Circular

# Different methods to weigh dry cargo in bulk

Over the last couple of years, we have been receiving more and more questions regarding the different weighing methods used when carrying dry cargo in bulk, and the possible consequences of choosing one weighing method over the other or a combination of weighing methods.

To clarify the situation for our readers, this circular looks at the various weighing methods most commonly used in the shipping industry. Of the various methods to calculate the quantity of cargo on board a vessel, the following two methods are the commonest:

- calibrated weighing methods;
- draft survey.

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### *Calibrated weighing methods*

There are different ways to weigh cargo on shore on scales, including:

- weighbridges;
- hopper scales;
- conveyor belts, etc

The accuracy of the scales ranges from anywhere between 0.01% and 10.0%, which, considering the usual trade allowance is about 0.5%, could result in a substantial shortage claim. Although this tolerance of 0.5% is not legally established and varies depending on the trade, cargo and jurisdiction, it is often used as a standard and guide internationally.

Since calibrated weighing figures are usually supplied by the shore terminal, it is vital that all parties involved are aware of the accuracy of the weighing equipment. Proving the accuracy or inaccuracy of the equipment could be decisive in establishing or defending shortage claims. Accuracy could be determined by requesting a copy of the certificate of calibration from the owners of the scales (e.g. the shore terminal). If the certificate shows that the accuracy of the scales is not within the percentage commonly accepted as trade allowance, another calibrated scale which is more accurate should be considered. Lower accuracy increases the risk of a shortage claim.

If the calibration certificate is not presented upon request, a letter of protest (LOP) could be issued.

However, accuracy and calibration are not the only causes of shortages. Various other problems may occur at different stages of the voyage. For example, imagine a conveyor belt several kilometres long at the port of loading which at the start is empty and full at the end. The scales are placed at the base, so the cargo left on the belt is taken into account but not loaded on board, despite the cargo being weighed and the conveyor belt weighing system being properly calibrated. To make matters even more complicated for the sea carrier, imagine that at the end of the voyage this same cargo is unloaded into trucks, some of which simply pass the weighbridge and whose actual weight is never recorded. Either of these situations could cause a significant shortage.

It is, therefore, vital that an alternative weighing method, in other words a draft survey, is always performed both in the port of loading and in the port of discharge. The numbers in the draft survey in the port of loading and the draft survey in the port of discharge must be in-line to prove that any shortage could not have occurred during the voyage. These numbers must correspond to the weight stated on the bill of lading. Preferably, the draft survey should be carried out jointly by an independent surveyor and the Chief Officer or Master in order to confirm that the weight of the cargo on board corresponds to the shore scales figures provided by the shipper or receiver.

### *Calibration*

An often cited dictionary meaning of the word ‘calibration’ is:

> *The process of checking a measuring instrument to see if it is accurate.*

The calibration of the scales is carried out by a certified calibrator who places calibrated reference weights on the scales.

The manufacturer of the scales generally specifies the measurement tolerance, a calibration interval between two calibrations, and the environmental range within which the calibration is accurate. A certificate stating all these details is then issued by a competent organisation.

The different standards in use nowadays, such as ISO (International Organization for Standardization) and ANSI (American National Standards Institute), are not specific about the recommended calibration intervals:

***ISO 17025***
*"A calibration certificate (or calibration label) shall not contain any recommendation on the calibration interval except where this has been agreed with the customer. This requirement may be superseded by legal regulations."*

***ANSI/NCSL Z540***
*"...shall be calibrated or verified at periodic intervals established and maintained to assure acceptable reliability..."*

***ISO-9001***
*"Where necessary to ensure valid results, measuring equipment shall...be calibrated or verified at specified intervals, or prior to use..."*

Having said this, it is the task of the owners of the scale to maintain the scale and ensure that it is calibrated at a certain interval within the validity period of the certificate. After any incident, for instance if a heavy object is dropped on the scales or a decrease in accuracy is noticed, the scales should be recalibrated.

***Draft survey***
As mentioned previously, another way of determining the cargo quantity is by performing a draft survey of the vessel. This method is carried out by recording all the draft readings of the vessel and calculating the total weight of the vessel by applying the Archimedes Principle:

*'Any body completely or partially submerged in a fluid at rest is acted upon by an upward force the magnitude of which is equal to the weight of the fluid displaced by the body'*

By applying this principle and deducting all known weights, the result is the total cargo loaded on board.

A successful draft survey depends on various factors, such as:
- the prevailing weather conditions;
- the trained eye of the person reading the draft;
- the accuracy of reading the drafts, sounding of tanks and making the required calculations.

Nevertheless, a draft survey performed properly in normal circumstances should be accurate enough to provide figures deviating no more than 0.5% from the actual total cargo quantity loaded on board.

If the draft survey figures in the port of loading are in line with the shore figures, we can be reasonably confident that the quantity of cargo which has been received for shipment is correct. However, if the draft survey figures are not, or nearly not, within 0.5% of the shore figures provided upon completion of loading, caution should be exercised because this might indicate either an intention to transport more cargo for less costs, or an increased risk of expected 'paper' shortage which the receiver will probably claim at the port of destination. The term 'paper losses' is used to describe situations where the alleged missing part of the cargo has never actually been shipped, but fraudulent or inaccurate documentation has been created to suggest otherwise.

