GEODYNAMICS LIMITED

easternwell GROUP

Dropped IBOP Actuator Arm

Dropped IBOP Actuator Arm - Chronology

Date and Time of incident	**Location of Incident**	**Severity**
16th August 2007 @ 19:45hrs	RIG 100 Work floor	High Potential

Wednesday 15th August 15:00

- Breaking a connection at floor level
  - Activated the IBOP to close position,
  - The IBOP activating arm (663gm.) fell approx 9' to the rig floor.
  - Drilling suspended & consequences were discussed during a toolbox meeting.
- Rig manufacturer technician field repaired the actuator arm assembly
  - Used Loctite and fitted spring washers to the arm retainer mounts.
  - Redressed the circlip groove.
- Activating arm re-installed by 17:00 with a new circlip and drilling resumed.

Thursday 16th 09:00

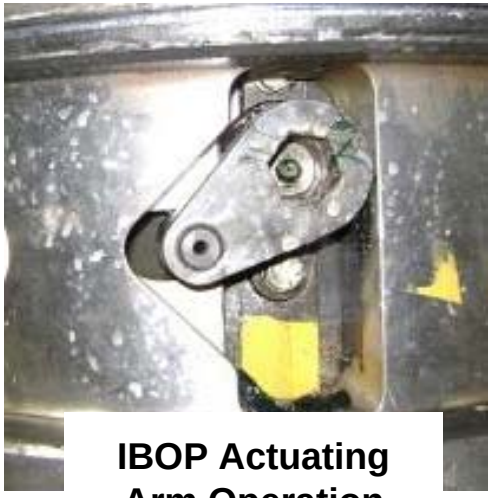
- The retainer bolts were checked during a rig service and found secure

Thursday 16th 19.45pm

- Made up the first stand of heavyweight (first connection to be made from the monkey board).
  - Drilling resumed, within two minutes the IBOP actuating arm fell approx 90' out of IBOP bearing retainer mount to the rig floor.

Dropped IBOP Actuator Arm

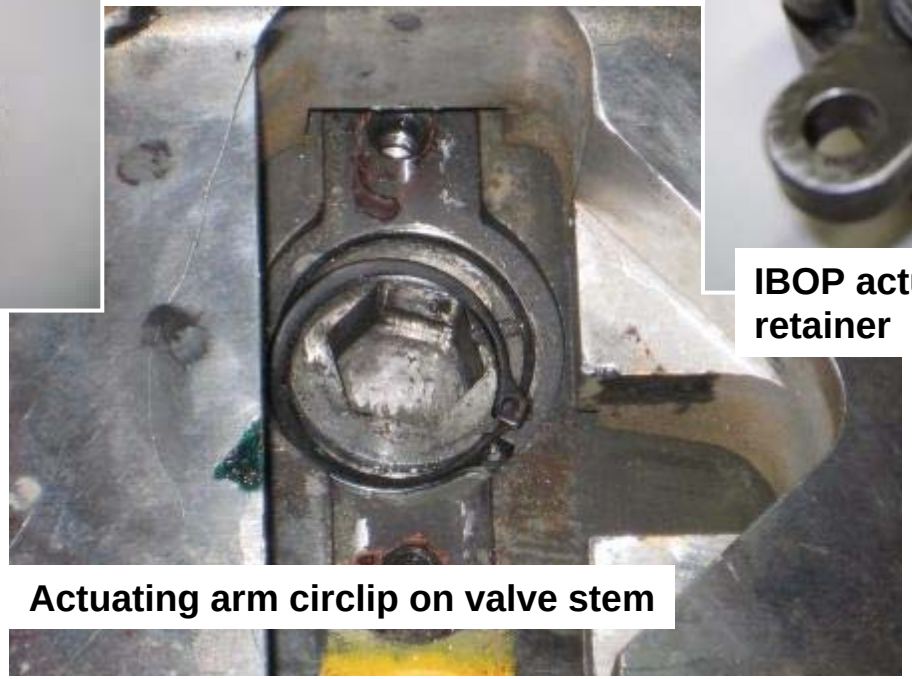
IBOP Actuating Arm & Bearing Retainer Mount



IBOP Actuating Arm Operation

Dropped IBOP Actuator Arm

IBOP Actuating arm (dropped object)



Actuating arm circlip on valve stem

IBOP actuating arm with retainer

Dropped IBOP Actuator Arm - Findings

1. Loose bolts on IBOP actuator arm bearing retainers.

- The assembly is fitted through the actuator sleeve preventing a clear view of the mating surfaces and protruding circlip.
- There was no locking system in place to prevent the retainer bolts from unscrewing.

2. Initial incident not fully investigated

- While shortcomings were found in the procedures for incident investigation, there were a number of senior people involved in the follow-up of the incident who would have reasonably been expected to recognise the severity and implement a major investigation.
- Instead, the failure was quickly assessed as “loose bolts”, the part was re-installed without correcting the problem and it re-occurred some hours later.

3. Inadequate clearance for actuating arm circlip inside IBOP housing

- Equipment design needs improvement - a simple dimensional check on the design documents by another party should have identified the problem .

Dropped IBOP Actuator Arm - Actions

Immediate Actions:

- Suspended operations, Rig Manager held TBM & discussed the incident and possible consequences
- Stand of pipe was removed, Top Drive lowered to the rig floor
- Rig was shut down until investigation and corrective actions were put in place to prevent a recurrence.
- Personnel mobilised to the Rig 100 to facilitate Tap-root investigation.
- Rechecked all torque tensions of bolts on the top drive and double check lock wires. The remaining IBOP actuating mechanism was removed

Dropped IBOP Actuator Arm

Long term Corrective Actions:

Le Tourneau Technologies – Rig Manufacturer

- Design, manufacture and install a retainer plate as secondary fall protection for the actuator arm.
  - Use a MOC process to review the new design ensure the new design of the product does not compromise any other function and to ensure all implications are understood and addressed.
- Issue a product alert to inform end users of the valve stem manufacturing defect and recall for modifications all units in service.
  - Review and modify engineering change procedure to ensure the final product assembles and operates as designed and intended (Issue previously identified).
  - Review third party OEM Quality Control procedures to ensure the end product is free of defects.
- Add specific detail to LTI pre & post commissioning checklist to ensure components are installed properly and safely secured to the top drive (no assessment of TD for potential dropped objects in the commissioning document).

Easternwell Group (Rig Operator) & Geodynamics (Rig Owner & Client)

- Update Near Miss reporting procedures to take into account the potential severity of a near miss and prompt the appropriate level of immediate action and investigation.
  - Specifically update the EWG Accident incident Investigation Standard and Incident recording & Reporting Standard to include quantitative risk analysis.

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Questions please?