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Preventing

C a r g o

S h o r t a g e



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Chapter 1 Introduction

Within the category of cargo claims handled by our Club, cargo shortage claims occur at the discharging port. For bulk carriers and tankers, as well as for general cargo and container vessels, a shortage claim arises where there is a discrepancy between the quantity of cargo noted on the B/L (Bill of Lading) and the quantity discharged.

In the case of cargo such as cereal grains, coal, mineral ores, and liquid tanker cargoes for which the quantity of cargo on the B/L is shown by weight, the quantity measured at the loading port (i.e. the quantity noted on the B/L) and the quantity measured at the discharging port are compared, and any cargo shortage beyond the Trade Allowance (generally 0.5% of the quantity on the B/L) generally becomes the subject of a Cargo Claim. In particular, with cereal grain cargo etc. for which the quantity noted on the B/L is determined by the Shore Figure at the loading port, cargo claims due to an alleged shortage exceeding the Trade Allowance are very common. While also dependent on the point in time at which the shore figure is taken, if, for example, a comparison of the loaded and discharged quantities calculated from the draft survey reveals a discrepancy much greater than the Trade Allowance, the suitability of the initial response by the vessel and the surveyors may significantly affect the subsequent claim handling.

Therefore, in order to avoid cargo shortage in bulk carriers and tankers as much as possible, we have considered trends in cargo shortage as reported to us, and discuss them below, as well as technical points for caution related to loading and discharging operations.



Chapter 2 Trends in Cargo shortage and Case Studies

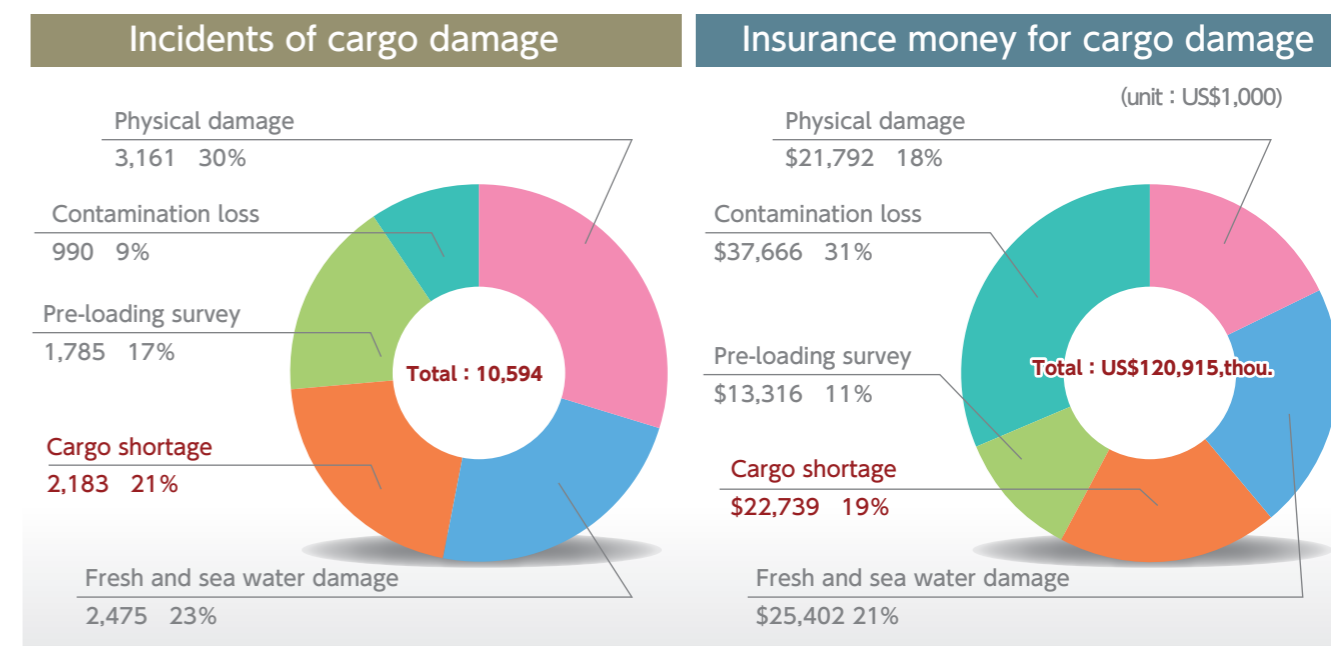
Cargo Damage including cargo shortage claims are the most common cases handled by us. Interest on the part of our members is therefore high, and it is apparent that our members face difficulties in finding effective measures to prevent such trouble. This chapter summarises the trends in cargo shortage claims handled over the past 7 years, and introduce cases in which caution is required.

2-1 Trends in Cargo Damage

Graph 1 below shows the number of incidents of cargo damage handled by us and a breakdown of insurance money paid out between the 2008 and 2014 policy years, by incident type.

A total of 10,594 incidents of cargo damage occurred over the past 7 years, resulting in payments of US\$ 120,915 thousand. The most common claim arose from physical damage, such as bending of steel coils, fresh and sea water damage to a variety of cargoes while in the hold, and finally, cargo shortage. A total of 2,183 incidents of cargo shortage occurred, accounting for 21% of cargo damage. In terms of insurance money, damage due to contamination (damage due to mixing of different liquids) was the most common cause, followed by fresh and sea water damage, then cargo shortage. Insurance money for cargo shortage totaled US\$ 22,739 thousand., amounting to 19% of the total.

When the number of incidents and insurance money are considered together, incidents of physical damage accounted for a comparatively high 30% of the total, however the portion of total insurance money was lower at 18%. On the other hand, contamination losses commonly associated with liquid cargo were 9% of the total, while insurance



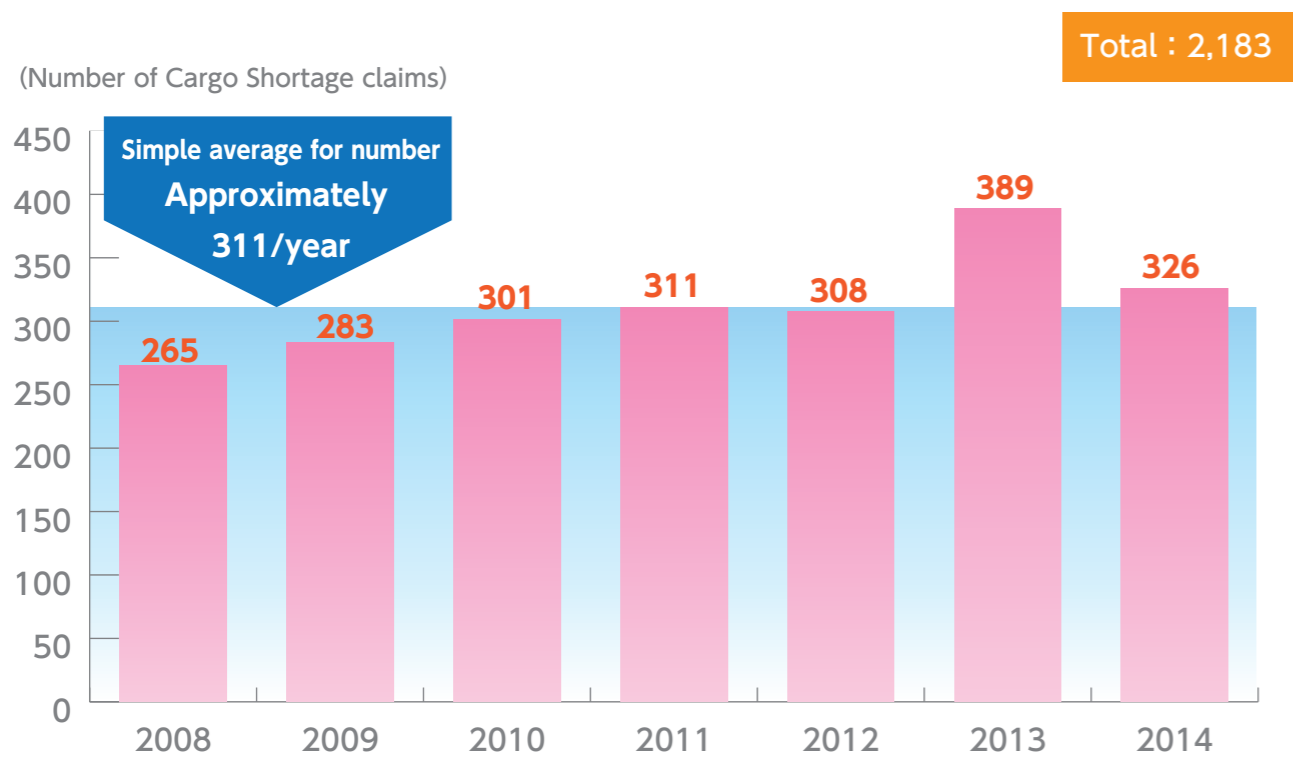
Graph 1: Number and Insurance money of Cargo Damage

money was 31% of the total. On this basis, a consideration of the simple average for insurance money per incident of cargo loss shows that the insurance payment per incident of physical damage was approximately US\$ 6,900, and the insurance money per incident of contamination loss was approximately US\$ 38,000. While it is difficult to make generalizations, there does appear to be a trend for insurance money to be greater for contamination losses. On the other hand, a consideration of cargo shortage claims reveals a fixed ratio in both the ratio of incidents and the ratio of insurance money (21% and 19% respectively), with an insurance money of approximately US\$ 10,000 per incident. On this basis, cargo shortage is one type of cargo damage which cannot be ignored.

2-2 Trends of Cargo Shortage

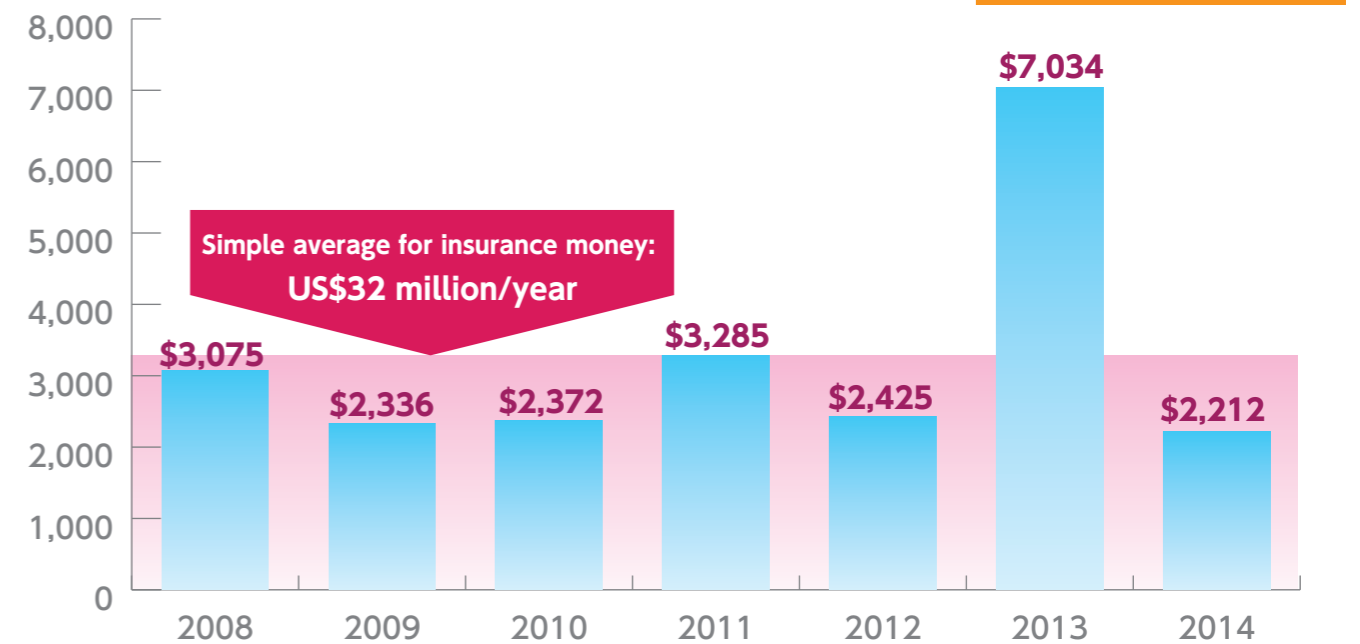
(1) Overall trends

Graphs 2 and 3 show the trends in the number of cargo shortage claims and insurance money paid out. As noted above, a total of 2,183 incidents of cargo shortage occurred over the past 7 years, with a simple average of 311 incidents per year. Incidents occurred at a regular annual rate. On the other hand, while insurance money varied with the scale of the incident, claims paid showed a simple annual average of US\$32 million. In particular, 2013 exhibited a spike in the figures, with larger payments than other years - 8 incidents each exceeding US\$100,000, and 15 incidents between US\$50,000 and US\$100,000. Incidents of payments exceeding US\$100,000 in which cargo shortage and water damage occurred simultaneously, and such cases resulted in very large claims.



Graph 2: Number of Cargo shortage claims

(units : US\$1,000)



Graph 3: Insurance money for Cargo shortage

(2) Trends by vessel type

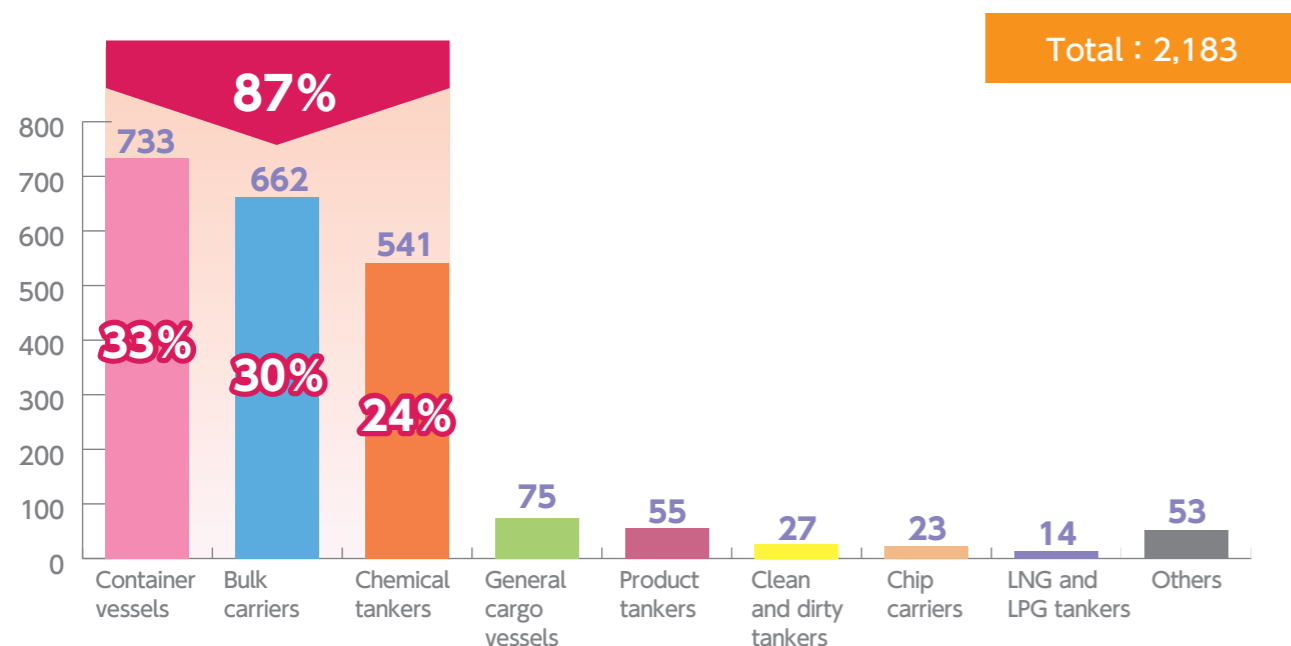
Trends in cargo shortage by vessel type are shown in Graphs 4 and 5. The largest number of incidents occurred with container vessels (733 incidents - 33%), followed by bulk carriers (662 incidents - 30%), and chemical tankers (541 incidents - 24%). The number of incidents of cargo shortage occurring for these 3 vessel types accounted for approximately 87% of the total. In terms of claims paid, the predominant number of incidents involved bulk carriers (42%), followed by container vessels (19%) and chemical tankers (16%), and thus the three vessel types exhibiting the largest number of incidents also represented the majority of insurance money (77% of the total).

