

# CAREFULLY TO CARRY



## Safe transportation of soya beans

Brazil is expected to produce a record soya bean crop yield this year. This is reflected in the number of vessels currently queuing at Brazilian ports.

As the harvest season is now underway in Brazil, Reuters reported that: *“The line-up of vessels expected to load soybeans at Brazilian ports over the next month shows a spike in shipments to around twice the level of a year ago due to a speedy harvest and strong global demand.”* There are reports of severe delays to trucks transporting soya beans to barges on the Amazon as a result of poor road conditions. This will have an impact on any vessels awaiting soya bean deliveries at the Northern Arc ports in Brazil and increase the storage time prior to shipment.

Soya beans are classified as oilseeds and contain a high oil content. The inherent quality and storability of a soya bean cargo is dependent on moisture content and temperature. As a result, soya beans can undergo self-heating during long periods of storage. Recent reports of heavy rainfall during the February harvest in Brazil increase the likelihood of quality related claims if the soya beans are not sufficiently dried.

Whilst the moisture content and temperature of soya bean cargoes are beyond a Master's control, there are some guidelines which a Master and his crew can follow to receive and carry a soya bean cargo in the most prudent manner and protect their interests in the unfortunate event that a cargo claim is presented against the vessel at disport. This bulletin provides some advice for shipowners and Masters who intend to load soya beans at one of the South American ports in the coming weeks.

### Hold preparation before loading

The ship's holds should be cleaned prior to loading a cargo of soya beans. There are several grades of cleaning, with the most stringent being “hospital clean”. The cleanliness required for soya beans is generally regarded as one grade below hospital clean, namely “grain clean”. In some cases, instructions on hold cleaning may be provided by the charterer prior to loading.

“Grain clean” is by far the most common standard of cleanliness used in the transport of bulk and break bulk cargoes. The US National Cargo Bureau suggests that in order for a hold to be certified “grain clean”, and thus fit for loading a cargo such as soya beans, the hold should be free of the following:

- Stains and residues of the previous cargo
- Loose rust scale and paint scale
- Any other contaminants
- Insect infestation
- Odours
- Moisture

A typical hold cleaning will involve sweeping the tanktop before washing the holds. The washing may be conducted twice, with the first round of washing using seawater and the second using freshwater. The extent of cleaning required is dependent on the previous cargo carried.

Before loading it would be prudent for the Master to carry out a hose test to ensure that the hatch covers and ventilation windows are weather tight.

## Considerations during the loading of soya beans

Soya bean cargoes can be loaded in a number of ways: directly from barges, from flat warehouses or silos or from trucks. In many cases, the cargo is transferred to the vessel by conveyor belt and loaded by pipe. If loading is conducted from barges, it is worthwhile that the crew note the number and/or names of the barges and the holds into which each barge loads. The sequence of hold loading in all circumstances should be recorded. Clear photographs of how the cargo is delivered to the vessel as well as how it is loaded will be invaluable in the event of a claim.

Usually, a Master and crew will recognise the type of commodity being loaded, for example soya beans or maize. However, they are not cargo specialists and it is difficult for the Master and crew to recognise whether soya bean cargoes are not loaded “*in apparent good order and condition*” as described on the Bills of Lading. This is predominantly due to the high speed at which the cargo is

loaded and that the quality of soya beans can only be accurately assessed by the laboratory analysis of representative samples obtained throughout loading.

It is unlikely that the Master will receive a quality specification for the soya beans to be loaded or a Quality Certificate representing the average quality of the cargo loaded on board. A Quality Certificate is usually issued to the cargo buyer after the vessel has sailed, when the samples, obtained by cargo superintendents/sampling attendants throughout loading on behalf of Shippers, have been composited and analysed. While a Quality Certificate can be requested from Shippers, the Master may not receive analytical information regarding the quality of the cargo being loaded and so will have to rely on a visual assessment of the cargo condition during loading, which as explained above can be challenging for non-specialists.

