



LEARNING FROM INCIDENTS AWARENESS ALERT

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P&T – Prelude FLNG

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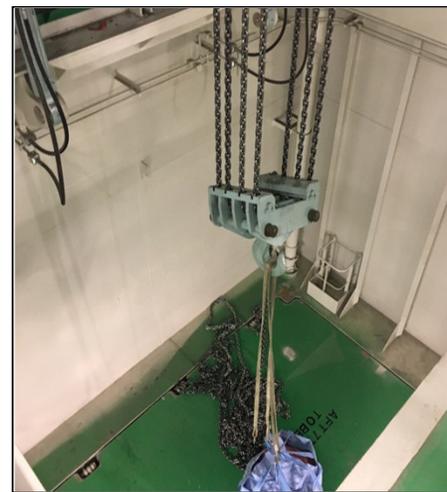
FAILURE OF EXO CHAIN HOIST

Target audience for this alert

- Project/Asset Managers
- Operation & Maintenance Personnel
- Lifting & Hoisting personnel / Subject Matter Experts (SMEs)
- Contracting and Procurement Manager

What happened

A 35 tonne Safe Working Load (SWL) electrically driven chain hoist was being used to lift ~200kg garbage bags from the floor in the aft machinery space to the 2nd deck, a distance of approximately 35m. The chain jammed in the hoist mechanism, ultimately leading to shearing of the pins connecting the hoist gearbox output shaft to the chain drive, allowing the chain drive to free wheel and 250kg of chain to run out, resulting in the chain falling to the floor. The area was a barricaded loading zone. No one was hurt.



Why it happened

- Chain jammed at the hoist chain guide inlet, due to inadequate chain bucket design. Functional requirements specified for this hoist (Ultra Low Head Room, 35t SWL and 35m lift) had led to the possibility of a 'full' chain bucket.
- Bolts connecting the hoist synchronisation chain to the drive sprocket failed, allowing loss of tension on the synchronisation chain.
- The plunger-head type limit switch, designed to stop the hoist on loss of tension in the synchronisation chain, mechanically failed to operate.
- Upon inspection, corrosion was found inside the limit switch, stopping the limit switch from extending when required.
- With the synchronisation chain inoperable, hoisting continued and the chain bundled inside the hoist mechanism, locking the gearbox drive from further movement.

*LFI Legal Guidance- <http://sww.shell.com/hse/incident/index.html>

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- Upon inspection, the motor overload protection (MOP) settings, designed to protect the motor in the event of overload when hoisting, were not set correctly, leading to overtorque of the drive and gearbox pin failure.

Lessons learned

- Ensure that the safety features inherent in Lifting Appliance designs are fully understood by Engineers/Supervisors.
- Ensure clear and full definition of Lifting Appliance functional and safety requirements are included in Specifications and purchase requisitions.
- Ensure mandatory checks of all safety features of Lifting Appliances during Factory Acceptance Test (FAT) and Site Acceptance Test (SAT).
- Preservation and preventative maintenance following SAT is to be strictly followed as per Original Equipment Manufacturer (OEM)/Vendor requirements, with specific focus on correct lubrication pins/nozzles.
- Ensure appropriate Lifting Appliance pre-start inspections are conducted prior to any lifting operation. Ultra-low-headroom chain hoists contain safety critical devices such as limit switches that cannot be tested as part of a routine pre-start inspection and may require close visual inspection.
- Ensure that recommended practice of [Construction Site Safety Standardisation \(LOGP\)](#) is in place for Lifting and Hoisting

Recommendations

- Ultra Low Headroom Hoists are not recommended for mechanical handling requirements where both high load and high lift height are a functional requirement;
- Assets to verify existence of Ultra Low Headroom Hoists in their facilities (those with synchronisation chain in the mechanism); for these hoists, verify with OEM the need to update inspection/maintenance regimes to confirm robustness of limit switches on these synchronisation chains.

Further information

Contact David Hope Johnstone, Prelude HSE Manager. Ref FIM 1872374

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