The average of insurance money per incident for container vessels was approximately US\$ 6,000, indicating that comparatively small claims were common. If the container seal is lost on container vessels, and if a different seal is attached, the cargo interests may suspect that cargo has been removed/pilfered, and in many cases a surveyor is appointed and an investigation conducted. Cargo shortage due to damage to containers and consequent leak/spill of cargo, occurs frequently. However, in many cases of container cargo shortage, cargo interests eventually do not make a claim, or make a claim for a small amount. This is a characteristic of container cargo shortages. On the other hand, when containers collapse, fall overboard, or their contents leaks / spills during a voyage, the claims amounts are often considerable.

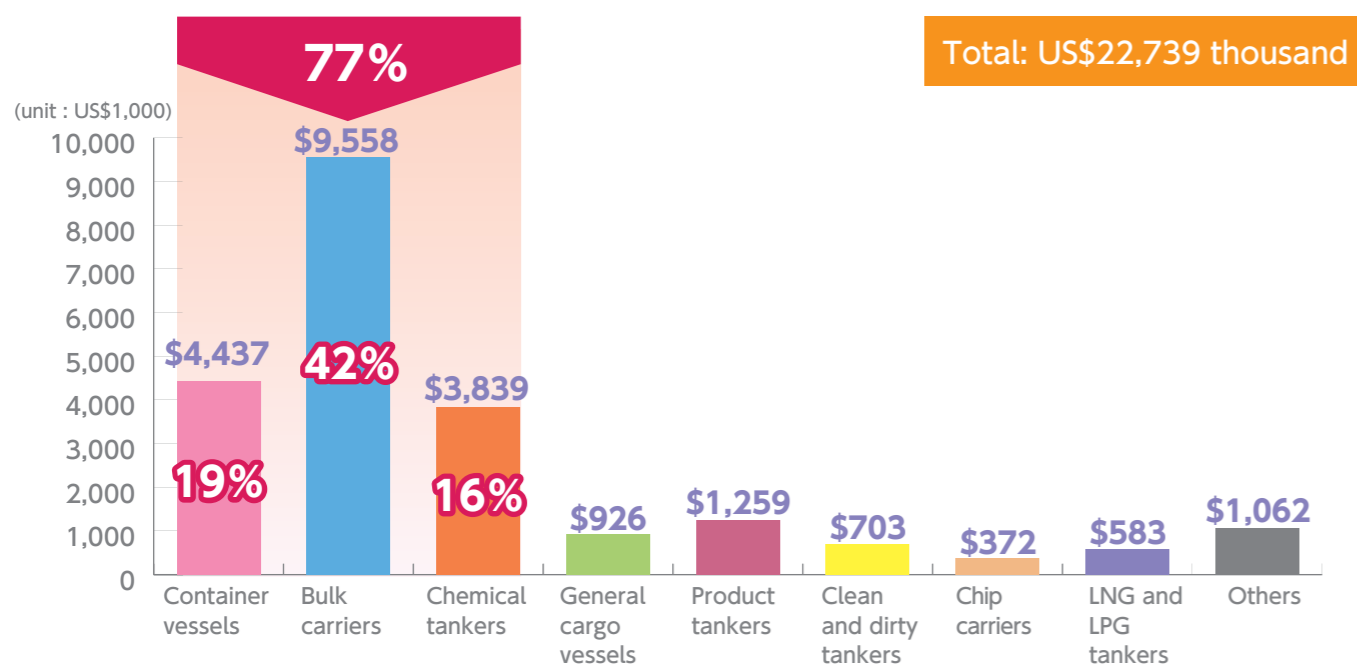
Bulk carriers represent the second largest number of incidents, with insurance money significantly greater than all other vessel types. The average of insurance money per incident is approximately US\$14,000, indicating a trend towards comparatively expensive incidents. When comparing bulk carriers with container vessels and chemical tankers, questions of how best to handle the quantity of the cargo itself, the number and weight of bagged cargo items, or the

method of measuring, are the most common cause of problems. Actual examples of cargo for which care is required are presented later. As described above, when cargo shortage occurs in bulk carriers simultaneously with sea or fresh water damage, the value of claims tends to increase, and careful attention is required.

The average insurance money per incident for chemical tankers is approximately US\$7,000. Since the value of chemical cargo is comparatively high, there is a fear that the claim amount will increase with the quantity of the cargo shortage. While details are presented later, it is noted that chemical tankers are characterized by a relatively limited number of regions in which they are subject to problems.



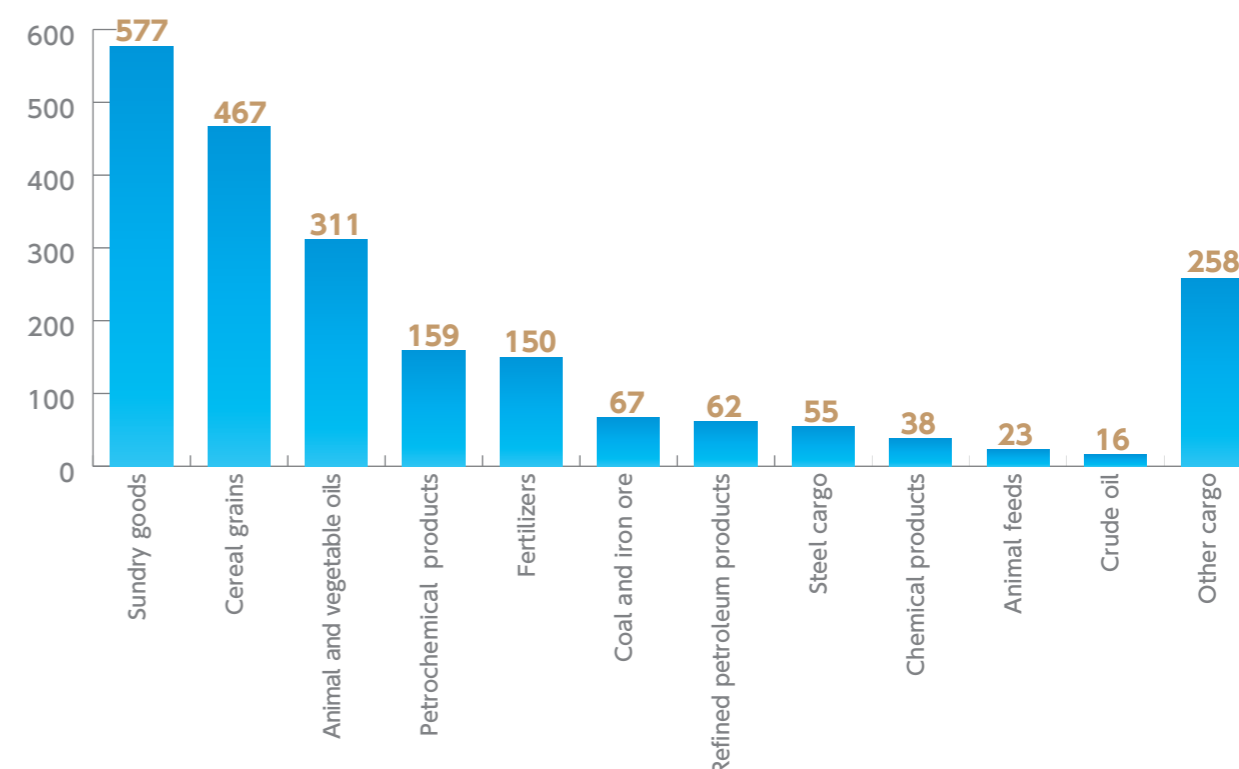
Graph 4: Number of Cargo shortage by Vessel Type



Graph 5: Insurance money of Cargo shortage by Vessel Type

(3) Trends by cargo type

Graph 6 summarises trends in cargo shortage by cargo type. The most common cargo shortage is for sundry goods, primarily on container vessels, followed by cereal grains (e.g. soybeans, wheat, bagged rice), animal and vegetable oils, petrochemical products, and fertilizers. Considering cargo and vessel type together, it becomes apparent that cargo shortage claims involve sundry goods primarily on container vessels, cereal grains and fertilizers on bulk carriers, and animal and vegetable oils, and petrochemical products on chemical tankers. The trends for types of cargo are therefore similar to the trends for vessel type as described above, with cargo losses concentrated on container, bulk, and chemical cargo.



Graph 6: Cargo shortage by Cargo Type

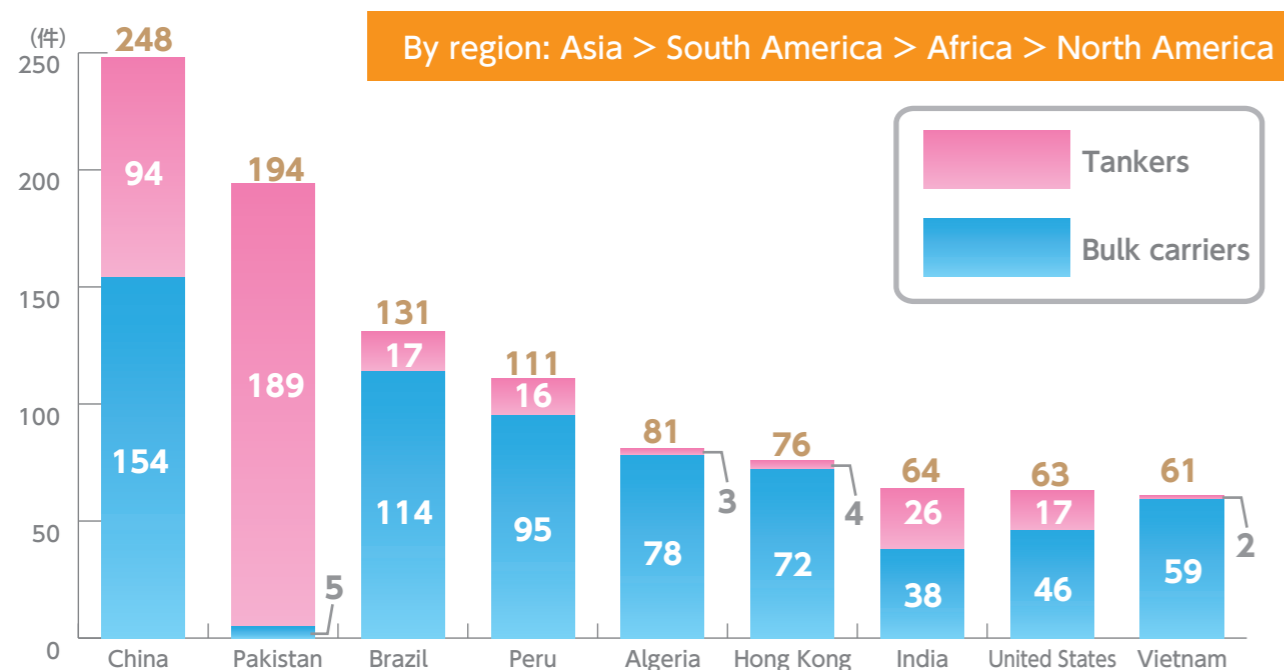
(4) Trends by region of incidents

Graph 7 shows region of cargo shortage for tankers (chemical tankers, product tankers, clean and dirty tankers, and LNG and LPG tankers) in red, and bulk carriers (bulk carriers, general cargo vessels) in blue. The location of the incidents is generally the discharging port. Almost all cargo shortages on container vessels occurred at transit ports (e.g. Singapore, South Africa). At these transit ports, the terminals, rather than the consignees, suspect container cargo shortages as described above and conduct investigations accordingly.

Incidents involving tankers predominantly occur in Pakistan and China. Especially for chemical tankers, comparatively small compensation claims occur frequently at the ports of Karachi and Qasim in Pakistan, and many our members have been involved with these claims over many years.

On the other hand, incidents involving bulk carriers are predominant in China, South America (e.g. Brazil, Peru), and Algeria in North Africa. In China, in particular, statistical data shows that many cargo shortages occur not only in tankers, but in bulk carriers. We encounter many incidents at the Chinese ports of Jiangyin, Qingdao, and Tianjin.

One of the background factors in the large number of cargo shortage in China is the use of a unique Chinese method of measurement. We will explain the details in the next chapter. Large numbers of cargo shortage claims occur in South America, with cargoes of grains and fertilizers. The nations of this region are frequently exporters of these products, and it is common to find that cargo quantity reports from the shippers at the loading port differ from the quantity onboard the vessel.



Graph 7: Region of Incidents of Cargo shortage

Summary of Trends in Cargo shortage

Of the incidents handled by our Club, the largest number is related to cargo damage. Of these, 21% of incidents, and 19% of insurance money, are related to cargo shortage. Approximately 300 incidents occur each year, and the problem therefore cannot be ignored.

While the number of incidents of cargo shortage in container vessels is considerable, in practice, cargo claims are often not made by the cargo interests and claims files are frequently closed after payment of survey fees. However, there is always the possibility that insurance money further to the collapse of containers, loss of containers overboard, or the leaking / spillage of cargo into the sea, during the voyage may be considerable.

When considered in terms of the regions in which the incidents occur, particular care is required with bulk cargo (cereal grains etc.) in China, and unloading of chemical tankers (animal and vegetable oils) in Pakistan.

2-3 Case Studies

In the previous section, we summarised trends in cargo shortage claims, and noted the need for caution in relation to China for bulk carriers (cereal grains) and Pakistan for chemical tankers (animal and vegetable oils). This section introduces points of caution for these countries based on claims we have handled.

(1) Bulk cargo discharged at China (soybeans)

Outline

The vessel loaded 66,000MT of soybeans at Santos, Brazil, and discharged at Tianjin, China. The results of a draft survey conducted by CIQ (China Inspection and Quarantine) at Tianjin showed a cargo shortage of 626MT (approximately 0.95% of the quantity on the B/L). Cargo interests claimed US\$ 325,000 for alleged shortage.

The dispute was concluded with an out-of-court settlement of US\$195,000 (60% of the claimed amount).

