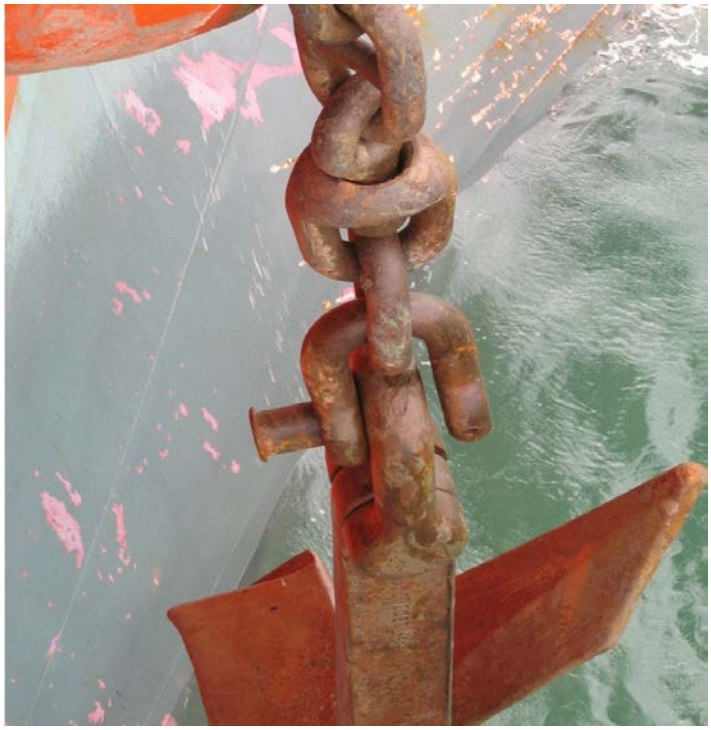
TECHNICAL AND REGULATORY NEWS No. 05/2016 – Technical

MOST ANCHOR LOSSES ARE AVOIDABLE

Relevant for ship owners/managers, shipyards, design offices and suppliers.

March 2016

DNV GL, Gard and The Swedish Club have observed a negative trend in loss of anchors and chains and associated costs. A study into the root causes has revealed that a majority of these losses could be avoided by increased awareness of the environmental limitations, more attention to some key technical issues and general good seamanship. This article is a brief summary of the technical issues related to anchor losses.



D-shackle bolt coming loose due to detached securing pin (© Gard)

Key issue

There is a general lack of awareness of the environmental loads for which anchoring equipment is designed. Class societies have unified rules for the design of anchoring equipment. The maximum environmental loads are:

- Current velocity: max. 2.5m/s
- Wind velocity: max. 25m/s.
- No waves (sheltered waters)

The investigation of the root cause of loss of anchor has shown that in a majority of the cases, the environmental conditions exceeded those stated above. Many anchoring locations are outside sheltered waters, and an equivalent environmental envelope was found as given by:

- Current velocity: max. 1.5m/s
- Wind velocity: max. 11m/s
- Significant wave height: max. 2m

In order to achieve the necessary anchor holding power, it is essential that the anchor chain and the fore-runner remain horizontal on the seabed and that good holding ground is available. The ratio between water depth and the length of the chain – the scope number – is a key factor in ensuring this, and class guidance is 6 to 10 scopes.

Further, the anchor winch motor is typically designed to lift the anchor and three lengths of chain (82.5m). The study revealed that there have been a number of cases in which the anchor winch was not able to recover the weight of the anchor and the chain due to anchoring in waters that were too deep.

Technical issues

In the study, we investigated the most typical technical failures, and this is discussed in depth in the "Anchor loss - Technical and operational challenges and recommendations" report presentation. However, two of the main issues are highlighted below.

The D-shackle is the single technical component which has the highest failure rate causing anchor losses. Typically, the D-shackle bolt comes loose due to a detached securing pin. The conventional way of assembling the D-shackle is to lock the tapered pin in place by hammering in a lead pellet, a small but

essential element in the anchoring equipment. This connection is not easily accessible for inspection. However, special attention should be paid to this detail whenever possible – when heaving the anchor or when the ship is in port – and, of course, when the ship is in dry-dock. Furthermore, tight securing of the anchor in the hawse pipe during voyage is recommended to avoid excessive vibrations, which again can cause the pin to come loose.

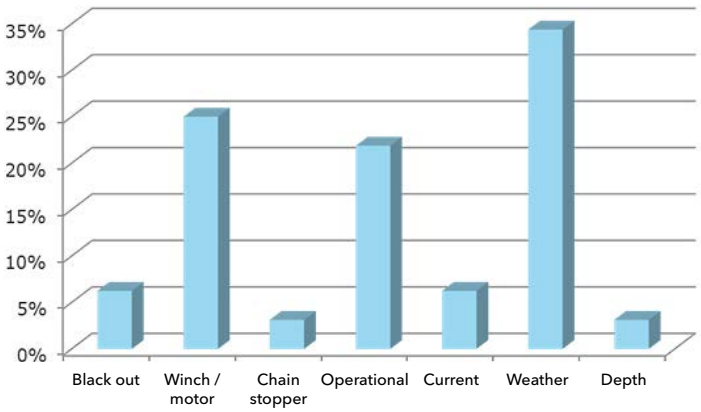
Then there is the issue of anchor winch brake bands:
The windlass brake is essential to control the pay-out of the chain, and many anchor losses are reported due to loss of brake power and uncontrolled release of chain. Corrosion of the drum and wear of the brake band lining reduces the brake capacity, and the main problem is that the brakes are not adjusted according to makers' recommendations.

Further key issues

Some key messages related to technical failures causing loss of anchor are listed below:

- Check the anchor carefully when in dry-dock for wear and tear.
- Check the securing of the D-shackle pin as often as possible.
- Adjust the brake band when the lining is worn.
  Read the instructions.
- Replace the brake lining when required, without delay.
- Check the condition of all devices for holding the anchor tight in the hawse pipe.
- Do not buy second-hand anchors or chains without certificates.
- Watch out for fake certificates. The price may be an indication.

The "Anchor loss - Technical and operational challenges and recommendations" presentation (see below) also includes operational issues related to anchoring operations.



Events causing loss of anchor (Source: The Swedish Club)

Recommendations

1. Make sure that the deck officers know the maximum environmental envelope the equipment can hold, and make sure this is reflected in the shipboard anchoring procedures.
2. Properly implement routine inspections and maintenance of essential components of the anchoring equipment. Class should always be contacted when repairs are to be carried out on the anchor and chain.
3. When ordering new ships, evaluate the possible need for increasing the anchoring equipment beyond minimum IACS class requirements especially if you will be anchoring in deep waters.

References

DNV GL, Gard and The Swedish Club have analysed damage cases involving loss of anchor and anchor chain, and have identified some frequent causes, both technical and operational. To share this knowledge with the maritime industry, we have developed an awareness video which can be viewed at:

www.dnvgl.com/anchorloss

From this page, DNV GL customers will also be given access to the "Anchor loss - Technical and operational challenges and recommendations" report presentation.

DNV GL rules relevant for anchoring:
DNV GL Rules Pt.3. Ch.11 Sec.1

IACS documents:

- IACS UR A1 Equipment, providing requirements for anchoring equipment
- IACS Recommendation 79 Guidance for anchoring equipment in service
- IACS Recommendation No. 10 Equipment, giving guidance on anchoring equipment for small and special ships, and for the design and testing of anchor windlasses

CONTACT
Fleet in Operation – Hull & Materials
MCTNO893@dnvgl.com