a batch, or the rate (KGs /hr) for continuous defrosting;
4. Any quality, safety or documentation checks that must be made before accepting the raw material;
5. Equipment preparation/maintenance activities such as cleaning, inspection, filling, emptying etc;
6. Any documentation to be completed prior to starting defrosting, including labels, traceability data etc.

B. DEFROSTING

1. Temperatures
    a. Room or equipment operating temperatures;
    b. Starting temperatures for the frozen seafood;
    c. Target temperature for defrosted fish or shellfish;
    d. Action level temperatures and what must be done if they are reached;
    e. Maximum product temperatures and what to do if they are exceeded;
2. Times – duration of defrosting cycle, what to do if times are exceeded;
3. Food Safety and HACCP issues – e.g. how to avoid cross contamination;
4. Problems – what to do if problems arise, and who to report to;
5. Communication
    a. what information to be communicated;
    b. who to and how.

C. POST DEFROST

1. How to know when it's finished
    a. Target temperatures or duration;
2. What to do with it next;
3. How to record what has been done;
4. What to do to get ready for the next batch;
5. What to do when its time to:
    a. Change the product;
    b. Handover to another operative;
    c. Finish for a break or the shift.
6. How to dispose of waste

Does the Defrost Standard Operating Procedure make references to other SOPs or policies? YES/NO

Can you list them?

What do you do if there is something wrong with the equipment, services[6], raw material or paperwork? Describe the limit of your authority in case of a problem.

What do you think are the possible problems that may be caused if you do not stay within the limits of your authority?

List them here and then talk to your supervisor to see if you have listed everything.

As you become more experienced in your job, will the limits of your authority increase? Yes / No

If yes, how will they change?

WASTE

The management of waste from defrosting operations is important as it can contribute to the overall costs of the process.

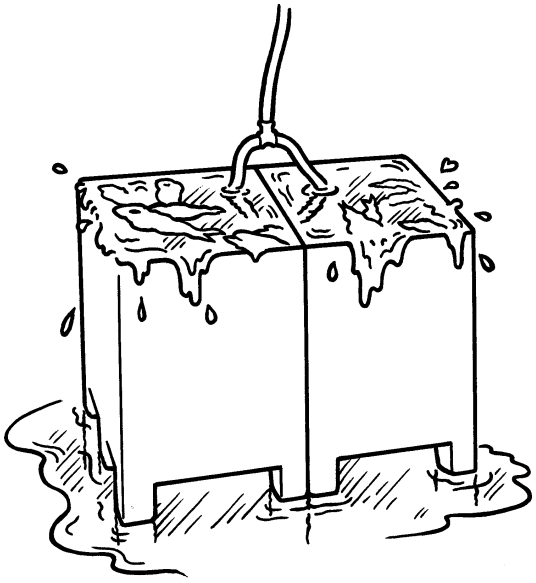
What kinds of waste should we consider?

Waste materials – waste fish or shellfish which for some reason must be disposed of.

Waste water – water defrost systems produce large amounts of contaminated water. There are limited opportunities to use this for a further defrost cycle, but eventually it must go down the drain. Systems

[6] Foe example, water at the correct temperature, electricity.

that sieve out or separate water from the larger pieces of flesh and keep them out of the drain will reduce the effluent charges.



Energy – defrosting is all about the application of energy to the frozen fish or shellfish. Are there any ways in which the energy can be used more effectively to defrost more material or use less energy? That depends on so many factors that we cannot discuss it here.

At the end of the process what do you do to dispose of waste and why is it important?

What do you do?	Why is it important

SECTION THREE

ENSURING QUALITY AND SAFETY

QUALITY

The benefits of frozen fish and shellfish are that the eating quality can be excellent and irregularities in the supply chain that may lead to quality loss can be reduced, resulting in a better product for the customer.

Freezing cannot improve the quality of the raw material, but if good freezing, storage and defrosting practices are followed, it can help to keep almost all of that initial quality intact until it reaches the final customer.

DEFROSTING GOOD PRACTICES

Temperature

- Ensure product temperature is monitored throughout the thawing cycle.
- Product temperature should be kept as close to $0^{o}C$ as possible.
- Ensure water or air temperatures are monitored and do not exceed recommended limits.
- Allow seafood temperature to equilibrate after thawing as different parts of the product will be at different temperatures.