《What is the CIQ?》

Commonly, CIQ is an abbreviation of ‘Customs, Immigration, and Quarantine’. In practice, it refers to ‘China Inspection and Quarantine’, and is formally the ‘Entry-Exit Inspection and Quarantine Bureau’. Currently, the organisation has its headquarters in Beijing (AQSIQ: Administration of Quality Supervision, Inspection and Quarantine), with branch offices in various Chinese ports. CIQ is a government organisation recognised in Chinese law, and is primarily tasked with inspection of the quality and quantity of imports and exports, as well as quarantine inspection. When Chinese Customs determines the amount of customs duty payable on imports and exports, CIQ inspection results are employed as the sole official statistics, and when cargo claims develop into legal cases, the Chinese courts tend to accept the cargo quantity based on inspection results provided by the CIQ.

Furthermore, surveyors from the CCIC (China Certification and Inspection), a division of CIQ, sometimes board the vessel and conduct draft survey.

Causation and Background

In this case, a discrepancy was found between the quantity of cargo on shore prior to loading and that on the vessel at the loading and discharging ports.

B / L	66,000MT
Loading port draft survey	65,994MT (▲ 6MT)
Discharging port CIQ draft survey	65,374MT (▲ 626MT)
Discharging port vessel draft survey	66,098MT (+ 98MT)
Discharging port cargo interests draft survey	65,686MT (▲ 314MT)

The quantity of cargo as obtained from the draft survey on the vessel at the Brazilian loading port was 65,994MT (the discrepancy of 6MT was approximately 0.01% of the B/L figure), however the actual quantity on the B/L did not take into account the quantity on the vessel, and was measured shore figure as 66,000MT. A shortage, albeit small, of 6MT was noted at this point. The Master issued a Letter of Protest to the cargo interests and the charterers to the effect that the vessel was not liable for the discrepancy between the B/L figure and the ship's figure, which was arrived at with a draft survey.


The draft survey at discharging port in China showed a figure measured by the CIQ of 65,374MT (the discrepancy of 626MT was approximately 0.95% of B/L figure), the figure measured by the cargo interests was 65,686MT (the discrepancy of 314MT was approximately 0.47% of the B/L figure), while the draft survey conducted by the Master and the ship's figure was 66,098MT (an additional 98MT), a considerable range of discrepancy.

According to our surveyors, the CIQ and the surveyors on behalf of cargo interests did not consider waves and swell when reading the draft, and noted that there was also a problem with measurement of the specific gravity of seawater. This example shows that a large discrepancy can arise information required for a draft survey is not gathered correctly. Possible problems arising in draft surveys are set out in detail in Chapter 3.

The vessel also issued a Letter of Protest to relevant parties at the discharging port.

Prevention Measures

Preventive measures to eliminate discrepancies and to consequential problems are set out below.

 **It is essential to conduct a draft survey at both the loading port and discharging port to determine the ship's figures.**

Verify the quantity on the vessel at the loading port and discharging port to determine how much has been loaded and discharged.

We negotiate with the cargo interests on the basis of the ship's figure as noted above when the cargo interests make a cargo claim. If the ship's figure cannot be verified, there is no basis to defend the alleged cargo claims, and our members are therefore at a disadvantage.

Copies of the draft survey records are kept on the vessel, and, after verifying the ship's figures, are signed by the Master and distributed to the relevant parties (e.g. cargo interests, charterers and local agent), and stored on the vessel for a fixed period of time (a minimum of one year from the date the cargo is delivered to the consignees at the discharging port).



A Letter of Protest (see attachment (1)) is issued by the Master if there is a discrepancy between the shore figure or quantities from other surveyors and the ship's figures.

If possible, have the Letter of Protest signed by cargo interests and charterers.

When cargo interests ask the Master to sign associated documentation (e.g. draft survey records), any signature must be accompanied by the remark 'Without Prejudice, Receipt Only'. This remark implies only that the document has been received, with no acceptance of the information given in the documentation. The Master's signature and remark have no effect on our members' rights in later claims. To addition of this remark should avoid unnecessary problems later on.



Cargo documents are essential

In anticipation of shortage claims from the cargo interests, the following three documents should always be verified, and the shipowners should obtain copies from the vessel.

B/L

: Verification of actual quantity of cargo and relevant parties (shippers, consignees and carrier on B/L)

Draft survey records

: Quantity of cargo actually loaded at the loading port and discharged at the discharging port

Empty Certificate

: Empty certificate: A document certifying that the quantity of cargo loaded on the vessel has been completely discharged.

Documents in addition to the above are required in some cases, and our members' good cooperation is necessary to ensure a smooth resolution of the claim. Furthermore, the three documents noted above are required not only in China, but are the minimum required at all ports, and apply to all cargo.



Closely monitor CIQ surveys

The CIQ is a government organisation, and once the draft survey is complete, their surveyors leave the vessel and only very rarely return for re-inspection when requested. Furthermore, in terms of Chinese law, even if there is a problem with a CIQ inspection, it is very difficult to find anyone liable. If there are any doubts as to the methods of CIQ surveyors, the Master should note them at the time of the inspection, and resolve them while the surveyors are on board. If any doubts arise in negotiations with the CIQ, it is important to instruct a local surveyor who will then request negotiations with the CIQ. Such negotiations may prevent problems in the event of a large discrepancy in the quantity of cargo on the vessel. Furthermore, even if the vessel's surveyors are dispatched in response to any doubts which have arisen, it may be difficult to keep the CIQ surveyors on board until our surveyors' arrival. It is therefore recommended that surveyors are appointed in advance, and the details of methods of inspection, procedures, and conditions etc. discussed and settled between relevant parties before the draft survey begins.

Cautions for Cargo shortage in China

The figure measured by the CIQ is the key point

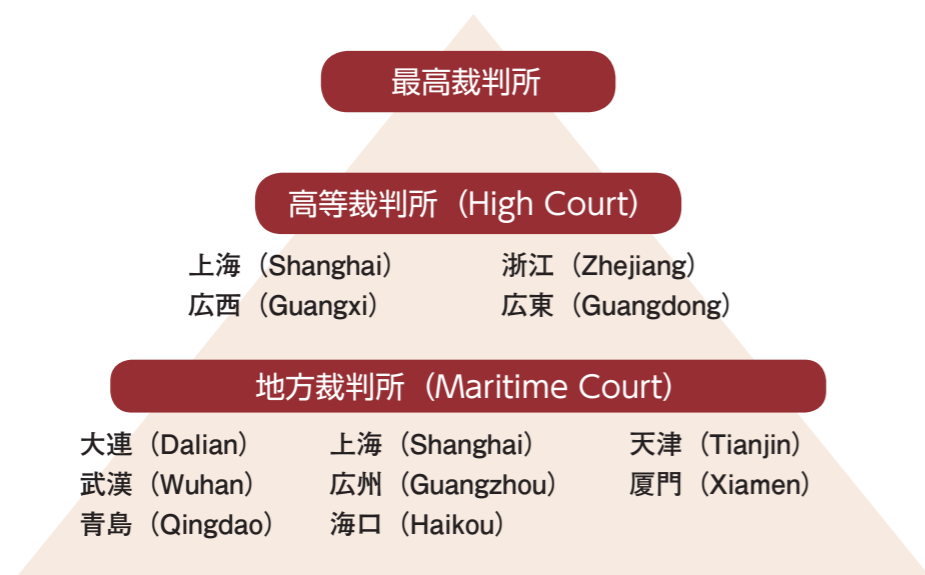
As explained above, the quantity of cargo received by the consignees is defined by the figure measured by CIQ. In other words, if the CIQ figure is less than the B/L figure, a ‘cargo shortage’ is naturally assumed. Fundamentally, courts tend to accept the CIQ figure, and it therefore always necessary to establish and maintain good contacts and communication with the CIQ surveyors in order to ensure accurate measurements.

Resolve claims smoothly

Chinese law does not provide for a time-extension of cargo claims, and the cargo interests must make a claim against the party causing the cargo loss (basically, the carrier on the B/L) and finalise the claim within one year after the consignees received the cargo. Although dependent on the amount of claim, a claim is very likely to be referred to a court, if not resolved within the time-limit. If, therefore, our members receive a cargo claim, it is important to maintain a close exchange of information with us to ensure awareness of the time-bar in resolving the matter.

Court Judgments

Disputes on maritime matters in China are handled at eight local Maritime Courts, in Dalian, Shanghai, Tianjin, Wuhan, Guangzhou, Xiamen, Qingdao, Haikou, four High Courts (Shanghai, Zhejiang, Guangxi, and Guangdong), and in the Supreme Court. Cases are normally initiated in the maritime court closest to the discharging port.



It is important to be aware that Chinese courts are not governed by precedent, and that decisions differ by jurisdiction. A decision followed by one court may not be followed by another. In particular, different courts have different understandings of Trade Allowances (generally 0.5% of the quantity on the B/L). The Trade Allowance is, basically, not recognised in the Qingdao court. However, most courts other than the Qingdao court have accepted the Trade Allowance to varying degrees in decisions, and this provides an avenue for negotiations.

Under Chinese law, the carriers are not liable for cargo shortage due to ‘natural loss’, i.e. the damage or loss from the nature or inherent vice of the cargo. Bulk cargo may diminish in transit, with the moisture content of the cargo evaporating, resulting in a reduction in the loaded quantity. For example, the moisture content of cereal grain cargo such as soybeans evaporates in transit. In this case, the certificate noting the quality of the cargo at the loading port also includes the moisture content of the cargo. It is therefore necessary to analyze and compare this value with the moisture content at the discharging port, and certify that the decrease in quantity has evaporated during the voyage. Certifying ‘natural loss’, in other words, the amount of evaporation during the voyage, presents considerable difficulties, but if it is recognised, ensures a high probability of a successful decision in favor of the vessel.

While differing from the ‘natural loss’ described above, water from cargo having a high moisture content (e.g. iron ore, coal, nickel ore) collects in the bilge during the voyage. Water is sometimes sprayed on the said cargo for environmental reasons during loading operations, to prevent dust escaping, and to protect the health of workers. In such cases, water collects in the bilges during the voyage, and must be discharged, so that, even if the quantity on the B/L is determined from the draft survey at the loading port, the B/L figure includes water applied during loading. Therefore, bilge water discharged during the voyage technically contributes to a cargo shortage at the discharging port. However, needless to say, this has no effect on the actual quantity of cargo. At the same time, there is always the possibility that the cargo interests will claim a cargo shortage on the basis of B/L figure, i.e. including the discrepancy due to the bilge water. To counter this, it is important that the vessel prepares an oil record book to record how much bilge water there was, when each bilge tank was discharged.



(2) Liquid cargo discharged at Pakistan (palm oil)

Outline

The vessel discharged palm oil at Qasim, Pakistan in March 2012. Two years later in July 2014, notification was received by the shipowners that a claim for US\$50,000 in compensation for a 40MT (approximately 0.67% of the quantity on the B/Ls) cargo shortage across 5 B/Ls (a total of 6,000MT) had been lodged in the local court.

The shipowners finally reached an out-of-court settlement for US\$20,000 (40% of the claimed amount).

While unloading in Pakistan, there were no communications or reports of problems related to cargo shortage, and the vessel, charterers and shipowners were unaware of any problem, so the claim came as a great surprise.

Causation and Background

As described above, discharging took place without any indication of problems so surveyors were not appointed and the vessel departed the discharging port. It was unclear why the cargo interests raised the claim in the court. A summary of the complaint, and the documents stored by the vessel, revealed the quantity of cargo to be as follows.

B/L (= shore figure)	6,000MT
Loading port Vessel ullage survey	5,985MT (▲ 15MT)
Discharging port Vessel ullage survey	5,990MT (▲ 10MT)
Discharging port Shore figure	5,960MT (▲ 40MT)

A cargo shortage of 15MT (approximately 0.25% of the quantity on the B/L) occurred in the ullage survey of the vessel conducted at a loading port in Malaysia. Furthermore, the ullage survey of the vessel at the discharging port also found a cargo shortage of 10MT (approximately 0.16% of the quantity on the B/L), a reduction in the cargo shortage compared to the figure at the loading port. The cargo shortage had therefore not occurred under the vessel's custody, but was thought to be due to cargo remaining in the pipeline connected to the shore tank.

Prevention Measures



It is essential to conduct ullage surveys at both the loading port and discharging port to determine the quantity of cargo on the vessel.

Verify the quantity on the vessel at the loading port and discharging port with ullage surveys.

If a cargo shortage is claimed by cargo interests, negotiate on the basis of the ship's figure as noted above. If the

quantity on the vessel cannot be verified, there may be no basis to defend the alleged claim, and our members may be at a disadvantage.

With chemical tankers, it is common for cargo in the same tank to be discharged at multiple ports. In such cases, care should be taken to verify the quantity on the vessel at each intermediate port, and thus ensure against problems at the final port on the voyage.



A Letter of Protest is issued by the Master if there is a discrepancy between the shore figure or quantities from other surveyors and the ship's figure

If possible, have the Letter of Protest signed by the cargo interests and the charterers.

When cargo interests ask the Master to sign associated documentation (e.g. draft survey records), any signature must be accompanied by the remark 'Without Prejudice, For Receipt Only'.



Cargo documents are essential

In anticipation of later claims from the cargo interests, the following three documents should always be verified, and the shipowners should obtain a copy from the vessel.

B/L

Verification of actual quantity of cargo and relevant parties (shippers, consignees and carrier on B/L)

Ullage survey records

Quantity of cargo actually loaded at the loading port and discharged at the discharging port

Dry-up certificate

A document certifying that the quantity of cargo loaded on the vessel has been completely discharged.



Appointment of competent surveyors in advance if it is thought that problems may occur

As in this case, it is common that no report of cargo shortage is received from cargo interests when discharging in Pakistan, but a cargo claim is raised later in court. Always verify the quantity on the vessel, and if any doubts arise, consider the appointment of competent surveyors in advance. Relevant documents should be kept for three years in anticipation of a claim occurring.

Cautions for Cargo shortage in Pakistan

i Cargo claim = Court case

In Pakistan, a discrepancy between the B/L figure and the quantity received by the cargo interests (i.e. shore figure) almost always results in a court case.

When discharging cargo, it is therefore important to understand that there is a high probability of a cargo claim being raised in court despite there being no report from the cargo interests of any cargo shortage etc. during discharge, and always to be prepared for such a claim.

i Pakistani courts

Under Pakistan law, the time-limit for cargo claims is one year after the consignees receive the cargo, however in practice it frequently takes a considerable time for the shipowners to receive the complaint from the court (2 years and 4 months in this case). These delays are due to the very long periods of time required for internal processing in Pakistan courts. Based on the complaint, it can be assumed that the cargo claim itself is valid if the cargo interests raise a cargo claim in the court before the time-limit.

Furthermore, since the complaint is often sent to the shipowners and charterers via the local agent, it is necessary to instruct the agent in advance to notify relevant parties without delay once the complaint is received.

