



## Mooring Line Failure

### Description

**A tanker was mooring at a berth with one dolphin and several mooring buoys. The vessel's Third Officer, an able seafarer (AB) and an ordinary seafarer (OS) were at the aft mooring station. All three were experienced mariners and had been on the ship for several months.**

The Master-Pilot exchange was conducted in the presence of all deck officers onboard and included a discussion of the vessel's mooring configuration. The Master advised that three stern lines should be used with two loose mooring lines from the stern bitts through the center fairlead and a third mooring line from the port side mooring winch through the starboard quarter fairlead.

However, the Third Officer configured the three stern lines differently from what had been discussed and agreed by using one loose mooring line from the stern bitt through the center fairlead and two mooring lines from the port side mooring winch through the same stern fairlead. For this configuration, one of the two mooring lines from the port side mooring winch was passed around a pedestal fairlead and the other used one of the stern bitts as a fairlead at a relatively sharp angle.

In the process of mooring, the load on the three stern lines was unevenly distributed with most of the strain on the mooring line using the stern bitt as a fairlead. When the Master directed the aft mooring station to heave on the stern mooring lines to arrest the motion of the tanker, the mooring line with the majority of the strain parted at the point it passed across the stern bitt.

The parted mooring line snapped back and struck the Third Officer in the face. The crew responded to the injury and the tanker was subsequently moored using a different mooring line configuration.

The investigation determined that the mooring line that parted was approximately 5 years old but had only been in use for 7 months. The mooring line had been stored onboard in a protected area prior to its use. It had been inspected less than two weeks before the incident and was determined at that time to be 16% deteriorated. A section of the mooring line was sent to the manufacturer for testing where it was found to have retained less than 50% of its certified minimum breaking load.

The investigation also determined it was highly likely that the stresses induced in the mooring line that parted were due to the external friction from the mooring line passing around the stern bitt. Furthermore, the mooring configuration used by the Third Officer was not supported by the vessel's mooring design as mooring lines from the port side mooring winch were designed to be led through the starboard quarter fairlead not the center fairlead.

The unusual mooring configuration also contributed to the uneven strain on the three mooring lines. Lastly, the investigation determined it was very likely there was a breakdown in communication during the Master-Pilot exchange whereby the Third Officer did not fully understand the Master's intended mooring configuration.

### Actual Injuries and Damage

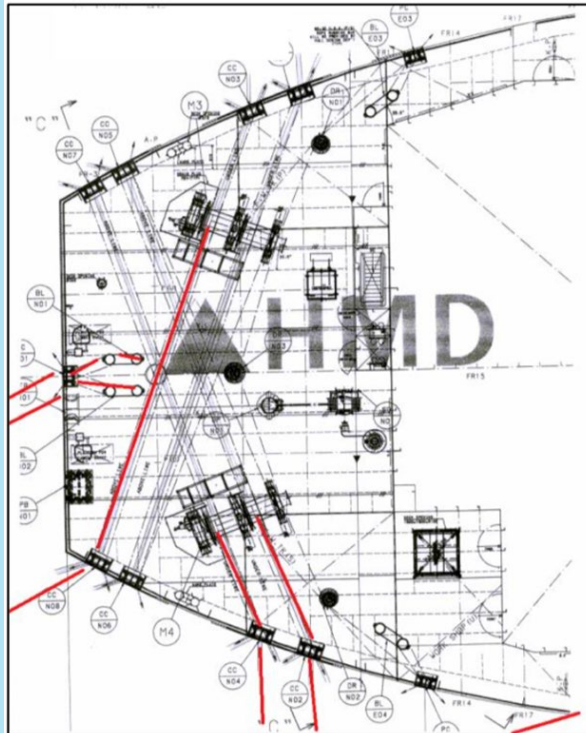
**The Third Officer sustained serious injuries to his face and jaw that required surgery and post-surgical treatment. He was taken ashore for medical treatment as soon as the tanker was safely moored over an hour after the injury.**

## Potential Damages

The Third Officer or the OS who had been standing next to the Third Officer could have been killed by the mooring line as it snapped back, and the Third Officer was fortunate that the injuries were not more severe. The Master and Pilot quickly realized that a stern line had parted and took decisive action to arrest the motion of the tanker by making good use of the assist tugs that were still on standby. Had the tugs not been there to assist, the tanker could have made hard contact with the dolphin causing damage to both the dolphin and the tanker's hull.

## Prevention

- ★ It is critically important for the Master, Pilot and deck officers to have a common understanding of the intended mooring configuration.
- ★ The risks associated with any uncommon mooring configuration should be specifically evaluated regarding the potential to put excessive stresses on mooring lines as they pass around and through fairleads. In this instance, a risk assessment should have been conducted in advance.
- ★ Any uncommon mooring configurations should also be assessed and evaluated to ensure they are consistent with the design of the mooring winches and fairleads.
- ★ All mooring lines should be frequently inspected to look for signs of abrasion, broken fibers, worn spots and other damage. They should also be turned end-for-end at specified intervals and be replaced after a specified lifespan.



Intended mooring configuration showing three stern lines.



Actual mooring configuration attempted with two mooring lines from the port side mooring winch through the stern center fairlead (blue and red lines) and a third loose mooring line secured at the stern bitt and also passing through the center fairlead (red arrow). The yellow arrow is the point where the mooring line failed.

When you identify a hazard before something goes wrong...

**it's a Good Catch.**

When you stop an operation before something bad happens...

**it's a Good Catch.**

When you recognize that an uncommon mooring configuration requires an evaluation of additional risks...

**that's a Good Catch, too!**



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