

## Heat Damage to Agricultural Products

### Introduction

The Club continues to encounter costly claims for damage to agricultural products due to the excessive heating of fuel oil in tanks bordering cargo holds. Although the majority of heat damage claims involve agricultural products in bulk, bagged agricultural products may be similarly affected.

Typically the fuel tanks involved are double bottom tanks. When the fuel oil is heated, the temperature of the tank plating rises and affects the adjacent cargo, possibly causing deterioration. The nature and extent of any damage will depend on the temperature of the fuel oil, the length of time that the product has been exposed to hot tanks and the properties of the commodity concerned. Damage may include discolouration or blackening of cargo, moisture migration, caking, the formation of mould and malodour. In the case of seed cake or other agricultural products which are liable to self-heat, any hot surface, even an uninsulated engine room bulkhead, may promote self-heating. If a seed cake cargo also contains an excessive proportion of unoxidised oil or moisture, self-heating may ultimately result in spontaneous ignition.

It is normally self-evident when hot fuel oil in double bottom tanks has caused cargo damage. The cargo surrounding the fuel tank is usually discoloured or scorched, and the extent of the damage may be several metres high. The holds affected are usually towards the stern where double bottom fuel tanks are typically situated. Cargo may also be spoiled if there are heated tanks behind the engine room bulkhead; in a recent case a tank containing hot sludge damaged a cargo of soya bean meal.

If a layer of heat damaged cargo is discovered during discharge it will generally become mingled with sound cargo. Receivers will often reject the whole amount which can result in a considerable quantity of cargo being declined. Earlier this year a mixture of 500 tonnes of heat damaged and sound soya beans was rejected. In another case, cargo interests rejected over 1,200 tonnes of maize damaged by fuel inside double bottom tanks which had been heated excessively. The associated claims are usually large and may amount to several hundred thousand US dollars. Moreover, some ports may prohibit the discharge of damaged or rejected cargo, requiring the vessel to proceed elsewhere to dispose of the distressed product thereby incurring additional costs and delays.



Photo courtesy of: Interasia Marine and Salvage Services Ltd.

Agricultural products, such as soya beans, can be susceptible to heat damage



Photo courtesy of: The Hodeida Shipping and Transport Co.

Mixing of damaged and sound cargo can lead to significant quantities of cargo being rejected

### Recommendations

Vessels that carry agricultural products that may be susceptible to heat damage should be provided with appropriate procedures designed to minimise the possibility of cargo claims when fuel and fuel residue tanks are heated. As part of this process the location of all tanks bordering the cargo holds to which heat may be applied should be identified.



Photo courtesy of: Interasia Marine and Salvage Services Ltd.



Clearly defined heat damage to soya beans in way of a centreline double bottom fuel oil tank

When drafting such procedures the following points should be considered:

- The engineers should be advised of the precise nature of the product and the proposed stowage plan well in advance of loading so that a suitable fuel oil management strategy can be adopted to minimise the risk of heat damage to the cargo.
- The IMSBC Code schedule for the cargo should be consulted for any particular requirements regarding stowage in way of heated fuel tanks and engine room bulkheads which are not insulated.
- Where possible, heated fuel tanks which do not border the cargo holds should be used.
- If it is necessary to heat a fuel tank which is in direct contact with the cargo, the oil should be heated to the minimum extent necessary to allow safe transfer. Excessive heating of fuel oil and fuel residues should be avoided. Similarly, hot oil should not be transferred into fuel tanks bordering the cargo holds.
- As far as practicable only the fuel tanks in use should be heated. In a recent case a double bottom tank containing fuel oil that was not being used was inadvertently heated to a high temperature for the entire voyage. Over 600 tonnes of heat damaged soya beans mixed with sound cargo was subsequently rejected by cargo interests.



Photo courtesy of: The Hodeida Shipping and Transport Co.

Costly cargo claims can be incurred due to inappropriate heating of fuel oil in bunker tanks



Photo courtesy of: Interasia Marine and Salvage Services Ltd.

Self-heating of soya beans in contact with a heated fuel oil tank

- Should the cargo deteriorate on passage due to inherent vice, cargo interests may allege that the damage was caused by excessively hot fuel tanks. Consequently, detailed records of which fuel oil and fuel residue tanks were heated and the temperature of the oil they contain should be maintained throughout the voyage.
- Fuel oil heating arrangements, including temperature sensors in the tanks, should be included in the vessel's planned maintenance system and undergo regular checks and tests.

Members requiring further guidance are advised to contact the [Loss Prevention department](#).