In the worst case, the agent delays notification of the complaint, and it is too late to appear at the first sitting of the court, not only will the shipowners be at a disadvantage in the court's decision, but, depending on the amount of the claim, the vessel and its sister ships may be arrested by the cargo interests on the next call at Pakistan ports. If the vessel is arrested, it is important to note that the considerable time required for internal processing of claims in Pakistan courts will affect the ability of the vessel's departure.

i Out-of-court settlements

Many claims in Pakistan are for comparatively small amounts, however in some of these cases, multiple B/Ls have been issued, and a court case is begun for each. Situations in which court cases involving more than 10 B/Ls simultaneously have been noted. Even if each individual claim is for a small sum, multiple cases may result in a final claimed amount which is considerable.

The large number of small claims in Pakistan involves considerable expense and time, and many cases are settled out of court. Unfortunately, the trade allowance is not accepted under Pakistan law, and also there is a tendency for judgments advantageous to the cargo interests. So, this makes quick settlements desirable. In recent years, out-of-court settlements of 40% of the claimed amount, and 30% of the total for multiple claims, are common.

Chapter 3 Cargo shortage and Draft survey

This chapter explains the reasons for shortages of cargo carried in bulk carriers and tankers, the precautions to be taken when conducting draft surveys for bulk carriers, and other technical points.



3-1 Timing of Measurement at the Loading port

When the quantity of cargo is noted on the B/L (e.g. bulk carriers, tankers) by weight, the quantity of cargo loaded must naturally be measured at some point in the loading process. The question of when to take the measurement of the quantity of cargo is determined in the freight contract between the charterers (the operator issuing the B/L) and the cargo interests.

Sailing instructions given by the charterers tell the vessel which figure is to be taken as the loaded quantity in the B/L. It is necessary to check with the charterers if no instructions are given.

(1) Timing of Measurement of the Quantity of Cargo at the Loading port for Bulk carriers

Broadly, measurement is carried out at the following points.

- 1 **When the cargo is placed on the conveyor belt at the bulk yard.**
Measurement at the time the cargo is lifted in the grab when the cargo which is stored at bulk yard transported to the vessel by conveyor belt.
- 2 **In the case of cereal grains, measurement of weight based on the level of cargo in silo**
In the case of cereal grains etc., the quantity is calculated by reference to the decrease in the level of cargo in the silo on shore.

3 When quantity is measured at the loader immediately before loading on the vessel
Measure when cargo is transferred from the conveyor belt to the loader in (1) above.

4 When the loaded quantity is measured with a draft survey after loading is complete
The cargo interests, shippers, and shipowners arrange a joint draft survey, and the loaded quantity is calculated and inspected from the draft of the vessel.

(2) Timing of Measurement of the Quantity of Cargo at the Loading port for Tankers

Tankers transport liquid cargo, and the method of measurement differs from that for bulk carriers, however the timing of the measurement is the same.

1 Measurement at the shore tank
Similar to the methodology in the above case (2) for bulk carriers, soundings and ullage measurements are taken in the shore tanks, and weight calculated from volume adjusted for temperature etc.

2 Measurement using shore flow meters
Measurement using flow meters installed in the pipeline between the shore facility and the vessel.

3 Measurement using ullage and soundings in the vessel tanks
Ullage and soundings are used to measure the cargo quantity in the vessel tanks before and after loading/discharging, and these measurements are then adjusted for temperature, and volume and weight calculated from the vessel's tank table.

3-2 Timing of Measurement at the Discharging port

Similar to the loading port, measurement of the cargo at the discharging port involves measurement of the discharged quantity of cargo in accordance with a number of points.

(1) Timing of Measurement of the Quantity of Cargo at the Discharging port for Bulk Carriers



1 Measurement of a draft survey before discharging
A draft survey is conducted before commencing discharge operations to measure the quantity of cargo on the vessel. When cargo is discharged at two or more ports, a draft survey is conducted after cargo is discharged at each of the intermediate ports, and the quantity discharged determined from the discrepancy between the figures before discharge.

2 Addition of each grab to a running total, and measurement in the hopper, when discharging cargo
When a grab is used to discharge cargo, the weight of the cargo in each grab is added to the total, or the hopper is measured after it receives each grab.

3 Measurement when transferring cargo to a shore facility by conveyor belt
Measurement during transfer of cargo to a shore facility via a conveyor belt in a similar manner to loading cargo.

4 Measurement of weight based on the level of cereal grains in a silo
When cargo such as cereal and grains is stored in silos, the volume of cargo in the silo is measured and converted to a weight value to determine the loaded quantity.

5 Measurement before the shore facility when discharged into trucks
When using trucks to transfer cargo to a storage facility, the trucks are weighed when loaded on shore scales to obtain the total weight, then the weight of the truck itself and pallets are deducted to obtain the weight of the cargo.

(2) Timing of Measurement of the Quantity of Cargo at the Discharging port for Tankers

1 Measurement at shore facility
Same as loading port, measurement at shore facility.

2 Measurement using shore flow meters
Measurement using flow meters installed in the pipeline between the shore facility and the vessel.

Measurement using ullage and soundings in the vessel tanks

3

Ullages and soundings in the vessel's tanks are used to measure the quantity of cargo in each tank and thus determine the total quantity of cargo before discharge. When a dry-up survey is conducted for discharged tanks, a Dry-up Certificate may be issued by the vessel.

In the Age of Sailing Ship, since the vessel needed to dump cargo to the sea in order to avoid the her distress/shipwreck, there is possibility of a cargo diminished during the voyage. Today, however, there is no contact with cargo during the voyage. If, therefore, measurement at the loading and discharging ports is accurate, and excluding cases in which the moisture content of cargo evaporates during the voyage, or the cargo itself evaporates, the loaded and discharged cargo quantities should be the same.

3-3 Causes of Discrepancy in Measured Weights of Loaded and Discharged Cargoes.

While theoretically the same, the following causes for discrepancies in loaded and discharged cargoes are possible.



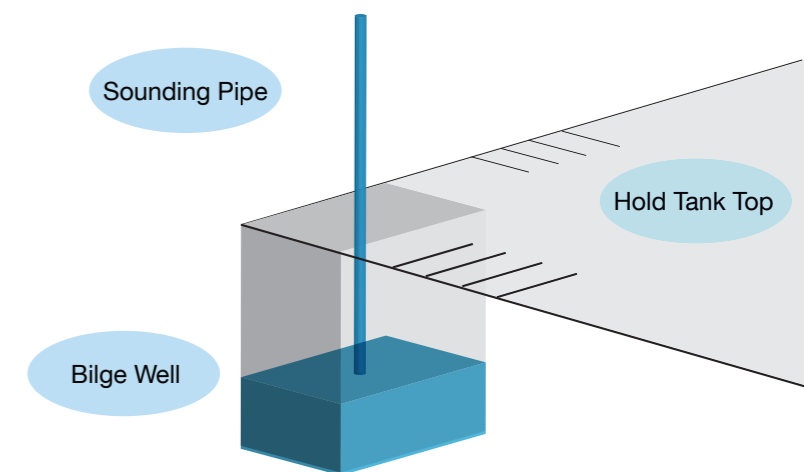
(1) Physical loss of cargo

1 Due to bulk carriers discharging bilge water.

There are very few cases of reduction in volume of cargo during the voyage. However, as noted in the previous chapter, when determining the loaded quantity with a draft survey, water from cargoes with a high water content, water in the cargo due to loading in wet weather, and water permeating into the cargo due to spraying to prevent dust during loading may be included as cargo in some cases. Since this water is discharged as bilge water during the voyage, there will be a reduction in the documented quantity of the cargo.

Brazilian iron ore has a particularly high water content, and is sprayed with water during loading to prevent dust. A considerable amount of bilge water is therefore unavoidable, and may reach approximately 2,000MT (1% of the quantity of the loaded cargo) in some cape size bulk carriers.

Keeping a strict record of the handling of bilge water is advisable as a means of avoiding claims due to cargo shortage at the discharging port. If bilge water has collected in the bilge well, it is possible to calculate the volume discharged from soundings and the size of the well. In particular, if a large amount of bilge water has collected and overflows the top of the holding tank, it will not only prevent an accurate understanding of bilge water discharge, but may also hinder discharge of cargo.



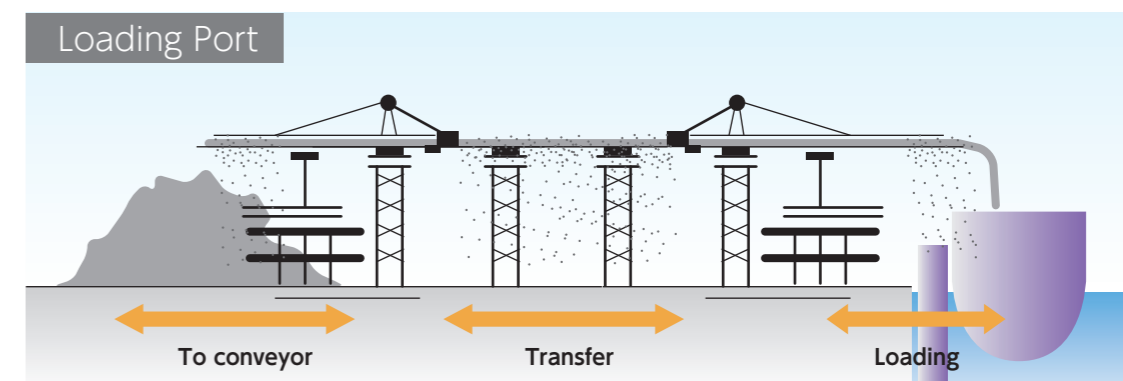
Furthermore, if the last cargo from the previous voyage remains in the bilge well, it will block discharge of bilge water. However, while this bilge water was measured as cargo at the loading port, since it cannot be discharged as the cargo, it will be seen as a shortage in the discharged quantity.

It is therefore necessary to clean the bilge well and take measures to ensure that cargo cannot enter (e.g. cover the bilge well cover with burlap) before loading operations.



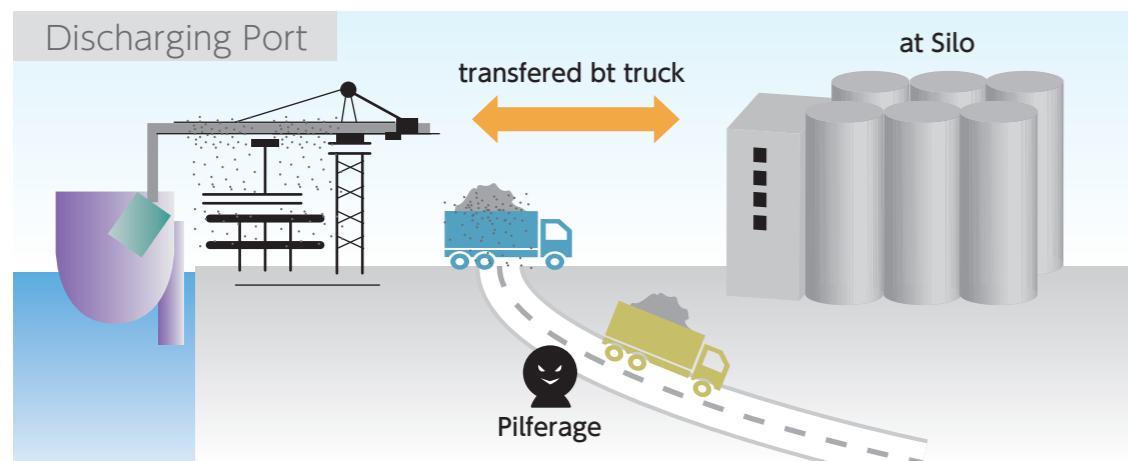
Note: Last cargo from the previous voyage remaining in the bilge well and blocking discharge of bilge water.

2 Due to the cargo spilled between the vessel and the shore measurement point at the loading port and discharging port for a bulk carrier



As in 3-1 (1), when the measurement point is on the conveyor belt in the storage yard, or when the cargo is transferred to the loader, cargo spilled after measurement and not loaded onto the vessel will naturally reduce the actual quantity of cargo loaded.

In cases of heavy rain or water spraying to prevent dust during loading, the cargo absorbs water after measurement and the full load is reached earlier than scheduled due to the weight of this water content. If this is then discharged as bilge water, the discrepancy will be large.



Spillage of cargo on the way to the measurement point after discharging from the vessel at the discharging port results in a cargo shortage. In particular, it has been reported from ports with low standards of management that when cargo is loaded onto trucks, each truck is inspected but after this the cargo is pilfered by the truck drivers, which results in a shortage of cargo.

【Prevention Measures】

It is difficult for the vessel to take practical measures when the loaded and discharged quantities of cargo are determined by shore figures. Even when loaded and discharged quantities of cargo are determined by shore figures, the vessel should conduct a draft survey, and if a discrepancy is found in the quantities, a Letter of Protest etc. should be prepared in response.

= For Tankers =

When the discharged quantity of liquid chemical cargoes is determined by the capacity of shore tanks, shortages may be caused when cargo remains in the pipeline between the vessel and the shore tanks. The pipeline cargo is not transported to the shore tanks and a cargo shortage claim may follow from cargo interests. With chemical tankers, the discharged quantity is the shore figure, and it is therefore necessary to verify the loaded quantity before discharge, and issue a dry up certificate after discharge.

3 Due to the natural loss of the cargo itself

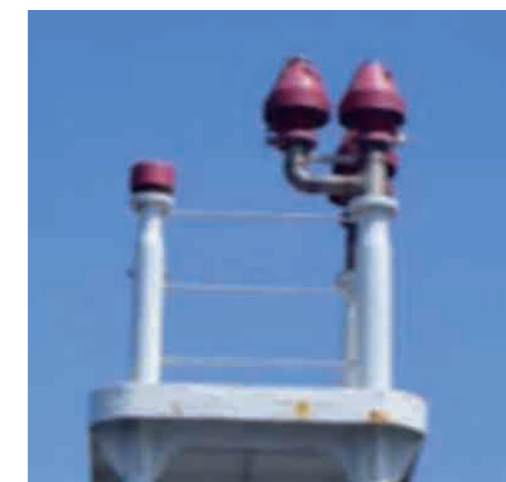
While rare, natural loss due to evaporation can also occur with some solid cargoes such as camphor (used as an insect repellent for clothing). Sailing instructions include a number of precautions when loading such specialised cargoes. Prior consultation with the charterers is necessary on methods of dealing with the problem. For example, it is important to take measures to prevent cargo shortages through natural loss by clarifying the trade allowance for the duration of the voyage, and commissioning a draft survey to determine the loaded and discharged quantities.

In the case of tankers, the cargo has a high volatility and the effects of improper sealing of tanks (e.g. manhole hatches, PV valves) will accelerate vaporisation (depending on cargo type). Care is necessary since these factors will lead to a decrease in the quantity of the cargo.

Tankers are fitted with PV valves, however if they are not well maintained they may be the cause of cargo shortages.

manhole hatches,

PV valves



What is a PV valve?

