Loss Prevention for Reefer Cargo

序章

The development of larger refrigerator units and progress of freezing technology made it possible for reefer carriers to cover diversified commodities for longer period aboard the ocean-going vessels.

With more sensitive reefer cargoes entering the market, however, crew members are required to exercise more effective quality control on the maintenance and operation of reefer systems as a whole. Listed below are the key issues we should never forget before, during and after handling temperature-controlled cargo for ocean transportation. Please read them carefully and make them your flesh and blood for better performance in your daily activities.

1 Where accidents tend to occur

Despite the reefer unit performing normally, it often happens to cause, or lead to cause, an damage to the cargo at such parts, or in such operations, as:

- a) Hatch Covers
- b) Hold Equipment
- c) Loading or Unloading Operation
- d) Deck, Shell Plate, Bulkhead or Tank Top

We will review these factors in more details to clarify their causes and resultant damage conditions.
a) Hatch Covers

Defective hatch covers for weather hatch and/or small hatch would mean more specifically:

1) Rubber gasket partially broken or missing, otherwise lost its elasticity.

2) Rubber gasket fixed unevenly.

3) Compression bars bent, partially broken or missing, otherwise touching rubber gasket unevenly due to rusting.

4) Hatch covers closed with foreign materials like wood, paper or rope hanging over hatch coaming.

5) Quick acting cleats bent, broken or missing.

6) Quick acting cleats losing function due to rust, and/or neoprene hand washer hardened without elasticity.

These defective parts would cause a gap around them to decrease air tightness of the hatch, inducing sea water or outside air to ingress into the hatch and make frost and/or ice over the cargo.

Hatch Covers for hold access hatches installed outside the store should be inspected the same way as those for weather hatch and small hatch to prevent frosting and/or icing damages.
b) **Hold Equipment**

Broken and/or missing hold equipment would cause damages to the reefer cargo as follows:

1) Grating and/or Side Sparring broken or missing.

2) Air Trunk (below Grating, inside Sparring) clogged with garbage and trash.

3) Drain pipes and/or oil pressure pipes broken, corroded, cracked, or their joints loosened, causing liquid therein to leak.
In case of 1) and 2) above, cooled air flow is blocked and the cargo is exposed to temperatures higher than those specified, to defrost and deteriorate the cargo quality.

In case of 3), the leaked liquid, be it seawater, fresh water or oil, smears the cargo directly or indirectly to cause the cargo icing or oil-staining thus deteriorating the cargo quality also.

c) Loading or Unloading Operation

The following operational irregularities are considered to cause damages to reefer cargo.

1) Receiving or loading such “hot cargo” without inspecting its temperature as was frozen insufficiently or exposed to the air temperatures higher than designated for the cargo.

2) Rough handling or loose stowage of cargo.

3) Stowage in hatch coaming space.
4) During operation and/or recess time with weather hatch left open, outside air flows into cargo holds.

5) Cargo operations in rain.

Unusually hot cargo is already damaged in its quality, and would never recover the original quality by refreezing on the vessel.

Shock to the cargo by rough handling or collapse of cargo due to poor stowage affect packing and contents, damaging its quality such as breakage, stain, desiccation and yield.

Cargo operations in rain, cargo stowed in hatch coaming space or left in hatch with open covers lead to icing, frosting, rising temperature or defrosting.
d) 甲板、外板、隔壁並びにTank Topに係るもの
事故の原因としては次のような状態が考えられます。

1) 甲板上にできた窪み、雨水・海水が溜まり易い場所、甲板とHatch Coamingの溶接部分等に腐食による穴又は亀裂が発生している。

2) 荒天による異常なストレス或は腐食により、外板、隔壁、Tank Top等に穴又は亀裂が発生する。
（一般的にはInsulationがある為、発見が遅る）

d) Deck, Shell Plate, Bulkhead or Tank Top
Following are considered as the cause of damages.

1) Hollows on deck, such points as to retain sea-water or rain-water, or welding of deck to hatch coaming rusted, holed or cracked.

2) Extraordinary stress to or rust on deck, shell plate, bulkhead or tank top causes holes or cracks (which are often missed or found too late, since insulation materials absorb the liquid leaking therefrom).