*Moisture content and temperature* are two of the main factors which influence whether the cargo or part of the cargo of soya beans may undergo self-heating. According to standards issued by the American Society of Agricultural and Biological Engineers (ASABE), it can be inferred that soya beans loaded with a moisture content above 12.4%, at temperatures above 25°C may become unstable during a long voyage. While some commercial contracts allow a soya bean moisture content of up to 14%, this would be too high for the safe carriage of soya beans being shipped over long distances, or on extended voyages. It should be noted that a Quality Certificate generally provides the average moisture content for a bulk cargo of soya beans. Some parcels of beans may therefore be loaded above or below the average moisture content stated on a Quality Certificate.

The Master and crew will have difficulty assessing the moisture content of bulk soya beans being loaded. While hand-held moisture meters are sometimes available, they do not always give results as accurate as those obtained from analysis undertaken in a laboratory. However, an obvious sign that a consignment or part of a consignment of soya beans has a high moisture content is when those soya beans are *visually mouldy*. This could indicate that the soya beans were not effectively dried after harvest or that the beans have been subject to poor handling and storage prior to shipment.

If the cargo on board a particular barge or a truck is



Sound soya beans



Mouldy soya beans

presented for loading with obvious clumps of white or green mouldy soya beans, or the beans are visibly wetted, then the Master should protest and refuse to load this cargo. Mouldy or wetted cargo loaded on board will only further deteriorate during the voyage and potentially initiate self-heating within surrounding soya beans.

The crew or cargo superintendent, if appointed, should enter the holds when safe to do so, i.e. during a loading break, and *visually inspect the surface of the cargo for any odours or noticeable moist, heating or mouldy cargo and obtain numerous spot samples from each hold which should be labelled clearly.* The findings should be noted and photographs obtained.

As with all agricultural cargoes, loading should be discontinued during rain and all holds kept closed until the weather conditions are appropriate. Lack of suitable covering to barges or trucks, especially during poor weather conditions, should be recorded. Any conveyor belts or loading equipment wetted by rain, which is subsequently used for loading, should be photographed and a Protest issued. Any cargo wetted ashore on the conveyor belt, shore equipment or in open barges or trucks, should be rejected from loading.

Monitoring the cargo temperature on board when it is safe to do, can also provide valuable information regarding whether the beans are undergoing self-heating. Soya beans undergo discolouration at high temperatures. The colour of the beans will change from cream to brown as a result of heating over a period of time. At very high temperatures, soya beans appear totally blackened. The Master should refuse to load visually darkened portions of soya beans. Taking temperatures at regular intervals should indicate whether the cargo temperature is stable across the consignment or whether there are hotspots within some cargo parcels, which should not be loaded. It is useful to monitor cargo temperatures at regular intervals during loading. The use of sub-surface calibrated temperature probes will provide more reliable readings than the use of an infrared thermometer.

If mouldy cargo or cargo at a high temperature is loaded on board and later discovered during loading operations, there may be a situation where the cargo needs to be removed from the vessel in order that the Master can sign clean Bills of Lading. This situation can lead to long negotiations with stevedores and Shippers. If the cargo is not successfully removed the Master should issue a Protest and the Member's P&I Club contacted for further advice.

Any delays caused by a lack of cargo readiness for loading should be noted. Furthermore, the Master should record any excessive spillage of cargo. Photographs of any significant events regarding the cargo should be obtained.

## Sampling

Members can appoint a cargo superintendent to sample the cargo throughout loading, according to a representative sampling method, in order to obtain representative samples which can be assessed for cargo quality in the event a cargo claim arises. However, this is often a costly exercise. Owners may wish to invite all parties to sample the cargo representatively in order to share costs.

If representative sampling during loading is not feasible, collecting some samples through loading may provide an indication of the cargo condition which was loaded, without being representative. How these samples were collected and from which location needs to be clearly documented.

## Heated fuel oil tanks

Prolonged exposure to high temperatures from heated bunker tanks can also lead to direct heat-related discolouration of soya beans located next to the tank. This will have a direct impact on the oil and protein quality of the beans. The temperature gradient established over time between the tanks and cargo will drive moisture up through the cargo, resulting in further heating of cargo at some distance from the heated tanks.



**Cargo damage associated with heated HFO tanks**



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Ideally, soya beans should not be loaded in holds adjacent to fuel oil tanks which are likely to be heated. Top side wing fuel oil tanks present a lower risk than those located in the double bottom as there is likely to be less cargo in direct contact with the steelwork of a top side wing fuel oil tank.