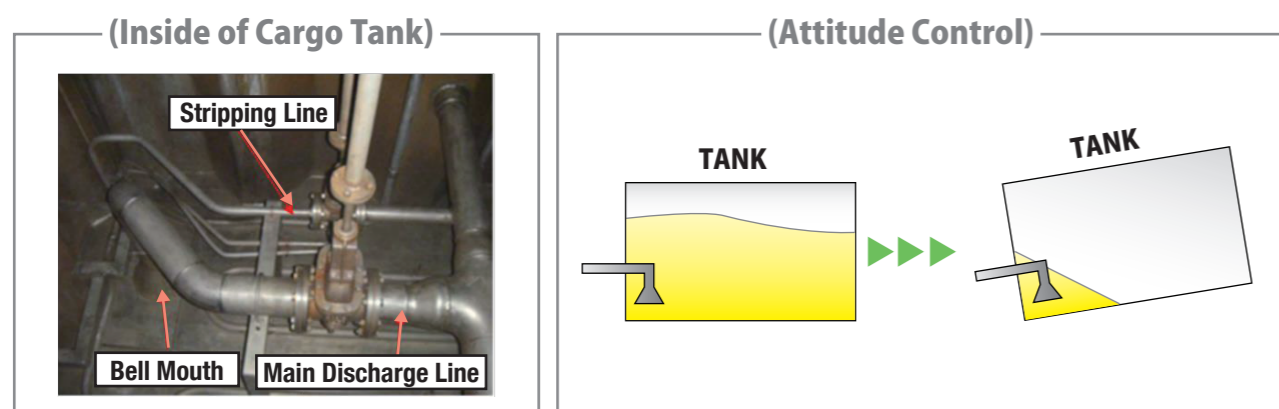
PV valves operate automatically for tank protection, venting to atmosphere if pressure becomes excessive, and taking in air if pressure becomes negative. Each valve is set to operate at an appropriate pressure.

4 Due to the other reason in tankers

Highly viscous cargoes must be heated to a specified temperature during voyage. If the temperature becomes too low the cargo will stick to the tank walls, and in some cases become impossible to discharge. Since this condition is not apparent to the eye, the amount remaining in the tank will result in a decrease in the quantity discharged.

While the aim of discharge work is to leave as little cargo in the tank as possible, any ROB (Remaining on Board) will be the subject of a cargo shortage claim. The following points should be noted in order to prevent this problem.

- Conduct operations with a clear understanding of the positions of intake pipes and presence or absence of sumps. Intake pipes are normally at the stern of the vessel.
- Use attitude control on the vessel to collect the liquid cargo at the intake pipes while stripping.



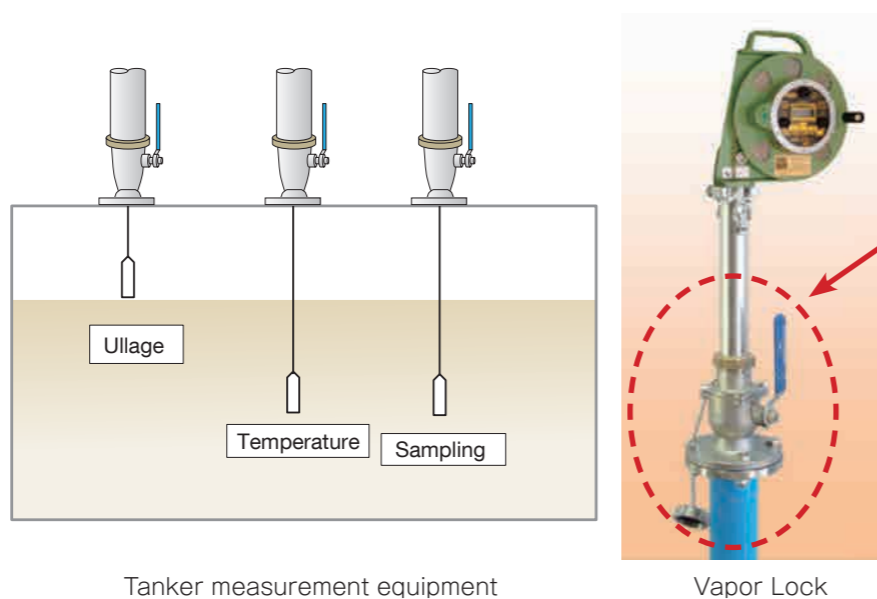
In most tankers it is not possible to visually inspect the cargo and tank inside to determine whether or not any cargo remains. The eductor intake pressure is therefore checked to determine whether or not the tank is dry. In such cases, if the attitude control of the vessel is incorrect and the liquid cargo cannot be collected at the intake pipe, it will not be possible to discharge the full quantity of cargo.

(2) Accuracy of the Measurement equipment in shore facility and on the vessel

The OIML (International Organization of Legal Metrology) is an international weighing and measurement organization working towards improving the accuracy of weighing and measuring instruments, however policies vary between countries so that no uniform policy is possible in practice.

For example, despite using the same type of Measuring equipment, quantities will not match unless it is suitably maintained and inspected. When the discharged quantity is determined using the measurement equipment of the shore facility, it should be assumed that this quantity will not match the quantity on the B/L.

It necessary to be aware that the combination of inaccuracies in measuring equipment



Tanker measurement equipment

Vapor Lock

and physical losses results in a discrepancy between the quantity on the B/L and the scale figure at the discharging port, leading to a cargo shortage claim.

The measuring equipment installed on tankers is also used for dry-up verification. Vapour lock equipment (permitting measuring while excluding the atmosphere in the tanks) is used for measurement on the vessel (depth measurement, temperature measurement). The measuring equipment is required to be certified by a measurement organisation and inspected at regular intervals. Appropriate maintenance is therefore important.

(3) Accuracy of draft surveys

A wide range of factors must be considered when calculating the quantity of cargo using draft surveys, and it must be remembered that the quantities of cargo at the loading port and discharging port will differ.

1 What is a draft survey?

This section explains the principles behind using a draft survey to calculate the quantity of loaded cargo.

First, the reason that a vessel constructed of steel is able to float can be found in Archimedes's Principle.

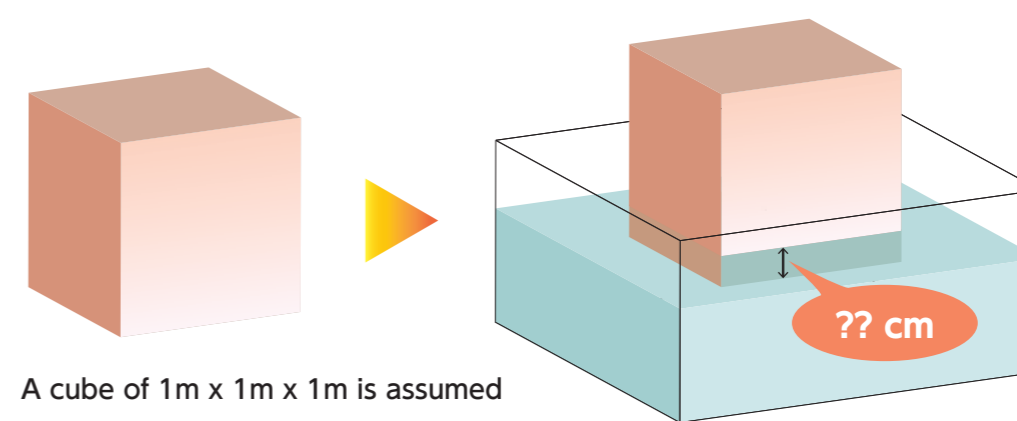
Archimedes's Principle

[A body immersed in a fluid is subject to a buoyant force equal to the weight of the fluid that it displaces.] This principle is used in the draft survey to measure the total weight of the cargo and the vessel, and the weight of items other than the cargo is then subtracted to find the quantity of cargo.

Question

When floating body in freshwater (density of $1,000\text{kg/m}^3$), by how many centimetres does the floating body sink into the water? How heavy must a load be for it to sink?

The draft survey calculates the total weight from the submerged portion of the vessel.



A cube of 1m x 1m x 1m is assumed to have a weight of 300kg.

Answer : 30 cm
Answer : 700kgs

(For the calculation, refer to the attachment ②: Detail calculation by Archimedes)

2 Draft survey methods.

A draft survey involves reading the port and starboard draft marks at the bow, amidships, and at the stern, and applying various compensation values to determine the gross tonnage.

Errors in reading the draft marks, and errors in the compensation values, are therefore incorporated as errors on the quantity of cargo.



bow



midship



stern

3 Factors included in the gross tonnage

The main factors included in the gross tonnage as found from draft measurements are as follows.

Vessel weight (Light Ship/Light Weight)

Measured at the shipyard upon completion, and noted on the approval drawings issued by the vessel classification society.

Fuel, lubrication oils, freshwater

The quantity in each specialised tank. Calculated from the tank table.

Ballast water

The vessel floats too high in the water without cargo, and ballast water (seawater) is therefore pumped into specialised tanks. The amount of ballast water is calculated from the tank table.

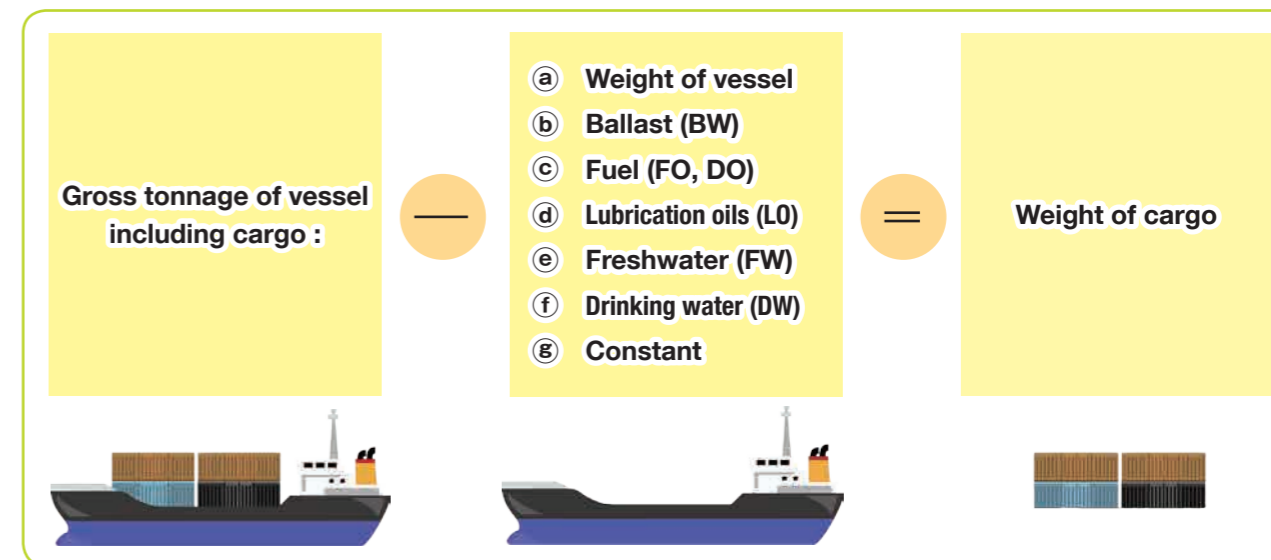
Indeterminate weights (Constant)

Ship's stores, parts, and foodstuffs loaded onto the vessel after its weight is measured at completion of construction are known as Constant. These weights are always changing, however they are normally between 2% and 4% of the weight of the vessel.

They should therefore be calculated in the draft survey each time before loading operations. An accurate figure should be measured when the ship enters a dock.

While employed as a third officer, this writer was put out in a boat in the dry dock to use a ruler to obtain an accurate measurement of the draft.

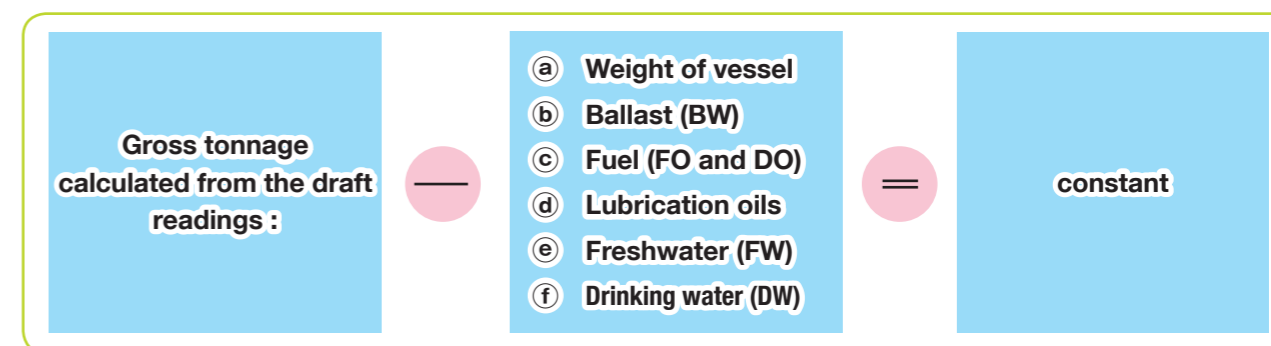
The quantity of cargo is calculated as shown below.



As is apparent from the formula above, the g constant cannot be found after cargo is loaded.

4 Finding indeterminate weights (Constant)

As described above, a draft survey is taken with cargo weight = 0, and the weight calculated with the following formula.



As is apparent from the formula above, if there is an error in the draft readings, or there are errors in the weights of above a - f to find the constant, these errors will all be included in the constant. When determining the loaded quantity of cargo, the value of the constant found before loading is used in draft survey before loading at the loading port and before unloading at the discharging port, and the error is then directly linked to the cargo shortage loss.

PC-based software is available in which the various equations are entered beforehand to reduce the time required for calculation. Furthermore, for large bulk carriers in which the cargo is identified, stowage software approved by the classification society is used. Provided the equations are entered correctly, there is almost no possibility of error.

As described above, the indeterminate weights (constant) are generally between 2% and 4% of the weight of the

vessel. If the calculated indeterminate weights (constant) exceed this value, or becomes a negative value (an extreme case), an error is therefore assumed in one or more of the values, and each must be verified again. (Refer to attachment ③ : Example of PC-based Displacement Calculation)

5 Errors in Each Factor.

This section considers errors in the various values subtracted from the gross tonnage, and the values read from the draft marks, when calculating constants or when calculating the quantity of cargo after loading is complete.

= Errors in reading draft marks =

As shown in the diagram at right, draft marks are in 20cm increments, with each character 2cm in width, and 10cm in height.

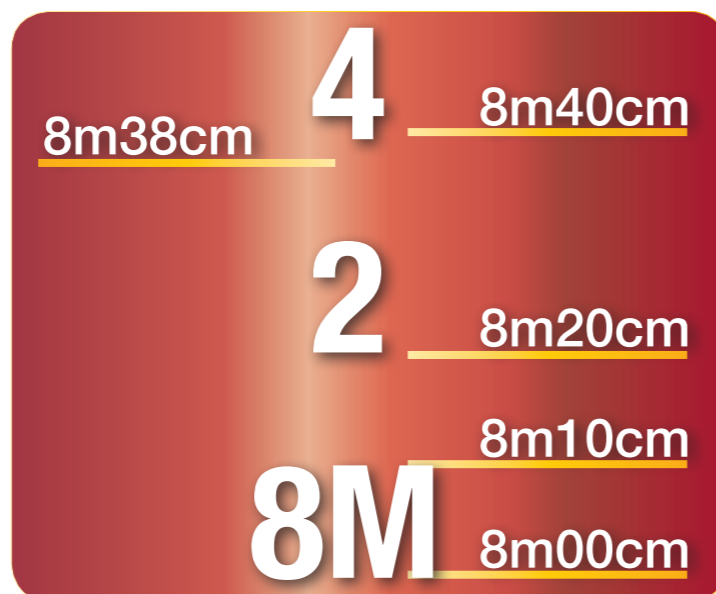
When the waterline is between 8m10cm and 8m20cm in the diagram at right, it is therefore necessary to estimate by eye.

