

Prevention of accident damage to cargo loaded on Bulk Carriers

Case 1) Seawater damage

Recently, the communication equipment installed on vessels has been improved remarkably, and vessels can easily obtain precise weather and/or sea condition forecasts, and besides, the number of old vessels has also decreased. Therefore, compared with several years ago, the number of cases of serious seawater damage to cargo has decreased, but accidents still continue to happen.

1 Causes of accidents

The main causes of damage to cargo due to seawater ingress into a vessel's hold during a voyage are as follows :-

- Defects of hatch covers and/or securing devices
- Defects of hold entrance hatch
- Defects of ventilator
- Breakage, corroded holes and/or cracks in the shell and/or deck plates
- Overflow and/or counter flow of bilge water
- Miss handling of valve at the time of ballasting operation and/or cracks in ballast tanks

By far the most common cause out of the above is defects of the hatch covers and securing devices.

2 Defects of hatch covers and/or securing devices

- Rubber gaskets become stiffened, lose elasticity, permanent grooves are deepened, and as a result, the strength of the contact between rubber gasket and compression bar becomes weak or they are not contacted.
- Rubber gaskets are partly missing and/or broken



- Compression bars are partly broken and/or bent, and uneven with rust scales

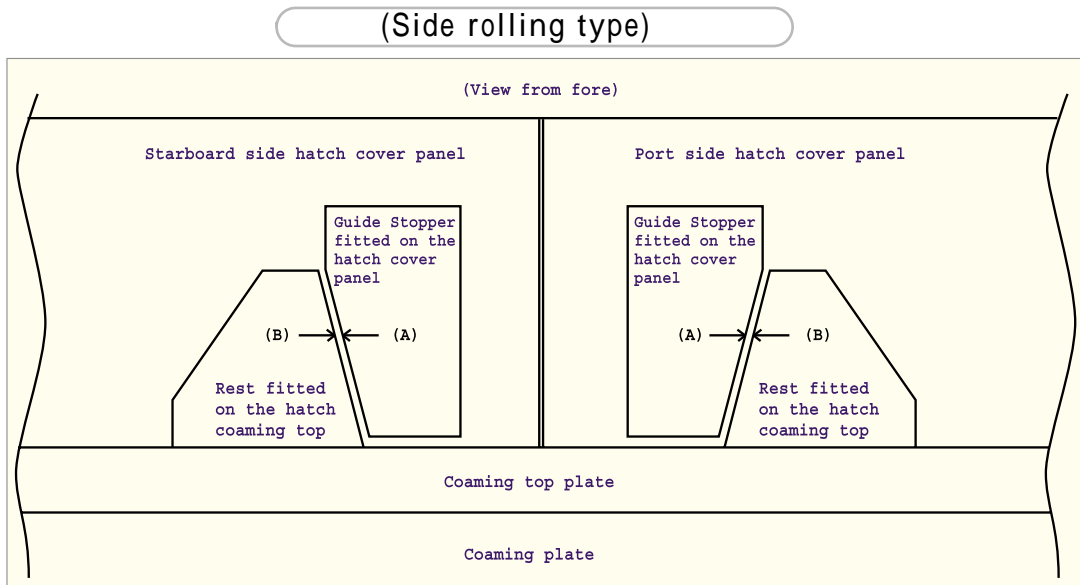
2 Sequel....

- Adjusting nuts of quick acting cleats rust and stick to the bolts, and there are no marks of the cleats having recently been adjusted. The cleat may be broken, bent or missing



The adjusting nut frozen to the bolt

- Rubber washers of quick acting cleats can become deteriorated and/or stiffened.
- Drain pipes on the four corner of the hatch coaming top are broken and/or plugged with some debris, and the Non-return valves are also broken.
- The contact faces of the Rests on the hatch coaming top and Guide stoppers on the side of the hatch cover panel can become heavily worn-down



These days, most vessels are fitted with rests on the coaming top, and guide stoppers on the side/ end plates of the hatch cover panel as securing devices, as shown in the above sketch, and they work as follows :-

2 Sequel.....

On hatch covers of side rolling type, the panels of both sides are held against each other strongly, and on folding type covers (two panels each fore and aft ; Jack Knife Type), the fore and after pairs are held against each other strongly, by a function of the slant (contacting) faces of the guide stopper and rest and the weight of the hatch cover panels. Therefore, if the contact faces of the guide stopper (A) and rest (B) are heavily worn-down, the strength of the contact between the panels becomes weak, and a gap(s) is created, allowing entry of sea water into the hold.



