

Dropped object: Lay tower adjuster leg pin

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The securing pin from a tiltable lay system (TLS) adjuster leg, weighing 600 kg, fell 16 m to deck.

What happened?

The incident occurred when the keeper plate bolts slackened off. No-one was in the immediate area below the adjuster leg at the time of the event and no-one was injured.

At the time of the incident there was an umbilical in the tower, but the umbilical was not being deployed. If deployment operations had been ongoing, then there would have been the potential for further consequences if the top tension were to have been above the survival capacity of one adjuster leg.

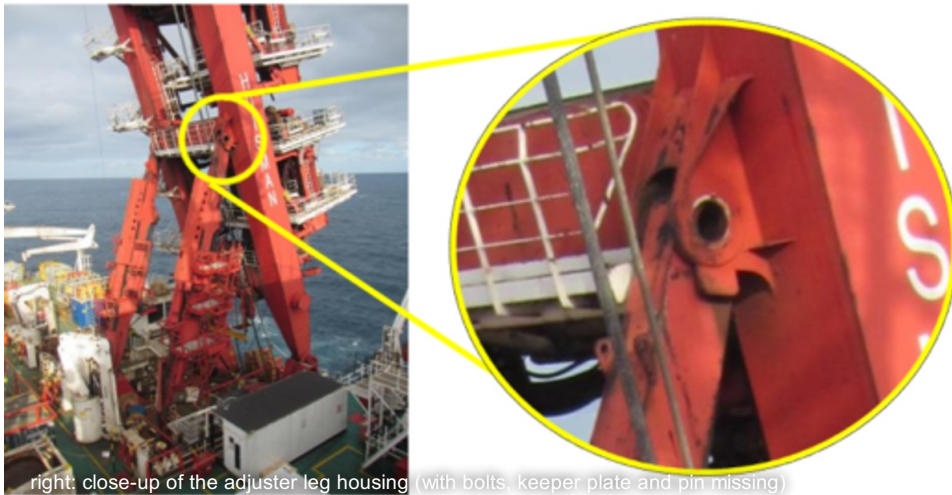
IOGP Life Saving Rules:



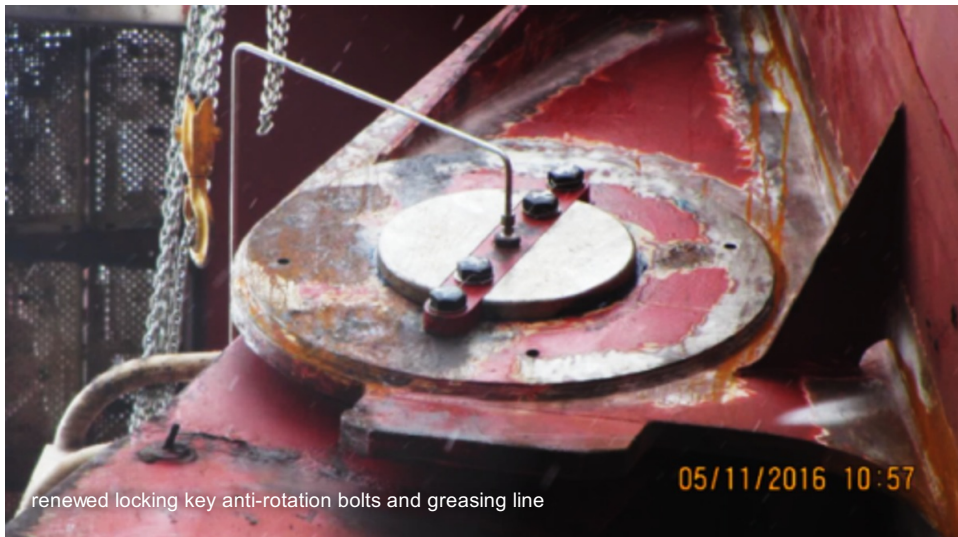
Line of fire



Safe mechanical lifting



right: close-up of the adjuster leg housing (with bolts, keeper plate and pin missing)



What went wrong?

- Investigations found that the planned maintenance and inspection regime was inadequate and unclear.
- During transits the tower was at times kept in operational position which could have allowed excess movement of the pin due to reduced load and increased dynamic movement.
- The design made it difficult to lubricate the pin adequately which may have caused excess friction.

Actions

- Following discussions with the manufacturer, the vessel returned to port for investigation, and during the transit to port, Structural Non-Destructive Testing (NDT) of pin connecting parts was undertaken on both legs to verify sufficient load capacity and seaworthiness.
- Adjuster leg pin put back in place and increased diameter anti-rotation locking key bolts were installed to provide additional bolt shear strength, as per manufacturers recommendation.
- Additional temporary bolt locking mechanisms (Loctite and locking wires) were installed on both adjuster leg pins locking key bolts to ensure vibration would not loosen the bolts before the permanent solution was ready.
- A check was made throughout the tower, of the tightness of all critical bolts and pins; new pin, bushing and lubricating lines were installed.

Longer term actions

- Tower to be in survival mode position during all transits according to the manufacturer's recommendations.
- Planned maintenance requirements updated and clearly defined for accurate inspection criteria for critical pins and securing mechanisms.
- Bolt locking mechanisms installed in TLS critical pins (adjusters and TLS pivot) to ensure vibration will not loosen critical bolts.

Members may wish to refer to the following incidents:

- High potential dropped object near-miss: antenna fell to deck *[an object came loose from a mast and fell to deck]*
- High potential dropped object *[an object fell 10 m onto the main deck of a vessel during pipe spooling operations]*
- Objects dropped from pipelay tower *[bolts vibrated loose, resulting in the shaft being unrestrained and free to vibrate out along with the end cap]*

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