The waterline is that in a dry-up condition in the dry dock, and therefore fluctuates. Furthermore, under normal conditions at the pier, and when loading and unloading offshore, the effects of waves and swell result in fluctuations of the waterline.

When the waterline is fluctuating it is necessary to take at least 10 draft readings and calculate the average. The author has experience on many vessels, and as noted in maritime tradition, he was taught that fluctuation of the waterline stops at the correct value only for an instant, and that this instant must be determined, however in practice this does not occur.

When in dry dock, therefore, it is necessary to put out a boat and measure the waterline with a ruler in order to accurately determine the waterline, and to calculate the constant as a reference value until the next time the vessel enters dry dock. Sufficient time is unavailable during loading to conduct a draft survey.

With Capesize bulk carriers as about 180,000 Dead Weight, an error of 1cm in the reading results in an error of 119MT.



= Errors in measurement of the specific gravity of seawater =

With Capesize bulk carriers as about 180,000 Dead Weight, an error of 0.001 in the seawater gravity results in an error of 181MT.

A seawater gravimeter as shown at right is generally used on the vessel.

With the seawater gravimeter it is desirable to measure at the seawater surface, the mid position, and the bottom position for each of the draft marks (18 positions) and calculate the average, however in most cases it is not possible in the short time available between completing loading and leaving port. And also, compensation for temperature is necessary to ensure accuracy.



As an example of the ease with which errors can occur, care is required when taking measurements at piers in river ports and river mouths where freshwater mixes with seawater.

The accuracy of the seawater gravimeter cannot be guaranteed in some cases. Ensure that reliable equipment is purchased.

= Measurement errors with varying weights =

To determine constants and cargo quantities, the weights of items associated with the vessel, e.g. fuel, lubrication oils, freshwater, ballast water, are subtracted from the gross tonnage found by measuring the draft. Errors in these varying weights result in errors in constants and cargo quantities.

Since the tanks for fuel, lubrication oils, and freshwater are small, weights can be found very accurately with precise sounding.

Of the varying weights measured, large errors are most likely in ballast water, and accurate measurement is required. A particular example is bulk carriers using holds as ballast tanks. Large errors in measurement of ballast water in the holds are noteworthy in such cases.

In other words, while other factors also affect the result, rolling of the vessel causes the liquid level in the tanks to rise and fall. If the vessel is rolling, therefore, multiple soundings should be taken as with draft measurement

With trim and heel (an incline across the axis of the vessel from port to starboard), in particular, it is possible to obtain a comparatively accurate value from the measured draft, however it is important to calculate using the draft marks amidships and to take the width of the vessel into consideration, rather than use an inclinometer.

On the other hand, if the vessel is twisting it is impractical to take detailed measurements of the angle of inclination. Devices other than inclinometers are also possible. In dry docks it is not uncommon to see a weight on a string fixed

to a bulkhead for use as a guide. It is important that this is mounted at the center of the vessel

Measures to minimize the errors in weights of these varying items are as follows.

- Minimize the incline of the vessel
- Half-full tanks have a greater likelihood of errors. Ensure that tanks are either full or empty if at all possible. Furthermore, the specific gravity of the seawater used as ballast water should be measured at the time it is loaded.
- Measurement errors will occur if ballast water is lying on the floor of the holds. Ballast water should be discharged before the draft survey if draft and air draft are not a problem.

(3) Measurement errors with liquid cargoes (tankers)

With tankers, the quantity of cargo is almost never found using a draft survey as it is with bulk carriers. Values obtained from ullage and sounding of each tank are compensated for temperature and specific gravity, and a tank table recognised by the classification society used to determine the quantity of cargo. If, therefore, there is an error in the varying weights, and the vessel is fully loaded, the scheduled quantity may not be able to be loaded, leading to a short loading.

3-4 Determining the Quantity of Cargo Loaded (B/L figure) at the Loading port for Bulk Carriers

The timing of measurement at the loading port was explained in 3-1. This section explains the method of determining the quantity of cargo loaded in practice.

(1) Determining the quantity with a draft survey

The cargo interests (shippers), charterers, and shipowner conduct a joint draft survey in many cases. This survey is noted in the sailing instructions. It is necessary to verify with the charterers if this is not clearly noted.

The quantity in each hold is often found by dividing the total quantity of cargo as calculated from the draft survey by the figure for each hold on the shore scale. There is a possibility of error for each type of cargo when two or more types are loaded and a draft survey is not taken for each.

While a first officer, the author had the experience of loading six types of coal on a nine-hold Capesize bulk carrier at the port of Gladstone in Australia. The sailing instructions specified that the quantity of each cargo was to be calculated with the method described above. To ensure a more accurate understanding of the quantity each type of coal loaded, the charterers asked if it was possible to take a draft survey after loading of each type of coal was completed, however problems were recognized with vessel strength calculations in the loading sequence plan, and the request was refused.

The Capesize bulk carrier as about 180,000 Dead Weight has a load of 157,653.949MT with a trade allowance (0.5% of the quantity on the B/L) of 788MT.

A 3cm error in the draft reading, and an error of 0.001 in the seawater specific gravity measurement, results in an error of 538MT.

(2) Determining the quantity with a shore scale

This method determines loaded quantity for each hold and cargo type with the weight measured ashore, and is frequently used with cereal grains etc. This method appears to be more susceptible to cargo shortage losses than a draft survey. Measures to deal with the problem are explained in Chapter 4, however basic details are as follows.

- 1 Details should be verified with the measurement method if the loaded quantity is determined with a shore scale.
- 2 Even when the loaded quantity is determined with a shore scale, the vessel must always conduct a draft survey. It is desirable to employ a surveyor if possible.



3-5 Stowage Plan

The following explains the basic procedure for the stowage plan.

1 The charterers provide the sailing instructions for the next voyage. These also include instructions for the quantity of cargo. The specified quantity of cargo $\pm 5\%$ is generally set as an option for the charterers, shipowners, and Master. It is considered important to load as much cargo as possible, and to minimize fuel replenishment and freshwater on hand.

2 A stowage plan is then prepared and approved by the charterers, and the loading sequence prepared. This documentation is sent to the stevedoring company (Refer to the attachment ④ : Loading Sequence).

3 Calculate the amounts of fuel, lubrication oils, and freshwater, and the constants, after entering port, and consult with the stevedore company on any fine adjustments necessary. Always calculate the constants before loading. Even if the quantity of cargo loaded is determined with the quantity shore, a surveyor should be engaged if possible for verification.

4 Commence loading. Since a plan for loading cargo and discharging ballast has been prepared in accordance with the loading procedure, at each juncture in the sequence, verify against information received to ensure that work is proceeding as scheduled.

Chapter 4 Preparations for and Responses to Cargo Shortage Claims

This chapter seeks to provide some guidance on how to minimize exposure to cargo shortage claims .

- Process from occurrence of an incident to settlement
- Measures that can be taken to minimise cargo shortage claims
- Negotiations after receipt of a claim
- Recovery action against charterers and shippers
- Documentation required for dealing with claims



4-1 Process from Occurrence of an incident to Settlement

Vessels receive cargoes from shippers at loading ports and deliver them to consignees at discharging ports. If there is a short delivery, consignees or subrogated cargo insurers are likely to pursue a cargo shortage claim against the carriers. Consignees or cargo insurers will be referred to below as 'cargo interests'.

Cargo shortage can occur at loading ports or discharging ports. Typically, when the cargo discharged at the discharging port is less than the B/L figure, the consignees will immediately notify the carriers of the shortage of cargo. A shortage claim will subsequently be lodged by cargo interests. For the purposes of clarity, we refer to the former as a 'claim notice', and the latter as a 'formal claim'.

Often, a demand for security will be made by cargo interests to cover their claim for the alleged shortage, either before or after the formal claim. Such request may not necessarily be requested only after completion of discharging. If cargo interests determine that there is a high probability of a cargo shortage as a result of a draft survey during the discharging operation, security may be requested at a very early stage of discharge. Unless carriers issue a letter of guarantee, cargo interests are likely to begin the process of arresting the vessel and/or preventing the vessel's departure. In such cases, we (P&I Club) will issue a letter of guarantee for the cargo interests' claim in order to avoid an arrest or release the vessel from arrest, subject to wording and quantum of the claim being agreed.

When a formal claim is received, we will seek to collect the relevant documentation, review the reasonableness of the claim, including merits and quantum, and if appropriate, negotiate with cargo interests (which process is discussed later).

In the event of a successful settlement, an agreement will usually be drawn up recording the terms of the settlement which is signed by both parties. Once the settlement money is paid to the cargo interest, the claim is finalised. If a letter of guarantee had been issued for the claim, it should be retrieved and cancelled.

The majority of cargo shortage claims are settled out of court. However, if settlement cannot be reached despite negotiations, legal proceedings (either in court or arbitration) will be unavoidable. In such a case, competent lawyers will be appointed.

Once the settlement money has been paid to the cargo interests, if it is appropriate to seek recourse or a contribution from charterers and/or shippers, steps to recover a contribution/reimbursement from the relevant party(s) will be taken, which when completed, will finally dispose of the claim.

Evidence provided by cargo interests

When cargo interests make a claim, they have a duty to establish that their cargo has suffered loss and/or damage. Generally, they have to show that :

- 1 The cargo has suffered loss or damage;
- 2 The loss or damage occurred during the carrier's custody of the cargo
- 3 The claim amount has been calculated appropriately

When a B/L is issued, the cargo quantity stated on it is assumed to be the shipped quantity. If cargo interests submit documentation showing that the actual quantity discharged is less than the B/L quantity, it is assumed that a shortage has occurred during the voyage, and that cargo interests have suffered a loss equivalent to the value of the short delivered cargo.

Having said that, the liability of the carrier only extends as far as his reach of operations. In other words, it is understood that the period of carrier's liability ends with the discharging of cargo from the vessel (tackle-to-tackle). In the case of dry bulk carriers, the reach of the carrier is within the ship's side of the vessel. In the case of tankers it is up to the manifold. Even if a cargo shortage has occurred, if it can be established that such a loss occurred beyond the ship's side of the vessel, or beyond the manifold, it is possible to argue that the carrier has no liability for the alleged shortage

Various exemptions to liability are provided to carriers by international regimes, such as the Hague Rules etc. These exemptions are based on the concept of liability of the carrier for losses being limited to their reach of operations. In some cases, the carriers may be exempt from liability for cargo damage under the terms and a conditions of the B/L or the charter party.

4.2 Measures to minimize Cargo Shortage Claims

Causes of cargo shortage claims can occur at either, or both, the loading and the discharging ports.

To minimize shortage claims, it is important to be able to show/establish that there has been no actual cargo shortage, or if cargo shortage has occurred, that the cargo shortage did not occur during the vessel's custody of the cargo, or that the shortage is not the liability of the carrier.

In terms of showing that there has not been any actual cargo shortage, or that any cargo shortage could not have occurred during the vessel's custody of the same, the following practical measures may be taken.

- For dry bulk cargo, seal hatches after completing loading, and have the intact seal witnessed and recorded before opening the hatches at the discharge port to establish that no cargo has been removed during the voyage.
- For cargo which has a tendency to produce free water during the voyage, carefully record the amount of bilge water discharged, to show that any loss in weight of the cargo can be explained by the discharge of free water.
- For tankers, when shifting cargo between tanks during the voyage, keep detailed records of cargo quantities.
- In order to establish that the carrier has delivered the full quantity of cargo which was loaded at the loading port, keep empty and dry-up certificates before loading and after discharging.

Regrettably, even if prevention measures are satisfactory on board, cargo shortage may occur at the discharging port in areas, beyond the control of the vessel. In such case, a competent surveyor is recommended to monitor discharging operations.

In addition to the crew measuring the quantity of cargo, an independent surveyor could be appointed to provide a record of the measurement and the process of discharge, which can be used to prove the quantity of cargo discharged, the process of measurement, and if appropriate, to support the argument that cargo loss has not occurred during the voyage. Appointing a surveyor is also recommended when loading and discharging in areas where shortage disputes are common.

A surveyor's work need not be limited to measuring of the quantity of cargo. In the following cases it is advantageous to have the surveyor monitor the loading and discharge of cargo as well.

- When stevedores use hand hooks to load and/or discharge bagged cargo, resulting in a loss of cargo through holes in the bags,
- Rough handling by stevedores resulting in spillage of cargo from grabs during discharge operations,
- When there is a possibility of pilferage of cargo during loading and/or discharge operations,
- When there is a possibility that trucks carrying cargo may bypass the weighing station and go directly to the warehouse, resulting in cargo shortage.

While many of the claims for cargo shortage are thought to be due to inappropriate loading and discharge operations and variations due to differing methods of measurement, it is very difficult for the carriers to record these fully, and since it is not easy to establish that the carriers are not fully liable for such problems, they may have no other choice but to agree an out-of-court settlement in some cases. As such, if the vessel can document the details of inappropriate discharge operations and methods of measurement for shore figures, this may be useful in defending a claim.

As explained in '4-4 Recovery Action Against the Charterers and Shippers below, in some charter parties, such as the SHELLTIME 4 form, when charterers give instructions for the signing of the B/L, the contract may provide for the charterers to indemnify the shipowners and hold them harmless in respect of any liability, loss, damage or expense by reason of the Master's signing of B/Ls at charterers' request. Therefore, it is recommended that a similar clause be inserted, if possible, when negotiating charterparties and/or fixture agreements.

■ Responding to a discrepancy between shore and vessel measurements of the quantity of cargo at the load port

If the discrepancy between the quantities of cargo measured by the vessel and that stated by the shippers at the loading port exceeds the range of measurement error, please contact us or our local correspondents directly. In some cases, the discrepancy may simply be due to a mistake in calculation or measurement. In this case, a re-survey by surveyors to check the cargo quantity should dispose of the dispute.

If a mate's receipt and B/L are issued for the quantity declared by the shippers, notwithstanding a discrepancy with the vessel's own loaded quantity, in so far as cargo interests are concerned, it will be assumed that the quantity of cargo stated by the shippers i.e. the B/L quantity, has been loaded onto the vessel, and defence against a shortage claim arising from such a discrepancy will be difficult.