When entering the ship figures on the bill of lading, the carrier should keep in mind that they are not bound *"to state or show in the bill of lading any ... quantity or weight which he has reasonable ground for suspecting not accurately to represent the goods actually received, or which he has had no means of checking"* (Hague-Visby Rules, Article III Rule 3). Therefore, if a significant discrepancy occurs between ship figures and shore figures, carriers should insist on entering the ship figures, or at least, where possible, clauses should be included in the bills of lading and other related transport documents with an appropriate remark such as "weight, measure, quantity

unknown". In addition, when faced with such a discrepancy, shippers may often offer to issue a letter of indemnity (LOI) in favour of the carrier in exchange for agreeing to enter the shore figures in the bill of lading. However, the potential risks and pitfalls related to the issuing of LOIs should be taken into account here (see our previous circular on letters of indemnity for general information).

Similarly, caution should also be exercised on whether the draft survey readings match the weight on the bill of lading when the vessel is in the port of discharge. If the draft survey in the port of discharge shows there is less cargo on board than that indicated in the bill, then a shortage claim is likely, and advice should be sought with the claims handling authority, this being either the broker or liability underwriters. The claim handler dealing with the matter will then be able to advise the insured on the applicability of possible defences in relation to the particular cargo or jurisdiction. The vast majority of such shortages exist only on paper.

### *Other reasons for shortages*

This circular highlights the risk of shortage claims resulting from the use of different weighing methods when loading and unloading, and/or incorrect shore or draft measurements. However, these are by no means the only cause of cargo shortages. In practice, even when the weight has been determined properly, there could be other reasons for a loss of weight of the cargo.

For example, water in the cargo could have evaporated, making the quantity of cargo less than the original quantity as stated in the bill of lading. Therefore, if cargoes with a large water content are carried, it is vital that proper samples are taken and analyses performed. In addition, maintaining accurate records of the quantity of bilge water pumped out of the cargo hold as well as a ventilation log might help in defending a claim for shortages.

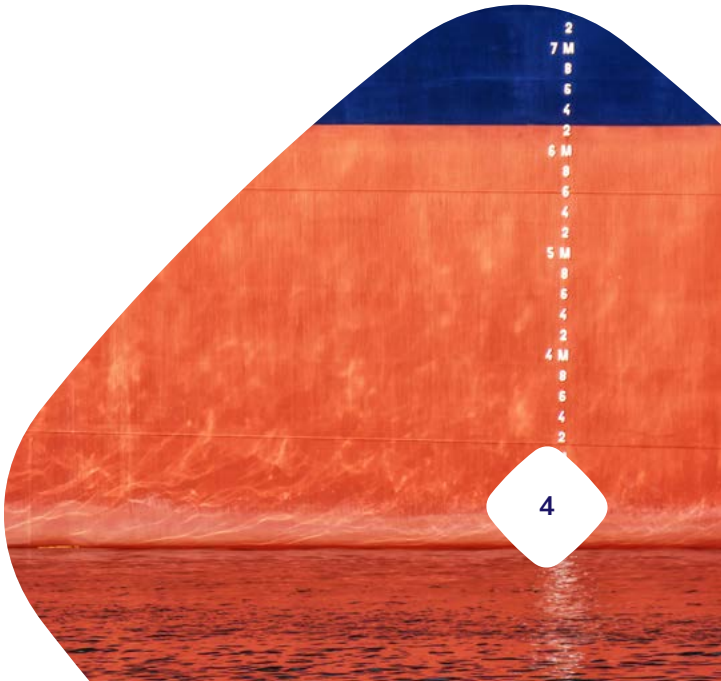
Sometimes, stevedores may also play a role in the shortage of dry bulk cargo. Their actions or omissions may result in cargo mishandling which could cause cargo spillage on the quay or in the water, especially when cargo is unloaded by grabs. Shortages may also occur due to pilferage by stevedores.

Another common reason for shortage claims is entering incorrect information on the bill of lading.

To prevent such misfortunes, a popular precautionary measure is to seal the vessel's holds by putting seals on the hatches and issuing the respective certificates upon completion of loading (when sealing) and in the port of discharge (when unsealing). This provides evidence that the holds were secured and any access to them was barred during the voyage. Seal numbers and location should be recorded and a sealing certificate issued by an independent surveyor. At the discharge port, unsealing should also be witnessed by an independent surveyor, who verifies that the seals were not tampered with. An unsealing certificate should also be issued. Ideally, hatch sealing and unsealing should be witnessed by a representative of the charterers or cargo interests who should also sign the respective certificates.

### *Trade allowance*

It is often assumed in the industry that carriers can benefit from a customary trade allowance in relation to the carriage of bulk cargoes. Parties therefore often assume that they are always protected for shortage of cargo as long as it does not exceed 0.5% of the quantities stated on the bill of lading. However, this is not guaranteed, as the recognition and application of a specific trade allowance and the method of determining its amount depend on the applicable law and jurisdiction, and these could differ significantly from one case to another. For this reason, it is unwise to assume that a 0.5% trade allowance would always be applicable.



### *Conclusion*

Do not forget the specifics of the different weighing methods when establishing the cargo weight and when apportioning the responsibilities between the parties in this regard. It is vital that the weight of the cargo is established in a proper and reliable manner, both in the port of loading and in the port of discharge. To minimise the risks of claims for cargo shortage, record the weight as established by the vessel (evidenced by a draft survey) in the bills of lading or other transport document. Sealing of hatch covers and entrances could provide benefits as well. If demanding this is not viable due to the circumstances or contractual arrangements, then it is recommended that clauses are included in the bill of lading whenever there is a discrepancy between the shore figures and the vessel's figures. Issuing an official letter of protest stating the facts, informing all parties involved, and contacting your liability underwriter are also among the first steps normally undertaken in such a situation.

In case of any questions or comments about weighing methods and the risks of shortages, please feel free to contact our Loss Prevention Services (LPS): LPS@msigspecialtymarine.com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