Showing heavy wear down at the contact face of the guide stopper



Showing heavy wear down at the contact face of the rest

3

Appearance of seawater damage to cargo in a vessel's hold due to defects of the hatch covers and securing devices.

When seawater enters a vessel's hold laden with grain, as a consequence of such defects, remarkable trace showing seawater invasion are found on the inner side of the hatch coaming plate, and strip-shaped wet damaged cargo are found on the top surface just under the joins of the hatch cover panels, and lumps of wet damaged cargo are found at the corners of the hatch coaming. The damaged cargo may form pillars that reach the tanktop plate, and it may spread over the whole area on the tanktop plate in some cases.



Showing damaged cargo in the top surface just under the join of the hatch cover panels (Side rolling type)



Showing the damaged cargo in the middle layer in the hold



4 Damage prevention plan

Rubber gasket

Generally, rubber gaskets have a life expectancy of 4 - 5 years.

Though elasticity is inevitably lost with the lapse of years and permanent deformation (such as permanent groove) will start, if the compression margin when the compression bar is fitted into the gasket is more than 3mm on tightening with the securing devices, it is said that sufficient watertightness remains. Therefore, when the compression margin becomes less than 3mm, the gasket should be changed immediately, and also if the gasket is found to be partly broken or missing, it must be repaired by the proper method.

Compression bar

16 to 22 mm thick steel flat bar is usually used for the compression bar, and its contact face to gasket should be half-round shape.

During loading and unloading operation, compression bars are often deformed by contact with slings, wire rope and cargo, and also, since compression bars are constantly in touch with gaskets, which contain seawater, and they are regularly exposed to change in temperature, the compression bars are among the most easily rusted parts of the vessel. So, deliberate care should be taken in order to keep the edges of the bars are kept half-round, as this part is especially easy to maintain.

Quick acting cleat

When steel washers become worn-down or rubber washers become stiffened and/or elasticity is lost, and of course, when the cleat itself is lost or bent, they should be replaced or renewed immediately. Moreover, bolts and adjusting nuts should be greased properly in order to prevent rusting.

Cleaning of coaming top and hatch cover end after loading cargo

After completion of loading operation, any cargo (especially grain cargo) and other debris on the coaming top and hatch cover end should be completely removed before closing of hatch cover.

If the hatch cover is closed with some cargo or other debris remaining, it will not be watertight, even if the securing devices of the hatch covers are in perfect condition. And, the drain holes on the four corners should be checked to see whether they are plugged with cargo or other debris, or not.

Hose test

Hose test of the hatch covers should be done before loading of cargo.

According to one of the leading classification societies, the water should be discharged at a distance of one meter from the joins of the hatch cover panel and/or coaming top to be tested, and the water pressure to be applied is 2 kg/cm².

When a hose test is done, it should be recorded on the deck log book, including the result.

— End —

<With collaboration from Nippon Kaiji Kentei Kyokai(NKKK)>



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|-------------------------------------|-----------|---|------------------------|---------------------|
| 東京本部 Principal Office(Tokyo) | 〒103-0013 | 東京都中央区日本橋人形町2丁目15番14号 |Tel:03-3662-7219 | Fax:03-3662-7400 |
| 神戸支部 Kobe Branch | 〒650-0024 | 兵庫県神戸市中央区海岸通5番地 商船三井ビル6階 | ...Tel:078-321-6886 | Fax:078-332-6519 |
| 福岡出張所 Fukuoka Branch | 〒812-0027 | 福岡県福岡市博多区下川端町1番1号 日動福岡ビル6階 | ..Tel:092-272-1215 | Fax:092-281-3317 |
| 今治出張所 Imabari Branch | 〒794-0028 | 愛媛県今治市北宝来町2丁目2番地1 |Tel:0898-33-1117 | Fax:0898-33-1251 |
| ロンドン駐在員事務所 London Liaison Office | | 78 Fenchurch Street, London EC3M 4BT U.K. | ...Tel:44-20-7702-1638 | Fax:44-20-7481-3885 |