THE SWEDISH CLUB CASEBOOK

10

Loss of anchor

10.1 Loss of anchor in heavy weather

A vessel was waiting for its berth to become available so the decision was made to anchor. A pre-anchor briefing was held on the bridge where the number of shackles to be used was discussed, and the crew were assigned their tasks for the anchoring operation.

One week earlier the bosun had inspected the windlass including the brake linings and had reported that all was in good condition.

Rough weather forecast

The weather forecast warned of rough weather the following day. The Master informed the bridge team that he would decide what to do later regarding the anticipated heavy weather. The anchoring party consisted of the Chief Officer, Bosun and two ABs. The bosun was controlling the brake, the Chief Officer was reporting what was happening to the bridge and giving orders to the Bosun and ABs. This was the first time the crew had anchored at this anchorage.

The vessel approached the dedicated anchor position as directed by the VTS. When the vessel was fully stationary the Chief Officer ordered the bosun to walk the anchor out using the windlass motor. When the anchor was about half a shackle above the seabed the anchor was let go. All went well and the crew resumed their normal duties when the vessel was safely anchored.

During the night the weather deteriorated. The OOW noticed that the vessel had begun to move and realised that the vessel was dragging. He called the Master who came up on the bridge. The weather was now rapidly deteriorating, and the Master woke up the Chief Officer and told him to assemble the anchor party and heave up the anchor.

Windlass motor fails

The weather had now increased to Beaufort force 8 and the bow was slamming because of the large waves. At that point, while the anchor was being heaved up the windlass motor stopped. The Chief Officer could see smoke coming from it and it was obvious that the motor could not be fixed straight away. At the same time the weather was deteriorating even further so it was decided that the anchor chain should be let go. The bitter end was removed, and the anchor chain was released. The vessel then left the anchorage and drifted in a safer position. The anchor and chain were lost and the vessel was not allowed to continue its journey until the anchor and chain had been replaced. The vessel had a spare anchor but the operation to replace the main anchor and chain took several days.

What can we learn?

- It is imperative that the crew understands the limitations of anchor equipment.
- This case study highlights the fact that the crew were not aware of the classification societies' rules or maybe did not fully understand them.
- Anchor equipment is not designed to endure heavy weather. If heavy weather is anticipated the anchor should be raised.
- Classification societies have unified rules for the design of anchoring equipment, and it is essential that the crew is aware of these limits. When planning to anchor, the following should be considered:

  1 The anchor is designed for temporary mooring in a harbour or sheltered area.

  2 The equipment is therefore not designed to hold a ship off fully exposed coasts in rough weather or to stop a ship which is moving or drifting.

  3 Anchoring equipment is designed to hold a ship in good holding ground in conditions such as to avoid dragging of the anchor. In poor holding ground the holding power of the anchor is significantly reduced.

Anchor equipment

Classification societies assume the following maximum conditions for anchor equipment:

- Current velocity: max 2.5 metres per second (about 4.8 knots).
- Wind velocity: max 25 metres per second (about 48 knots or force 10 on the Beaufort scale).
- No waves.
- Equivalent condition including wave loads:

  1. Current velocity: max 1.5 metres per second.

  2. Wind velocity: max 11 metres per second.

  3. Significant wave height max 2 metres.

- Length of paid out chain: cable: 6-10 shackles

In addition, the following should be noted:

- The design load for the performance of the anchor winch motor is a minimum lifting capacity of 3 lengths of chain, i.e. 82.5 metres plus the anchor.
- The windlass brake is essential to control the pay-out of the chain. The design load for the windlass brake is 45% of chain breaking load when a chain stopper is installed and 80% of chain breaking load when no chain stopper is installed. The conventional design is with brake bands but there are also disc brake systems.
- In heavy weather conditions or strong current, the rudder and engine must be fine-tuned to prevent too high tension in the chain and overload of the windlass motor. Ensure that the chain is kept as vertical as possible.

10.2 At anchor during a typhoon resulting in a grounding and total loss

A laden 45,000 MT deadweight tanker had anchored in a bay outside an Asian port. It was late summer and the vessel was waiting for a berth to discharge its cargo.

Weather warnings forecast

Weather warnings about an approaching typhoon for the area where the tanker was anchored had been broadcast for two days prior to the vessel arriving at the anchorage. The tanker had anchored with 7 shackles of chain in the water. There were some islands around the anchorage and the Master considered the anchorage would be a suitable place to ride out the approaching typhoon, which had been upgraded to a category 2 typhoon.

Around 04:00 the following morning the wind increased to Beaufort scale 9 and the Master told the Chief Officer to pay out 2 more shackles of chain in the water, making a total of 9. During the morning the wind continued to increase to Beaufort scale 12 which caused the anchor to drag.

Wind continued to increase

The Master tried to manouvre the vessel into the wind using the engines. However, two hours later the wind had increased even further, and it was not possible to turn the bow into the wind with the vessel at anchor. The vessel was now turned so that the wind was acting on the broadside of the dragging vessel.

The Master ordered the Chief Officer to heave up the anchor. However, this was not possible as the vessel was dragging. The windlass was not designed for these environmental loads, as it was only designed to lift the weight of the anchor and three shackles of chain (82.5m) in calm water.

Vessel ran aground

At this point there was nothing the crew could do, and the vessel ran aground on one of the islands surrounding the anchorage.

The Master sent a distress signal and the crew abandoned the vessel. Shortly after abandoning the vessel the crew was rescued by a local tug. Fortunately, there was no pollution and no injuries to the crew.

What can we learn?

- It is not uncommon for crews to be unaware of the environmental loads for which anchoring equipment is designed. Classification societies have unified rules for the design of anchoring equipment, and it is essential that the crew is aware of these limits (see below).
- A category 2 typhoon, as in this case, will have a predicted wind velocity of about 45 metres per second (about 87 knots) which is almost twice the load the anchoring equipment is designed for.
- If heavy weather is anticipated, as in this case, it is important that the vessel leaves the port/anchorage as soon as possible. This case highlights the risks and consequences of not leaving in sufficient time.
- It is recommended to use weather routeing which will warn about approaching heavy weather and suggest an alternative route for the vessel.

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- In heavy weather conditions or strong current, the rudder and engine must be fine-tuned to prevent too high tension in the chain and overload of the windlass motor. Ensure that the chain is kept as vertical as possible.

Glossary of common industry abbreviations

Term	Meaning
AB	Able seaman
AIS	Automatic identification system
ARPA	Automatic radar plotting aid
COLREGS	International Regulations for Preventing Collisions at Sea
COSWP	Code of Safe Working Practices for Merchant Seafarers
CPA	Closest point of approach
CSM	Cargo securing manual
ECDIS	Electronic chart display information system
ETA	Estimated time of arrival
GM	Metacentric height
GPS	Global positioning system
IHO	International Hydrographic Organization
IMDG Code	International Maritime Dangerous Goods Code
IMO	International Maritime Organization
IMSBC Code	International Maritime Solid Bulk Cargoes Code
ISM	International Safety Management Code
JRCC	Joint rescue coordination centre
MOU	Memorandum of understanding
NM	Nautical miles
OOW	Officer on watch
PA	Public address system
PMS	Planned maintenance system
SMS	Safety management system
SSAS	Ship security alert system
SSP	Ship security plan
STS	Ship-to-ship (transfer)
TML	Transportable moisture limit
UHF	Ultra high frequency (radio)
VDR	Voyage data recorder
VHF	Very high frequency (radio)
VTS	Vessel traffic serice

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