Bulkhead クラックから漏れた油の痕跡
Trace of oil leaked through bulkhead crack.

断熱材に染み込んだ油（油臭により発見）
Oil absorbed in insulation material, found by its smell.

荒天等により甲板上に打ち上げられた海水が、甲板などにできた穴、亀裂から船艙の天井・側板内部に浸入し、内張りの隙間などから船艙内に漏出して、付近の貨物に「水付き」を引き起こします。

又、隣接する燃料タンク内の油が漏洩し、周辺に積まれている貨物の「臭い付き」又は「油付き」を引き起こします。

Sea-water shipped over the deck by rough weather ingress through holes or cracks of the deck into the hatch ceiling/bulkhead, and leak around the cargo to sustain icing damages.

Oil in adjacent tanks may also leak to the hatch and the cargo stowed therein sustains smelling and/or oil stained damages.
冷凍貨物の損害を防ぐには
以上のことから、冷凍機が最良の状態でも起り得る貨物事故を防ぐためには、
I 船艙の密閉
II 冷気の循環
III 貨物の保護
の3点が重要であり、貨物の積載前及び積揚荷役に際しては次の諸点に注意を払い、不具合があれば速やかに対処（点検・交換・補修・除去・清掃・改善等）することが有効と考えられます。

a) Hatch Coverに係るもの
1) Rubber Gasket の使用期間は耐用年数の4～6年（Panel間のものは2～3年）以内であるか。又、指で押した時に弾力性があるか。破損又は欠落はないか。
2) Compression Barに曲り、破損、欠け、又は頂部の錯はないか。
3) Hatch Coaming 上面を清掃したか。木、紙片、又は線等の異物はないか。
4) Quick Acting Cleatに曲り、破損、又は欠落はないか。可動部(Head, Nut)は容易に動くか。
5) Quick Acting Cleat の Neoprene Hand Washerを手で掴んだ時に弾力性があるか。又、耐用年数（2～3年）以内であるか。

To prevent damages to reefer cargo
We must realize that the damage to reefer cargo occurs even if the refrigerator unit is in its best condition, so,
I Close reefer space tightly
II Circulate cool air
III Protect cargo
by all means. Before and during cargo operations, we must pay attention to the following points and, if any abnormality is found, take corrective actions promptly (check, exchange, repair, dispose, clean, etc.)

a) Hatch Covers
1) Check if durability of rubber gasket (4 ~ 6 years or those between panels 2 ~ 3 years) is satisfied. Confirm elasticity with some rebound, when pushed by fingers. No breakage or missing parts.
2) Check if compression bar is not bent, broken or missing, otherwise if its top is not rusted.
3) Check if hatch coaming top is cleaned, or if foreign materials like wood, paper, ropes do not get entangled.
4) Check if quick acting cleat is not bent, broken or missing, or its head or nut is smooth.
5) Check if neoprene hand washer of the quick acting cleat is elastic enough when held by hand, or within the set durability of 2 ~ 3 years.

b) Hold Equipment
1) Check if Grating and Side Sparring are not broken or missing.
2) Check if Air Trunk is not contaminated with wood, paper, vinyl sheet or other foreign materials.
3) Check if pipes are not leaking or marking leaks of water or oil.
c) Loading or Unloading Operation

1) Check if the cargo temperature has not exceeded an instructed temperature.
   Before starting operations, check cargo temperature as instructed by shipper, or by the transfer certificate.
   Check actual temperature of the cargo by portable thermometer while cargo is loaded or unloaded.
2) Check if cargo is handled carefully, and also stowed and secured in balance.
3) Avoid, as much as possible, stowing cargo in hatch coaming space.
4) Check if blank sheet is provided windward, or if weather hatch is closed when operation is suspended.
5) Check if operation is suspended when it starts raining.

d) Deck, Shell Plate, Bulkhead or Tank Top

1) Check any hollow or likely point on deck to ensure there is no hole, rust or crack at the foot of Hatch Coaming.
2) Check if the lining of hatches is not marked ingress of water or oil, or smell oily.