Timescale

- Ensure the timescale is appropriate for thawing the seafood. In general, seafood is best thawed quickly (0-6 hours) but not so quickly that product safety and quality is compromised.

Product

- If double freezing (i.e. re-freezing thawed seafood) ensure that thawing is done to the highest standards to reduce risks of changes in texture.
- Thawed seafood will spoil as rapidly as chilled-not-previously frozen seafood. Ensure thawed seafood remains at chill temperatures (as close to $0^{o}C$ as possible).
- Do not process under-thawed product, unless it has been specifically tempered for use in another process.

Process & Equipment

- Ensure the process used is monitored and controlled throughout – do not leave the seafood thawing without any supervision as this can lead to under or over thawing.
- Use the most appropriate method and equipment for the product.
- Thawing conditions should be clean and hygienic.
- Do not use water to thaw cut or processed seafood – only use water to thaw whole or semi-processed product e.g. headed & gutted fish.
- When purchasing thawing equipment ensure it has proven expertise with seafood products. Ask for demonstrations wherever possible.

MONITORING THE DEFROST PROCESS

Monitoring during defrosting is essential if the product is not to be under or over thawed. Recording goes hand in hand with monitoring and here is a list of the typeof observations that should be taken and recorded.

- Defrosting unit cleanliness at start of process;
- Product start temperature;
- Product temperature at specified intervals during defrosting;
    - How and exactly where to take temp must be clearly specified;
- Temperature of thawing medium if water or air thawing used;
- Flow rates of product for continuous defrosting, and water/air flow rates if used;
- Product finish temperature;
- Time;
    - Start time;
    - Time of observations;
    - Finish time;
- Weights
    - Start weight of raw material;
    - Defrosted weight of materials;
- Any out of conformances and any corrective actions taken.

ASSESSING THE QUALITY OF DEFROSTED FISH

Frozen fish, correctly defrosted may still have some of the attributes characteristic of freezing and defrosting, while being of high quality. Quality can easily be assessed onsite by gently cooking fish or shellfish samples in a microwave and assessing them against the appropriate Torry Cooked Assessment Scheme. High quality frozen fish will have the following qualities when thawed, cooked and assessed.

Cold Store Flavour: Ideally this should be absent from the raw material.
Firmness: Not soft or tough, but with a firmness equivalent to good fresh fish.
Dryness: Not watery or dry, but juicy.

Drip Loss: The loss of fluid on defrosting and cooking should not be excessive.
Cooked Flavours: These should still be sweet and characteristic for the species.

It is strongly recommended that seafood businesses train staff to objectively assess the quality of fish and shellfish so that regular and frequent checks can be carried out on the quality of the cooked material.

Seafish have a range of training courses on seafood quality assessment.

OTHER QUALITY PROBLEMS

Aside from the general issues over contamination, food hygiene, rough handling, poor chilling etc that can cause problems for all types of seafood product, defrosted fish and shellfish can suffer from these specific problems.

- DRIP LOSS

When fish and shellfish are frozen, water in the flesh turns into ice and forms crystals. Slow freezing produces larger ice crystals than quick freezing.

The larger the ice crystals the more damage they cause to the cells that make up the flesh. When the material is defrosted the damaged cells leak fluid and this drips out of the flesh.

- FREEZER BURN

If frozen material is stored in a freezer for too long then the slight regular changes in temperature can cause water vapour to leave the frozen material. This is one of the reasons why freezers can ice up. The frozen fish and shellfish will lose water, parts of the flesh will dry out and look almost cardboard like. Badly freezer burned fish can appear more like balsa wood than fish. Freezer burn cannot be reversed, no matter how long you soak it in water.

- DEHYDRATION

This is a risk with both still and forced air defrosting processes. If the air has too low a moisture content then surface dehydration or drying can happen.

Air with a high (almost saturated) water vapour content not only avoids dehydration, but can be very efficient in thawing the seafood.

- WATER LOGGING

Water thawing should only be used for whole[7] fish or shellfish where the likelihood of excessive water being absorbed is low. Using water to defrost fillets of fish will usually result in defrosted fillets that have absorbed too much water. If more than 5% by weight of water is absorbed then this must be declared on the final product packaging.

- UNDER THAWING

Usually the result of a rushed or inadequate process. Under thawed fish and shellfish is usually harder to process and can reduce throughput and increase wastage and product reworking.