The following practical actions may be taken when there is a discrepancy in the quantity of cargo at the loading ports

- Issue a Letter of Protest in relation to the discrepancy in the quantity of cargo to establish that there is a short loading and the loss of cargo has not occurred during the voyage.
- Note the vessel's figure on the Mate's Receipt and insert a remark that it differs from the quantity stated by the shippers.
- Instruct the charterers and shippers to insert the remarks on the Mate's Receipt relating to cargo quantity in the B/L.
- Inform the shippers about the cargo shortage and request loading of additional cargo until the quantity on the vessel reaches the quantity declared by the shippers.
- If it is not possible to insert the remarks on the Mate's Receipt and the B/L, and additional cargo cannot be loaded, issue a Letter of Protest which gives details of the short loading to the charterers, and instruct the charterers to discuss with the shippers.
- Notify the charterers and request participation of their surveyor to record the quantity of cargo loaded, to assist in any potential recovery action against the charterers.

Often, when there is a discrepancy in the quantity of cargo at the loading port, charterers may request shipowners not to clause the Mates receipt or the B/L stating the actual quantity loaded and return for a letter of indemnity (LOI). If the charterers are judged to be reliable and have sufficient financial backing, and are likely to honour their LOI, the LOI might be useful in minimizing the risks of shipowners. On the other hand, such an LOI has been held to be invalid in an English court judgment (Brown, Jenkinson & Co., Ltd. v. Percy Dalton (London), Ltd. [1957] Lloyd's Rep 1, p.13) on the basis that it was a conspiracy between the shipowners and charterers to defraud the consignees. Shipowners should therefore take note that an receipt of an LOI in these circumstances may not be risk free.

■ Responding to cargo shortage at the discharging port

Cargo shortage claims are likely when the following situations arise:

- The results of a draft survey show that the discrepancy between ship's figures and shore figures exceeds the normal range of tolerance.
- The Master receives a Letter of Protest about cargo short delivery from receivers.
- Spillage/pilferage of cargo during discharging operation.

In such situations, please instruct the Master to prepare a clear and detailed Statement of Facts, and contact us. Of course, the Master can contact our local correspondents directly through the local agents as well. We will also appoint a competent surveyor to investigate the cause of the cargo shortage in preparation for any potential cargo claim.

In some cases, cargo interests' surveyor may ask the Master to sign documents noting the quantity of cargo discharged. If the documentation is signed without objection, this will be interpreted as the Master accepting the contents of said documents. The Master should therefore try not to sign such documents. However, if he has no alternative, he should sign with a remark 'Without Prejudice, Receipt Only' to indicate that he does not accept the content of the documents.

Very often, cargo interests may arrest the vessel for their alleged claim. In such cases, we (P&I club) will discuss with the cargo interests, and may issue of a letter of guarantee to them in order to avoid an arrest or to secure the release of the vessel from arrest.

4-3 Negotiations After Receiving a Formal Claim

If a formal claim is raised, we will normally seek to conduct settlement negotiations with the cargo interests in order to settle the claim. Usually our claims handlers negotiate directly with the cargo interests, but where appropriate, our local correspondents and/or lawyers may be appointed.

Defence against shortage claims can broadly be classified as either factual or legal.

(1) Factual defences

Factual defences, as the name suggests, are based on facts. The following points will be investigated, and if the facts support arguments that the vessel is not liable for the cargo shortage, these facts will be asserted to the cargo interests.

- ✓ Did the cargo shortage occur during the vessel's period of responsibility?
- ✓ Was loading/discharging operation appropriate?
- ✓ Were there any errors in measurement or calculation by the cargo interests?
- ✓ How accurate and/or reliable are the measurements taken by the cargo interests?
- ✓ Was the shortage due to the nature of the cargo?
- ✓ Were measurement methods the same at the loading port and the discharging port? US court precedent indicates that evidence of having used the same methods of measurement at both the loading port and discharging port is required.

(2) Legal defences

Legal defences can be further broadly classified into validity of the claim and the claimant, specific terms stated on the B/L, international cargo regimes and time-limits.

A Defence based on the validity of the claim and the claimant.

Verify the following points to confirm whether or not the claim is valid.

- ✓ Do the cargo interests have a proper title to sue?
- ✓ Have the cargo interests made a claim against the contractual carrier?

When a formal claim is received from cargo interests, it is necessary to ascertain whether they have title to sue against the carriers. Cargo interests can establish title to sue by showing that they are the lawful holder of the B/L. If the claim is made by cargo insurers, documentation (for example a Subrogation Receipt) is required to show that they have paid the insurance money for a cargo shortage to the assured consignees, and that the insurers have been subrogated to from the rights of the consignees. When a claim is received from recovery agents or lawyers, it is necessary for them

to show that their clients have title to sue, and that they have received a formal authorization to act from their clients. We will therefore ask for relevant documentation to verify the cargo interests' title to sue in respect of the cargo.

Under English law, the party liable for cargo shortage claims under the B/L is the contractual carrier under the B/L. As such, it is necessary to determine the identity of the carrier. Under Japanese and English laws, the carrier is determined from the B/L. It should be noted that there may be circumstances where a non-contractual carrier under the B/L may also be liable for a shortage claim where they have a tortious liability to the cargo interests,

Generally, the shipowner (or bareboat charterer) will be the contractual carrier when the B/L is signed 'for the Master' or 'on behalf of the Master' in the signature field of the B/L. When the B/L is signed 'for the Master', it is considered that the B/L has been signed on behalf of the Master. Therefore, since the Master is a representative of the shipowner, the shipowner is considered to be the carrier under the B/L and will be liable for cargo claims in the first instance.

Where the B/L is signed "for and on behalf of the charterers", and/or where the charterers' name is stated "As Carrier" in the B/L carrier, the charterer will be the contractual carrier under the B/L. Entry of "(Name of Charterers) as Carrier" indicates that the charterers as carrier have issued the B/L. In this situation, even when a cargo claim is raised against the shipowners, they can seek to reject the claim on the basis that charterers are correct contractual carrier who are liable for the cargo claim, not the shipowner.

In some cases, it may be difficult to ascertain whether the shipowner or the charterer is the correct contractual carrier under the B/L, and it may be the case that both parties may be considered the contractual carrier.

B Defence based on specific terms in the B/L

Are there any useful clauses to defend cargo shortage claims on the back side of the B/L?

By way of example, the North American Grain Bill of Lading contains a clause stating that if multiple Bs/L are issued for the cargo in one hold, any cargo shortage must be allocated equally to each B/L. Accordingly, if cargo interests' claim for shortage is based on an unequal allocation of the shortage for all the B/Ls, we can raise the argument that there is an error in the claim amount. For example, if there is a total cargo shortage of 100 MT for two Bs/L, each for 1,000MT of cargo, the shortage should be allocated as 50 MT to each B/L, not 100MT to one B/L.

See North American Grain Bill of Lading, 'Clause 5 Each Bill of Lading covering the hold or holds enumerated herein to bear its proportion of shortage and/or damage, if any incurred.'

The 'Unknown' clause

Some B/Ls include the notation 'Quality, Quantity unknown' on the front. The intention of this notation is to advise cargo interests that the quantity and quality of cargo noted on the B/L have not been verified by the shipowners. Under English law, this may be effective to prevent reliance on the B/L quantity by cargo interests. However, such notations may have no effect whatsoever under other legal systems or jurisdictions. As such, it will not necessarily absolve the carrier from all liability for quantity and quality claims.

Terms of any incorporated Charter Party (C/P)

Some B/Ls incorporate the terms of a particular Charter Party. Where this is the case, the date of the C/P is normally noted on the front of the B/L. It will be a matter of construction, and the law of the local courts whether the terms of such a C/P will be incorporated into the contract of carriage, in particular law and jurisdiction clause for disputes under the B/L. If a claim is pursued in court or arbitration, the question of where, and under which jurisdiction, the claim is to be brought and determined becomes important.

C Defence based international cargo regimes

Exemptions under Hague Rules and Hague-Visby Rules

In most B/Ls, there will be a General Paramount clause incorporating one of the international cargo regimes, such as the Hague Rules or the Hague Visby Rules. Sometimes, these international cargo regimes will apply mandatorily depending on where the cargo was loading, where the BL was issued etc.

Under the Hague Rules, and the revised Hague Visby Rules, the carrier is generally exempted from liability for negligence or default of the Master in the navigation or management of the vessel; fire; perils of the sea, defective packing, or inherent defect of cargo. However, there are very few cases in which these defences are successfully applied to cargo shortage claims. Also, in order to rely on these defences, the carriers must establish that they have before and at the beginning of the voyage exercised due diligence to make the ship seaworthy, which includes the cargoworthiness of the vessel.

For countries which have not ratified the Hague Rules or Hague-Visby Rules, they are likely to have enacted legislation of similar content. If so, similar defences may be available under the local laws/rules.

Trade allowance

In a number of countries the carrier is exempted from liability for cargo shortage of less than 0.5% of the B/L quantity. Legal precedents for this commercial practice are also available. However, the amount of the trade allowance accepted differs depending on the governing laws, the countries, the states within a country and the cargoes. In some countries, trade allowance is never accepted. Caution is required.

While trade allowance is based on commercial practice, if a legal basis is required it can be found in the carrier exemptions for loss/damage arising from inherent defect, quality or vice of the cargo under the Hague Rules and Hague-Visby Rules. See Hague-Visby Rules Article 4 - 2(m) - 'Wastage in bulk or weight or any other loss or damage arising from inherent defect, quality or vice of the goods.' For example, a decrease in quantity due to evaporation of the moisture content of the cargo during the voyage may be due to the nature of the cargo., and therefore not the responsibility of the carrier.

D Defence using time-limits

In countries which have ratified the Hague Rules and Hague-Visby Rules, the time-limit for commencing a legal action is one year from the day the cargo was delivered to consignees. Or, if the cargo was lost, the time-limit is one year from the day the cargo should have been delivered. If, at the time a claim is raised, a period of more than one year has elapsed since the cargo was delivered, the claim can be rejected as being time-barred.

In most jurisdictions, the time-limit can be extended by agreement between the cargo interests and carrier. However, if agreement is not made, the claim was be time-barred unless cargo interests commence legal action.

If a legal action is commenced, , the carrier will need to respond in order to avoid an adverse judgment by default. Having said that, , in order to avoid unnecessary legal expenses, it is usually recommended that the request for extension of a time-limit is accepted to give parties time to discuss settlement.

By way of example, China has not ratified the Hague Rules or Hague-Visby Rules. In addition, Chinese law does not recognise an extension of time-limits. If, therefore, settlement agreement is not reached on a cargo claim in China within one year of the cargo being delivered, cargo interests are likely to take a legal action. In some cases, a legal action commences without the carrier being informed of the claim, and the first notification of the claim may be a summon received from the court.

4-4 Recovery action against the Charterers and the Shippers

(1) Recovery action against the charterers

When shipowners wish to recover claims from the charterers, they must first ensure that the claim against the charterers is not time-barred, and after resolving the claim with cargo interests, consider seeking recovery of the funds and reasonable expenses incurred to the charterers in accordance with the C/P.

For C/Ps which incorporate the Inter Club Agreement (ICA), unless there is a clear default by the shipowners or the charterers, reasonable settlement amounts and relevant expenses are apportioned between shipowners and the charterers. However, if no written notification of the cargo claim is received within 24 months of discharging the cargo, the recovery claim is deemed to be time-barred. Caution is required. Furthermore, if the words 'cargo claims' are inserted in Clause 26, NYPE form C/P as shown below, the apportionment of liability in accordance with the ICA does not apply.

Clause 26 “The Owners shall remain liable for the navigation of the Vessel, acts of pilots and tug boats, insurance, crew, **cargo claims** and all other matters, same as when trading for their own account.” Source: NYPE 1993. Note that the 1946 and 1981 versions include the same clause.

If the ICA is not incorporated in the C/P, the apportionment of the settlement amount of cargo claims will be determined in accordance with the clauses in C/P. Thus, it is important to consider the possibility of seeking compensation from the charterers in parallel with negotiations with cargo interests.

Depending on the terms of the C/P, it may be that the B/L is signed by the Master under instructions from the charterers or his agent, and the charterers may then be liable to indemnify the shipowners for the consequences of the Master's compliance with their instructions. For example,

(SHELLTIME 4)

Clause 13. (a) The Master (although appointed by Owners) shall be under the orders and direction of Charterers as regarded employment of the vessel, agency and other arrangements, and shall sign bills of lading as Charterers or their agents may direct ... without prejudice to this charter. Charterers hereby indemnify Owners against all consequences or liabilities that may arise

(i) from signing bill of lading in accordance with the directions of Charterers or their agents, to the extent that the terms of such bills of lading fail to conform to the requirements of this charter, or (except as provided in Clause 13(b)) from the Master otherwise complying with Charterers' or their agents' orders (SHELLTIME 4)

Apart from the 2 year notification of claim time limit if ICA applies, under English law, the time-limit for starting a recovery action against the charterers is six years from the date of settlement with the cargo interests.

If the carrier under the B/L is the charterers and the charterers have responded to the cargo claim in the first instance, a recovery action may be pursued by charterers against shipowners in accordance with the clauses in C/P.

(2) Recovery action against the shippers

Under the Hague Rules and Hague Visby Rules, the shippers are obliged to provide accurate information in respect of the quantity of cargo, and if there is strong evidence that the quantity of cargo notified by the shippers is in error it might be possible to seek compensation from the shippers in relation to the amount of the settlement of the cargo claim.

The shipper shall be deemed to have guaranteed to the carrier the accuracy at the time of shipment of the marks, number, quantity and weight, as furnished by him, and the shipper shall indemnify the carrier against all loss, damages and expenses arising or resulting from inaccuracies in such particulars. The right of the carrier to such indemnity shall in no way limit his liability under the contract of carriage to any person other than the shippers. (Hague-Visby Rules Article 3 - 5).

Note that, even if there is an error in the shipper's notification, it may be difficult to establish this. Even if there is an error in the notification, if the vessel does not immediately raise an objection, there is also the possibility that the recovery claim against the shippers will not be recognised. If, therefore, there is any doubt about the quantity of cargo from the shippers, it is recommended that a written objection be made without delay.


4-5 Documentation Required for Dealing with Claims

Our claims handler will ask our members to provide relevant cargo documentation in each individual case, however the following basic documentation is necessary for cargo shortage claims.

