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Structural Failure of Crane Swing Gear Drive Housing Injures Three

On January 27, 2017, four offshore personnel in the Gulf of Mexico were subject to uncontrolled motion while being transferred from a vessel to a production facility via the “Billy Pugh” basket that was hoisted by a Titan model T5400B boom crane. The boom began to swing due to the wind, and neither the swing break lock nor attempts to reverse the swing stopped the uncontrolled motion. The basket subsequently hit the railing on the vessel which caused injuries to three of the four offshore personnel.

The operator, crane contractor, and BSEE’s investigation determined that the crane’s hydraulic swing gear motor (slew drive system) had failed, which made it impossible to control the lateral movement of the boom. The mounting pad eye brackets that secured the swing gear drive housing to the crane cab base had sheared, allowing the housing to deflect under loading and the swing gears to disengage from each other. The disengaged swing gears prevented any control of swing motion and effectively disabled the crane during the personnel lift.



The BSEE investigation concluded the following:

- The mounting bolts either backed out during operations due to vibration or other operational causes, or the bolts were never fully tightened to torque specification when the crane was installed.
- The loose bolts allowed the swing gear motor mount to deflect under loading, which put unplanned stresses on the pad eye mounting brackets until the brackets sheared.
- Inspection of these bolts for any loosening and to insure the proper torque setting is not a normal part of daily pre-use, quarterly, or annual inspection(s) of the crane.
- Abnormal movement of the swing gear motor under loading, resulting from failure of the securing bolts or mounting brackets, may only be detectable by personnel looking for that specific failure.

A **Safety Bulletin** is a tool used by BSEE to share lessons learned from an incident or near miss. It also contains recommendations that should help prevent the recurrence of such an incident on the Outer Continental Shelf.

BSEE recommends that operators review the full [BSEE Accident Investigation Report – Incident Date 27 January 2017](#) and take the following actions:

- Evaluate the condition of the mounting brackets and the torque values of the bolts securing the swing drive gear housing of cranes;
- Consider incorporating specific periodic examination (quarterly and/or annual inspections) of the crane swing drives, including pad eye connections and bolts.
- Review this incident with all personnel and organizations that work with crane operations. Review participants include crane personnel, crane contractors, crane manufacturers, riggers, and inspectors.

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