

---

# SAFETY ALERT BULLETIN

---

## Failure of Anchor, Chain, Stopper and Windlass

### THE INFORMATION BELOW IS BASED ON REVIEWS OF INDUSTRY INCIDENT INVESTIGATION REPORTS

The industry continues to experience an increasing number of incidents involving anchors, anchor chains, pawl bars / stoppers and windlass failures. The purpose of this Safety Alert Bulletin is to highlight this continued trend to all tanker and barge operators. It is hoped that this will encourage operators to review their procedures / guidelines for operations relating to Anchoring, particularly where this takes place in areas of high traffic density, variable weather conditions and /or strong currents. It may also be appropriate to include maintenance and inspection procedures for anchors, anchor chains, Windlass and other related equipment as part of this internal review.

This safety bulletin is not intended to instruct operators on how to operate, maintain or inspect their vessels. It is simply a mechanism to raise awareness and for exchanging information relating to commonly identified contributing factors and causes which have led to anchor loss, break out of anchor cables / chains and windlass failure. including

#### **Anchor and anchor chain / cable**

- Wear down of Swivel bolt threads and/or locking nut inadequately secured.
- Missing sealing leads from taper /spile pin causing failure of Kenter or 'D' shackle.
- Loss of anchor heads including crown pins.
- Cracks/fracture of shank/flukes due to fatigue or material quality.
- Corrosion/thinning down of anchor chains including connections.
- Anchoring or remain at anchor during inclement/deteriorating weather
- Continuous excessive swaying or strong currents.
- Anchor sustaining hard impact from being dropped from inappropriate heights.
- Excessive use of same anchor.
- Inadequate inspections / maintenance routines
- Inadequate supervision / training / awareness.
- Anchors not adequately lashed or secured whilst at sea
- Anchoring for extended period causing anchor chains to foul and form chain balls or knots resulting in loss of anchor and chains.
- Non-compliance by personal of company's procedures.



#### **Windlass**

- Anchoring at depths exceeding windlass design capabilities
- Failure of claw clutches due to fatigue / excessive wear.
- Weighing anchor in inclement weather resulting in excessive loading of the windlass motor
- Inadequate inspections / maintenance routines particularly:
  - Hydraulic lines and connections
  - Inadequate filtering / cleaning of hydraulic system.
  - Excessive brake lining wear
- Inadequate / non-compliance with manufacturers operating procedures.



### ***Guillotine bar / Pawl bar / Chain stopper.***

- Wear & tear of stopper at leading edge (where the bar / tongue makes contact with a vertical link) which allows the chain to pass through even though the stopper is secured.
- Failure of stopper / bar, securing pin due to material flaws / fatigue.
- Inadequate inspections / maintenance routines
- Latent defects / design flaws (locking pins not in place or inadequately secured).



### **Key learning's:**

- Anchors, anchor cables and Windlass if exposed to extreme environmental conditions create situations, particularly in deep anchorages, where forces are developed that may exceed maximum design limitations. This can be avoided through the provision of guidance of when to weigh anchor and vacate the anchorage e.g. at specified wind force such as force 6 or above.
- Forces generated by currents and waves can be of far greater magnitude than those created by the wind
- Forces generated by current increase significantly as under keel clearance reduces.
- Conducting NDT test on anchors / cables / chain stoppers during major repair periods may help to identify flaws.
- Planning and risk assessment prior to arrival into the anchorage or when deciding to remain at anchor can be a useful tool to identify potential issues
- Monitoring of weather and receiving weather forecasts from all available sources is imperative.
- Consideration can be given to the use of main engines to manoeuvre a vessel in order to relieve tension/stress in the anchor chain before 'heaving up' or whilst at anchor. This may also help to prevent an anchor from 'breaking out' and 'dragging' whilst being retrieved.
- The kinetic energy of a large vessel can be much higher than the capacity of the anchoring system.
- Windlasses are typically designed to weigh a maximum of 3 to 4 lengths of anchor cable plus the weight of the anchor.
- Inspection / maintenance by responsible & competent persons may improve the reliability of the equipment.

### **Key Messages:**

- Anchors play a major role in preventing a ship from touching bottom / shore structures. Depending on the speed of the vessel and prevailing weather conditions one anchor alone may not be sufficient to stop / hold the vessel thus **BOTH** anchors need to be fully operational at all times.
- Monitoring of prevailing weather conditions plays a vital part of maintaining the safety of anchored vessels.
- Steaming out to sea may be a safer option than anchoring, or remaining at anchor during inclement / deteriorating weather; particularly before the sea and swell become too high to prevent safe recovery of the anchor.
- It is imperative to be aware of windlass limitations relating to weighing anchor.

Attention is drawn to industry or publicly available publications and international legislations such as :

- (i) Anchoring Systems and Procedures for Large Tankers (An OCIMF publication)
- (ii) Anchor Practice – A Guide for Industry
- (iii) Anchoring large vessels - The Nautical Institute publication
- (iv) Mooring and anchoring - The Nautical Institute publication
- (v) The Ship Masters Business Companion - The Nautical Institute publication.

### **Disclaimer**

Nothing in this Safety Alert Bulletin shall constitute a standard, an endorsement, or recommendation of INTERTANKO. The Bulletin is not, and is not intended to represent, advice on which the reader should rely, and nothing in the Bulletin should be relied on without independent and/or professional advice being sought. Whilst every effort has been made to ensure the information has been compiled from sources believed to be accurate, current and reliable at the time of posting, INTERTANKO and the authors take no responsibility for any information contained in the Bulletin, including errors or omissions, and denies any liability whatsoever for any costs, loss or damage which any person, group, organisation or agency may claim, incur or suffer as result of using any information in the Bulletin.