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Sound Sampling of Grain Cargoes

Samples of grain and oilseed cargoes should be obtained correctly; but drawing these is not as easy as it sounds. Ben Cockshull, an expert Food Scientist at the consultancy CWA International, explains the importance of correct sampling techniques for bulk agricultural cargoes if these samples are to be used later in defending claims against the ship owner.

Ship operators and surveyors are often advised to “take samples” when loading or discharging bulk grain or oilseed cargoes, such as when loading soya bean cargoes in South America or when cargo damage is observed at discharge. But how can we try to make sure these samples are obtained in the best possible manner?

Sampling defined

Sampling refers to the action of obtaining samples that represent an item of interest, such as a grain cargo. These samples may then later be used for analysis, which informs us about properties of the sample material. The sampling and analysis steps should be considered as two distinct and separate events.

The correct and proper collection of samples represents one of the strongest methods for accurately resolving quality disputes and determining causation of cargo damage. When a cargo claim is raised, or a cargo quality issue is anticipated, the next thought should be what kind of samples need to be obtained and how.

Some sampling techniques are best suited to asking questions about the entire quantity of cargo, whilst others lend themselves to asking more specific questions such as the severity and causation of any potential damage.

Ideally, sampling activities should be performed jointly amongst the interested parties; not only will this reduce the costs associated with sampling, but it can also help to reduce any sampling and analytical discrepancies further down the line.

The two main types of sampling activities are spot sampling and representative sampling. It is important to draw a distinction between the two as it can be a common source of confusion.

Spot samples

These samples are obtained from a specific site of interest and only represent the condition of the cargo in that sample. Spot samples are typically sought when trying to determine the cause of a certain type of damage, for example identifying the source of a contaminant or whether cargo damage by wetting was caused by seawater or freshwater ingress. Any findings from a spot sample(s) should not be extrapolated to represent all the cargo onboard a vessel.

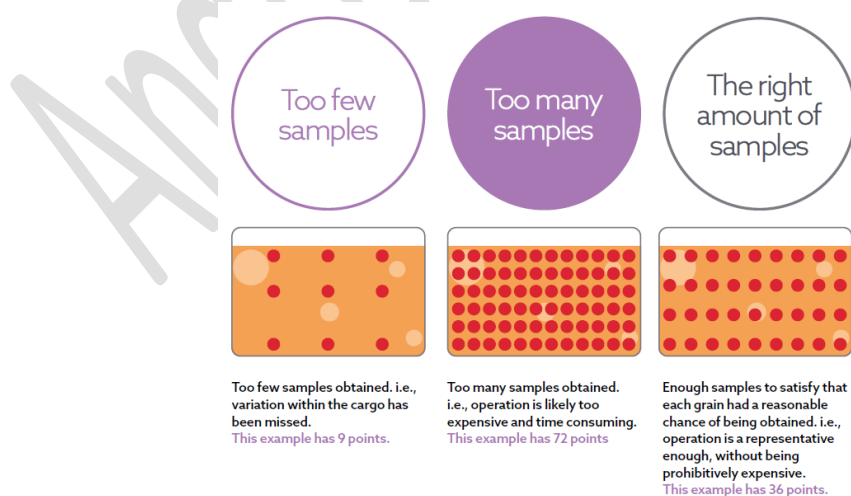
When taking spot samples, it is essential to obtain a sample from an unaffected area for comparison.

Representative samples

The quality parameters of cargoes loaded on a vessel are rarely uniform throughout the consignment. In the case of bulk agricultural cargoes, variability is often seen in key quality factors such as moisture, protein and/or foreign matter content. This variability can be due to a range of factors such as the growing environment, processing and storage conditions and commodity origin.

To capture and account for this inherent variability, representative samples must be obtained.

Representative sampling procedures have been set out by international trade organisations, such as the Grain and Feed Trade Association (GAFTA) and the Federation of Oils, Seeds and Fats Associations (FOSFA). These procedures aim to capture the variability within the consignment, by sampling at a suitably high frequency. To be representative, these sampling procedures require large numbers of samples, known as incremental samples, to be obtained uniformly and systematically throughout loading or discharge. Sampling protocols will typically stipulate the minimum size of lots and number of incremental samples that need to be obtained per lot. The high number of incremental samples, minimum lot sizes and sampling during cargo movement help to ensure that the probability of any individual grain or oilseed being sampled is as even across the entire consignment as is practically possible.



NB. The above is for illustrative purposes only.

If sampling were to occur at a lower frequency than specified in the sampling protocols, it is likely that variability within the consignment would be missed. On the other hand, if sampling were performed at a higher rate than the sampling protocols stipulate, then the sampling procedure would likely be prohibitively costly and/or labour intensive.

If the relevant representative sampling protocol is not followed, then accurate conclusions cannot be made from the subsequent analysis of laboratory samples.

Sampling at the higher frequencies required by representative sampling protocols can be very labour intensive. CWA recommend that sampling is performed in accordance with the applicable sampling protocol by a competent third-party company or cargo superintendent that has been accredited by the relevant international trade organisation (e.g. GAFTA or FOSFA). Hiring an accredited company helps to ensure the relevant experience, knowledge and manpower is available.

Representative samples are usually best obtained when the cargo is moving during loading or discharge, known as dynamic sampling. Some instances, however, may require sampling to be performed when the cargo is stationary, known as static sampling. Whilst samples obtained during static sampling are more representative than a spot sample, since they involve multiple incremental samples being obtained from a stationary pile, the sample material will only represent those parts of the cargo accessed i.e., the upper 1m of a pile of maize. Dynamic and static sampling will typically require different sampling protocols.

What to do once the samples have been obtained?

After all incremental samples have been obtained it is important that they are properly homogenised and reduced to form laboratory samples for each individual lot and for all lots cumulatively.

A common method to achieve this with minimal equipment is '*coning and quartering*'. The laboratory samples can later be sent for analysis and the results, if sampled correctly, should accurately reflect the condition of the cargo that the sample is said to represent.

Once the laboratory samples, or any spot samples, have been produced they should be packaged and stored according to the requirements of the relevant sampling protocol. CWA recommend that samples are immediately:

- double bagged in thick, clean and dry plastic bags
- closed with a numbered seal
- properly labelled

In general, the minimum details included on the label should be:

- vessel name
- quantity represented/description
- sample date
- commodity
- lot identifier (if relevant)

- location or point of sampling
- name of the person who obtained the sample

A sampling report, signed by all parties, should be produced which includes the seal numbers and how they were distributed. Generally, samples of bulk agricultural cargoes should be stored in a cool, dark, and dry place.

In summary, the timely and proactive collection of the correct samples can significantly aid an effective response and investigation into cargo claims, both during the early stages of the case and through to any potential legal proceedings.

Find out more

Carrying grain and oilseed cargoes? See our loss prevention material:

- [Carriage of Grain Cargoes – Briefing](#)
- [Soya Beans Cargo Damage Claims in China – Briefing](#)
- [Carriage of Seed Cake and Other Residues of Processed Oily Vegetables – Briefing](#)

See our cargo care checklists:

- [Cargo Care Checklist: Grain](#)
- [Cargo Care Checklist – Seed Cake](#)

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