✓

Necessary documents for cargo shortage claim

- B/L (front and back)
- Stowage plan
- Charter party (C/P)
- Statement of Facts from the Master of the vessel on the quantity of cargo at the loading port and discharging port
- A Letter of Protest relating to the discrepancy of quantity of cargo



For dry bulk cargo

- Mate's Receipt
- Loading port and discharging port Draft Survey Reports
- Empty Hold Certificates
- Hatch Sealing/Unsealing Certificates

For tankers

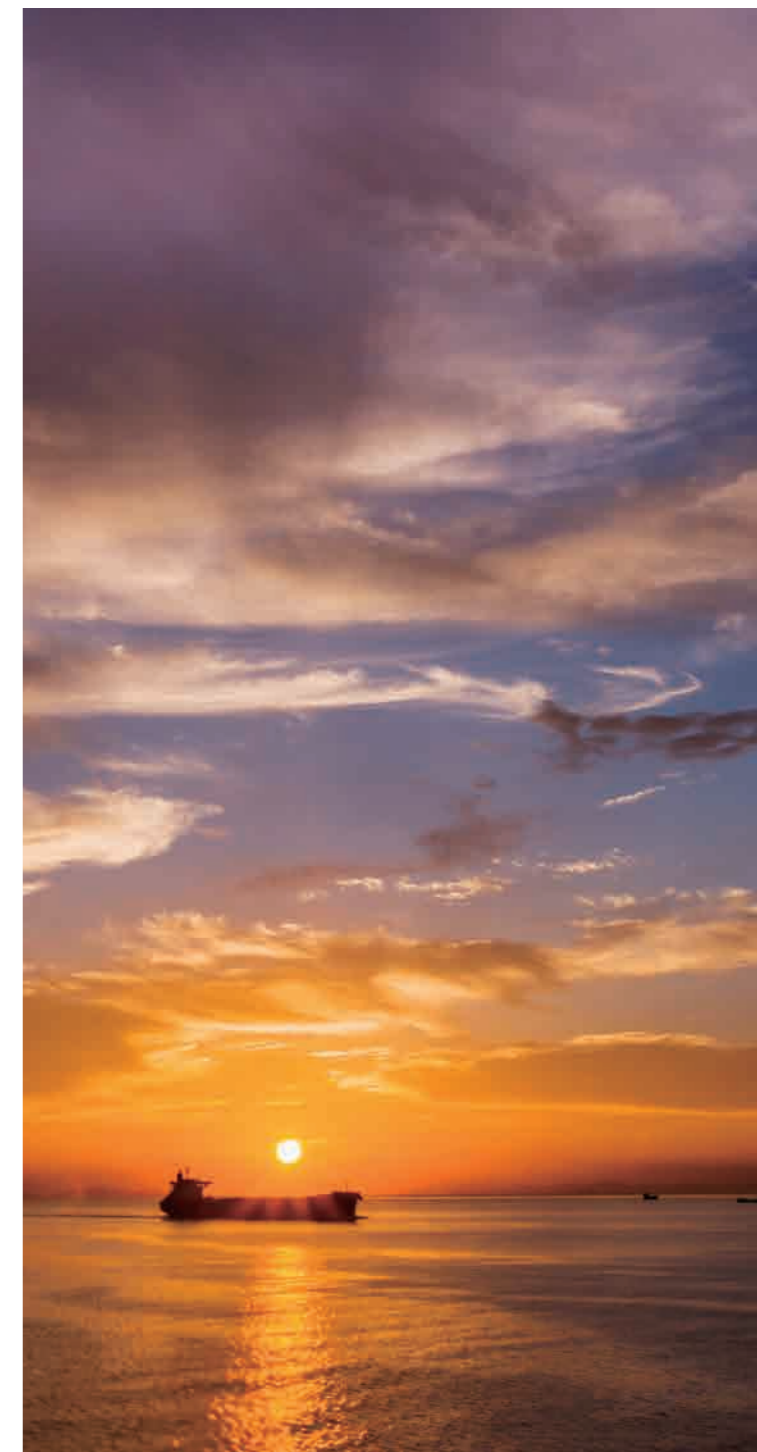
- Loading port and discharging port Ullage Reports
- Loading port and discharging port Draft Survey Reports Empty/Dry Certificates before loading and after unloading

Chapter 5 Conclusion

Cargo shortage problems often occur at the discharging port when the cargo quantity has been measured using shippers' figures at load ports. Measures to prevent such trouble can and should be taken at the loading port.

Not only should the planned and loaded quantities of cargo be compared before and after loading, but a voluntary draft survey should be carried out with each loading sequence in accordance with the loading procedure. In some cases, since the loaded and discharged quantities are determined by the shore quantity, draft surveys may not be carried out. However it is important to carry out to do so, especially if a cargo shortage claim is anticipated, a joint survey which includes the cargo interests and the charterers if at all possible is recommended.

Whether the discharged quantity is determined by draft survey or shore figure, if there is a discrepancy between the shore figure and the vessel's figure, it is important to prepare a Statement of Fact and issue a Letter of Protest, and send copies to all those concerned, before departure and without delay, irrespective of whether or not you have received a notice or claim at that time.



Attachment ① Letter of Protest

[Sample Form]

Messrs. _____ Date: _____
Dear Sirs, _____

LETTER OF PROTEST

M.V. _____ Voy. _____
Port _____

This is to advise you that the quantity of the cargo loaded on the vessel at this port is as follows:

Description of Cargo:
Destination of Cargo:
Stowage Tank:

Shore figures given by Shippers (A) : MT
Ship's figures by ullaging/draft survey (B) : MT
Discrepancy between both figures (A-B) : MT

Whereas the said discrepancy being beyond vessel's control, the Owners, the Master, the Vessel and the Crew are not responsible for any dispute and all consequences and/or liabilities of any kind whatsoever directly or indirectly arising from or relating to the said discrepancy.

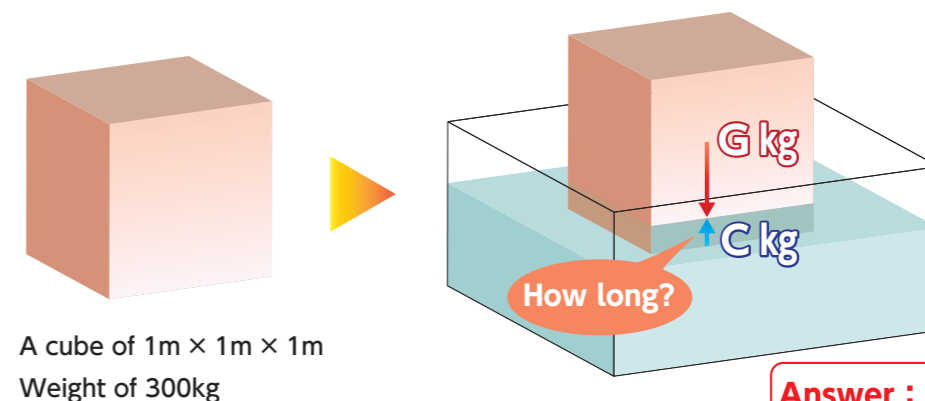
Kindly acknowledge receipt of this letter by signing at the space below.

Yours faithfully,

We hereby confirm receipt of this letter and accept the above. Master: _____

Stevedore Company: _____

Attachment ② Detail calculation by Archimedes



Density of water 1000kg/m³
Cubic volume of submerged portion
Depth of submerged portion
Area of base of submerged portion
Density of floating body 300kg/m³
Cubic volume of floating body
Height of floating body
Area of base of floating body
Acceleration due to gravity

ρ_w kg/m³
 V_w m³
 H_w m
 $s_w = 1\text{ m}^2$
 ρ kg/m³
 $V = 1\text{ m}^3$
 $H = 1\text{ m}$
 $s = 1\text{ m}^2$
 $g = 9.8\text{ m/s}^2$

Weight of floating body **Gkg**
Weight of submerged portion **Ckg**
Buoyant force = Weight of floating body

$$\begin{aligned} \rho \times V \times g &= \rho \times H \cdot s \\ \rho_w \times V_w &= \rho_w \times H_w \cdot s_w \\ G &= C \\ \rho \times V &= \rho_w \times V_w \\ \rho \times H \cdot s &= \rho_w \times H_w \cdot s_w \\ s &= s_w \\ \rho \times H &= \rho_w \times H_w \\ H_w &= (\rho / \rho_w) \times H \\ &= (300/1000) \times 1\text{ (m)} \\ \therefore & 30\text{ cm} \end{aligned}$$

It is necessary to increase the density of floating body to totally submerge it in water
It should be $\rho = 1000$ to be $H_w = H = 1$
additional density : ρ_x

$$\begin{aligned} \rho + \rho_x &= \rho_w \\ 300 + \rho_x &= 1000 \\ \rho_x &= 1000 - 300 = 700 \\ \rho \times V &= 700\text{ kg/m}^3 \times 1\text{ m}^3 \\ \therefore & 700\text{ kg} \end{aligned}$$

Attachment ③ Format of displacement calculation

DISPLACEMENT CALCULATION			
LN	VESSEL : XXXXXXXXX	PORT:	DAMPIER, AUSTRALIA
3	PARAMETERS	VALUE	OBTAINED FROM
4		Observations at Draft Survey	
5	Forward draft Port:	8.06	By Actual Observation
6	Forward draft Starboard:	8.04	By Actual Observation
7	Midship draft Port:	9.08	By Actual Observation
8	Midship draft Stbd:	8.68	By Actual Observation
9	Aft draft Port:	9.96	By Actual Observation
10	Aft draft Stbd:	9.92	By Actual Observation
11	Density	1.013	By Actual Observation
12		Draft at Marks	
13	Forward	8.050	Mean of Forward Port and Forward Stbd(L5+L6)/2
14	Midships	8.880	Mean of Midship Port and Midship Stbd (L7+L8)/2
15	Aft	9.940	Mean of Aft Port and Aft Stbd (L9+L10)/2
16	Trim between draft Marks	1.890	Difference between Aft and Ford drafts (L15-L13)
17	Distance between draft Marks	266.200	From Ship's Particulars
18	Distances between draft Marks and Perpendiculars to calculate draft correction		
19	Convention: Correction Negative if Perpendicular forward of Mark		
20	Forward	-5.000	From Ship's Particulars
21	Midships	0.000	From Ship's Particulars
22	Aft	7.800	From Ship's Particulars
23	Corrections to Draft Marks:		
24	Forward	-0.035	Values at (L16/L17)*L20 (TrimxDist.between draft mark and perpendicular)/
25	Midships	0.000	Values at (L16/L17)*L21 Dist between marks
26	Aft	0.055	Values at (L16/L17)*L22
27	Drafts at Perpendiculars(Corrected)		
28	Forward	8.015	
29	Midships	8.880	Correction applied as per convention
30	Aft	9.995	
31	Trim between Perpendiculars	1.98	L30-L28 Difference between Aft and Ford draft
32	Mean of Means Correction:	8.911	((L29*6)+(L28+L30))/8
33	Displacement	91058.290	From Hydrostatic Table
34	Length between Perpendiculars	279.000	Ships Particulars
35	Convention: Negative if LCF or Longitudinal Centre of flotation forward of the midpoint		
36			
37	LCF	9.280	From Hydrostatic Table
38	TPC or Tonnes per Centimetre	109.820	From Hydrostatic Table
39	First trim correction	723.574	Add if LCF is in same direction as deepest draft
40	Mean of means + 0.50	9.411	Value at L32+0.5(Corrected mean of mean + 0.50)
41	Mean of means - 0.50	8.411	Value at L32-0.5(Corrected mean of mean - 0.50)
42	To find diff of MCTC between mean of mean+0.50 and mean of mean -0.50		
43	at mean of means + 0.50	1942.000	Hydrostatic Table
44	at mean of means - 0.50	1888.160	Hydrostatic Table
45	Difference of MCTC	53.840	
46	Second Trim correction	37.861	Always add correction
47	Diff. between Midship drafts	0.400	Values at LN7-LN8
48	To find difference between TPC or Tonnes per Centimetre for heel corrn.		
49	At midship draft Port	110.020	Hydrostatic Table
50	At midship draft Stbd.	108.920	Hydrostatic Table
51	Diff. Between TPC	1.100	Values at LN 49-LN50
52	Heel correction	2.640	Always add correction
53	Displacement	91822.365	Corrected for trim,heel
54	Density observed	1.013	
55	Density correction = Displacement corrected for trim,heel X density of dockwater/1.025		
56	Final corrected Displacement	90747.371	Corrected for Density
57	Light ship	21277.000	
58	Ballast	64729.000	
59	Fresh water	165.000	
60	Drinking water	100.000	
61	D.Oil	58.000	
62	F.Oil	3986.000	
63	CONSTANT	432.371	
64	Cargo on Board:	0.000	
			Values to be entered Manually
			Values calculated Automatically

Attachment ④ Loading Sequence

LOADING SEQUENCE

VOY No.: 2 (Revised 2)

PORT: DAMPIER
DATE: 10/23
DENSITY: 1.023
LOADER: 1
Ball Rate: Ave. 8500 MT/HR x 1 loader
3500 MT/HR x 2 PUMPS EACH

Max Draft (M) = 18.02
Max. Air draft = 27.85
Depth of berth = 19.20

ARRIVAL DEPARTURE

Port	Headland	ARRIVAL	DEPARTURE
FW	257	167	
DW	58	53	
DO	63	62	
FO	1297	1265	

DISCH PORT

Port	Headland	DISCH
S/G	1.023	China
FWD	17.40	
MD	17.56	
TRM	0.16	OCEAN
S/F	48%	48%
B/M	46%	46%

LOAD PORT

Port	Headland	LOAD
S/G	1.023	
FWD	17.40	
MD	17.56	
TRM	0.16	OCEAN
S/F	48%	48%
B/M	46%	46%

DE-BALLASTING OPERATION

D	R	A	TANK No. & QUANTITY					ROB	FPT	AIR DRAFT	DEEL	OCEAN	ACTUAL DRAFTS
			FWD	MD	TRM	BEFORE	AFTER						
9.72	10.05	9.84	0.33	42	28%	34%							
10.18	10.73	10.56	0.55	18.7	18.0	-104	-31%	-51%					
10.43	11.56	11.23	1.13	18.0	17.3	-233	-62%	-94%					
11.70	10.65	11.25	-1.05	17.8	16.9	-65	-56%	-53%					
12.44	12.10	12.47	-0.34	16.4	16.1	-201	-51%	-80%					
11.40	14.17	12.91	2.77	16.2	15.0	-130	-67%	-56%					
11.93	14.04	13.15	2.11	16.4	16.0	-162	-67%	-56%					
12.34	14.39	13.72	2.05	15.8	15.3	-352	-75%	-98%					
11.03	16.68	14.01	5.65	14.3	12.8	-143	29%	-61%					
12.63	15.68	14.25	3.05	16.1	15.1	-89	47%	-78%					
11.80	17.61	14.73	5.81	13.4	12.0	-19	52%	-67%					
12.01	18.23	15.25	6.22	13.4	12.9	-135	45%	-74%					
12.47	18.51	15.74	6.04	13.5	13.0	-249	53%	-86%					
16.88	16.81	16.83	-0.07	15.1	11.7	19	44%	-52%					
16.88	17.25	17.09	0.37	11.7	11.4	-16	44%	-52%					
17.18	17.27	17.28	0.09	11.5	11.3	-51	46%	-59%					
17.42	17.28	17.43	-0.14	11.3	11.1	-79	47%	-58%					
17.48	17.56	17.58	0.16	11.1	10.9	-102	47%	-58%					

Running Draft Survey

All WBT - Stripping

CH 1 CH 2 CH 3 CH 4 CH 5 CH 6 CH 7 CH 8 CH 9

MAC FINE LUMP

27,000 26,500 25,000 22,700 25,000 25,000 22,700 25,000 25,000

17,000 17,000 17,000 17,000 17,000 17,000 17,000 17,000 17,000

27,000 23,200 26,500 22,700 25,000 25,000 22,700 25,000 25,000

36.9% 31.0% 36.2% 31.0% 33.4% 30.3% 36.4% 37.1% 80.1%

WBT 1 WBT 2 WBT 3 WBT 4 WBT 5



JAPAN P&I CLUB

P&I Loss Prevention Bulletin

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Loss Prevention and Ship Inspection Dept.
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