

What happened?

The semisubmersible Mobile Offshore Drilling Unit (MODU) was in the final stages of pulling the Blowout Preventer (BOP). The BOP was being lifted the last metre to gain clearance for access to the BOP transporter in the moonpool. With the travelling block at the uppermost limit, the Kinetic Energy Management System (KEMS) was 'tripped', and the resulting action was not as expected. A failure in the drawworks disc braking system allowed the traveling blocks, complete with riser and suspended BOP, to descend approximately 50 metres in an uncontrolled manner, until the Top Drive impacted against the riser gimbal at the rig floor level. The subsequent investigation concluded that there was no operator error and the incident was a result of a disc brake system failure.



Top Drive impacted riser gimbal at rig floor level

The MODU had recently undergone a drawworks brake upgrade (band brakes to disc brakes). The installation and tie-in consisted of:

- Installation of disc brake kit with anti-bird nest feature
- KEMS software upgrade with interface
- Elmagco brake interface
- Crown'o'matic interface
- Commissioning of system

What went wrong?

The anti-bird nesting components were incorrectly installed thus limiting the 1200 psi used to function the service brake to 200psi.

When the drawworks were hoisted into the KEMS upper limit the anti-bird nesting system reduced the pressure to the service brakes from 1200psi to 200psi and the emergency brake pressure was dumped allowing the calipers to set. Due to the limited supply pressure of 200psi, the service calipers had minimal, if any, effect. The emergency calipers and Elmagco brake were not designed to stop the load under dynamic conditions on their own.

Dropped Blocks

Causal factors included incorrect installation of the anti-bird nest / disc brake hydraulic interface; inadequate commissioning of the upgraded (6 months prior) disc brake system; the disc brake system handover from the supplier to rig personnel was inadequate; Management of Change process during system upgrade was not implemented effectively; and follow up and understanding of previous disc brake incidents was inadequate.

Key Lessons:

- Rigs equipped with disc brakes equipped with anti-bird nesting functions should be alerted to the potential problems arising from incorrect installation of hydraulic control valves.
- Commissioning procedures for modifications to existing facilities should be reviewed to ensure:
 - Commissioning is carried out on a complete system basis, as well as on the system interfaces.
 - User training is adequate to obtain sound knowledge of the upgrade and its impact and interactions with other facility systems.
 - As built drawings and operating manuals are available to facility personnel for newly installed/upgraded systems
- Rig owners should review the implementation of their Management of Change process to ensure that it is properly implemented for upgrade work on their facilities with clear work scopes and accountabilities identified.
- Rig owners should ascertain that management places appropriate emphasis on procedural compliance and adherence. Reliable document control systems must ensure critical information is captured in procedures, and that the most current procedures are in use.
- The importance of carrying out thorough and systematic accident/incident investigations is highlighted. Capturing lessons learned and correcting root causes is key in prevention of further associated incidents.

Contact

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