If it is unavoidable that the cargo has to be loaded into holds adjacent to heated fuel oil tanks, the Master should inform the Chief Engineer that a temperature-sensitive cargo is to be loaded to allow for a suitable heating plan to be prepared.

The required levels of heat application to the fuel oil to facilitate efficient transfer from the storage tanks to the settling tank will be dependent upon the inherent properties of the fuel oil. As a matter of prudence, it is recommended that the fuel oil be heated to the minimum temperature that will allow for efficient transfer. Heat application to the fuel oil tanks in direct contact with the cargo should be performed in such a manner to result in the smallest temperature differential between the cargo and fuel oil tank.

The fuel oil temperatures should be recorded in the Engine Room Logbook. Evidence that heating was applied in the most prudent manner will be the best defence against any claims that might arise in this regard.

## Ventilation throughout the voyage and during delays

The cargo should be ventilated in accordance with sound maritime practice and any carriage instructions provided to the vessel. Ventilation should be conducted in accordance with the fumigation instructions where applicable and when the weather/sea conditions permit. It is important to avoid wetting of the cargo. The decision to ventilate should be based on either the *Three Degree Rule* or *Dew Point Rule*.



### Surface damage to cargo as a result of ship's sweat

During a voyage it is usually only practical to open the ventilation windows for natural surface ventilation, however in some circumstances it may be possible to partially open or crack the cargo hold hatch covers if they are not sealed to allow a more efficient exchange of air. This must only be done under suitable sea and weather conditions. This method is often useful for vessels delayed at anchorage.

The decision to ventilate should be reviewed at least *every four to six hours*, since frequent changes in weather conditions may affect when ventilation should be undertaken. If possible, ventilation should also be carried out during the night provided the dew point or temperature measurements indicate the conditions are appropriate. During periods of heavy weather or adverse sea conditions, steps should be taken to prevent rain and spray from entering the cargo spaces and may mean that ventilation is stopped until conditions improve.

It is important to maintain a Ventilation Log that notes which ventilation rule is being followed as the basis for the decision to ventilate the cargo. The log should record which holds were ventilated and the duration. If the Three Degree Rule is being followed, the average cargo temperature at loading and the ambient dry bulb temperatures need to be recorded. If the Dew Point Rule is being followed, the wet and dry ambient air temperatures and wet and dry hold air temperatures, as well as the dew point temperature calculations, need to be recorded. In addition, any periods when ventilation is stopped or prevented and the reason why (i.e. during the fumigation exposure period or due to adverse weather) should be noted. If bad weather/shipping seas prevent ventilation, photographs should be taken as evidence and a Sea Protest issued which includes these photographs. These records will provide a valuable defence for owners in evidencing that ventilation was correctly undertaken in the event a claim arises with regards to the care of the cargo.

The Master should ventilate the holds prior to arrival at the discharge port in accordance with any instructions provided by the load port fumigator.

The vessel may be subject to delays at anchorage. Whilst delayed, the crew should continue to ventilate the cargo according to one of the two ventilation rules when conditions deem it necessary and safe. If the vessel is only capable of undertaking natural ventilation, it may be wise, assuming the hatch covers are not sealed, to tent the hatch covers or crack them open when ventilation is appropriate.

If suitable, opening the hatches will also provide an opportunity for the crew to inspect the surface of the stow and obtain sub-surface cargo temperatures to determine if there is any evidence of self-heating. Localised hot spots or mouldy cargo should be photographed and recorded. If it is practical, cargo in these hot spots/ mouldy areas should be removed from the hold and kept in bags or drums on board the vessel.

## Discharge

The Master should instruct the crew to monitor the discharge operations carefully. This entails noting and photographing how discharge is undertaken. The quantity of spilled cargo should be noted and, if excessive, a Protest issued. Any delays that were not the fault of the vessel should also be recorded.

In the event that damaged cargo is discovered, the Master and Members should inform their P&I Club as soon as possible in order to appoint a local surveyor to discern the location, depth and (if possible) extent of the damage. It is often the case that the location of any damage can be used to hypothesise the cause. Detailed photographs and even drawings of the damage location would be useful. In the event that a local surveyor cannot attend immediately, it would assist if the Master/ crew photograph and document the damage clearly.

**Prepared by the Food & Agricultural Commodities Department, CWA International Ltd**



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