

UHMPE pull-in rope damaged during mooring connection to buoy

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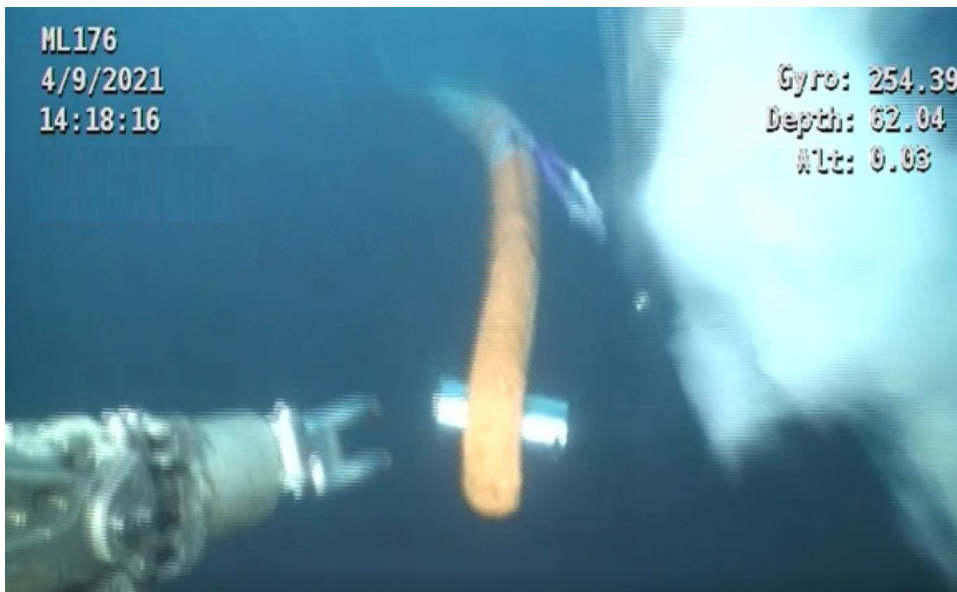
A synthetic pull-in rope used in a subsea mooring operation was violently pulled out of the control of an ROV.

What happened?

The ROV was pulling the thimble side of the rope away from a submerged turret production (STP) buoy when it lost control of the pull-in rope, causing damage to its 7-function arm. The pull-in rope was slowly paying out from a special handling winch, in combination with a capstan to overcome the friction on the full rope over the vessel deck.

Another ROV witnessed the sheave spinning very fast and the pull-in rope spooling off towards the surface, and that the thimble was stuck between the sheave and the buoy.

An ALL STOP was called on the bridge for investigation and intervention. The damaged ROV was returned to deck to carry out repairs on the damaged arm. The other ROV grabbed the loose end of the pull-in rope to keep it away from the thrusters.



What went wrong?

Slack on the pulling rope built up subsea, creating a catenary close to the vessel's port side propeller.

A combination of the sea current, pulling force of the vessel thrusters and wash

from the propulsion of another nearby vessel caused the pull rope to be ripped out of the hand of the ROV, and the other end went into the propeller which cut and damaged the rope.

What were the causes?

Our Member discerned the following causes:

- **Immediate causes**

- High sea current (2.8 knots) at time of incident combined with subsea conditions and the effects (wash) of nearby propulsion systems.
- There was insufficient monitoring of the pull-in rope catenary as it went over the vessel stern rollers.
- The vessel was in an unfavourable heading with respect to the direction of the current.

- **Underlying causes**

- The friction acting on the rope from the steel deck, was higher than anticipated.
- The synthetic (UHMPE) pull-in rope was (too) light.
- The task plan did not appropriately address the environmental conditions subsea.
- The supplier providing the mooring system confirmed that they did not consider environmental conditions during the design of the equipment.

- **Root cause** – Ineffective assessment and control of the impact the subsea environmental conditions would have on the pull-in rope during the operation, including design limitations.

Actions

The installation procedure and task plan for this work were amended, particularly with regard to the impact the subsea environmental conditions would have.

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