- OVER THAWING

Usually the result of a poorly monitored or inadequate process. Over thawed product usually suffers poorer texture and loss of freshness.

Both under and over thawing can be caused by varying ambient conditions that are not properly monitored or managed.

If the defrosting process is influenced by environmental conditions such as air or water temperatures, then over thawing may be more common during high summer temperatures, while under thawing is more common during low winter temperatures.

[7] Or partly processed e.g. H&G fish, prawn tails etc.

LABELLING AND TRACEABILITY

Labelling is important throughout the production process, not just during defrosting. At every stage of production it is important to know what product is being processed, how it is handled, what has happened to it and what will happen to it next.

Labelling is one of the ways in which we achieve this. Have a look at the paperwork, labels etc that provide you with the information needed during defrosting.

List the different types of information here. Some common examples have been added to get you started. Ignore the last two columns for now and just fill in the first column.

Information/description	Labelling?	Traceability?
Date: Batch ref: Species / Product name: Operator name:		

Now, let's look at the differences between Labelling and Traceability.

Labels and Labelling:

- Identical products and batches of products will usually contain the same label information;
- This is the information that is common to all of the H&G frozen Barents sea cod that you are defrosting, or the various batches of Scottish scampi pieces that have been brought out of the cold store;
- The importance of label information is it tells us what is common from one batch to another, and if that is all that was important we could print off a batch of labels at the start of the week and use them for every batch of frozen H&G cod we defrosted all week.

Why is labelling important?

It's important so that the customer knows what they are getting. In this instance the customer is the next stage in the production process after defrosting.

Traceability Information is different. The key thing about traceability information is:

- It is used to distinguish one batch from other batches that appear identical;
- Often the only significant difference between batches is the time/date they were handled, which is why so many batch references are based on a combination of time and date;
- The key purpose of traceability is to allow us to trace the *history, processes and environment* that a food product has experienced.

Why is traceability important?

It's important so that the producer can track back a single batch of product all the way to the area it was harvested from and all the way forward to when it was sold. Traceability is there to provide information to help investigate and if possible prevent food safety failures.

Using these two simple definitions, go back to the table above and place ticks in the 2nd and 3rd columns to indicate where you think a particular item of information is about labelling or traceability.

Are there any items that you are unsure about? You may wish to discuss your conclusions with an appropriate person.

WHAT IS A BATCH?

A batch is something made up by the company. By that we mean there is no hard and fast rule or definition to use. It's very much a case of what suits your individual business, and it's a balance between conflicting advantages and disadvantages.

The key factor is batch size.

Batch size	Advantages	Disadvantages
Smaller batch sizes	If things go wrong and product has to be recalled and destroyed, smaller batch sizes are less costly to recover.	More frequent label changes. Additional/multiple recording of data. End product testing requirements and costs may be multiplied.
Larger batch sizes	Easier to deal with, fewer records, and testing requirements are smaller and less costly.	If things go wrong then a much larger and more costly batch of product may have to be recalled.

ACTIVITY

If your company has an organisational procedure or policy on labelling and traceability then study it.

SECTION FOUR

ADDITIONAL RESOURCES

Most of the information you need to know to effectively control the defrosting of fish and shellfish should be contained in this Learner Workbook and the various SOPs we have asked you to look at.

Discussions with your colleagues should have helped fill in any gaps.

If you want to find out more about the technical aspects of defrosting then we ecommend Seafish's technical document, *Seafood Thawing SR598* which is available from the Seafish publications database on the Seafish website www.seafish.org

GENERAL

1. Food Safety training courses from level 1 to level 3:
    a. Available in various languages;
    b. Available as taught courses, open learning programmes and by eLearning[8];
    c. CIEH and REHIS approved.

2. Health and Safety training courses:
    a. Level 1 taught course;
    b. Level 2 as a taught course or open learning module;
    c. CIEH and REHIS approved.

For information on all of these training resources and others, contact Seafish:

Seafish Training
Sea Fish Industry Authority
Humber Seafood Institute
Europarc
Grimsby
DN37 9TZ

Tel 01472 252300
Email training @seafish.co.uk

See also: www.seafish.org and www.seafoodacademy.org

[8] A free to study, level 2 course is available at www.seafoodacademy.org

For up to date information on resources please visit the Library on the Seafood Training Academy website www.seafoodacademy.org and download the Library Guide for FDQ Learner Workbooks, where you will find links to the above documents and much more.