



GEODYNAMICS  
LIMITED



easternwell  
GROUP

# Dropped IBOP Actuator Arm



# Dropped IBOP Actuator Arm - Chronology

## **Date and Time of incident**

16th August 2007 @ 19:45hrs

## **Location of Incident**

RIG 100 Work floor

## **Severity**

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

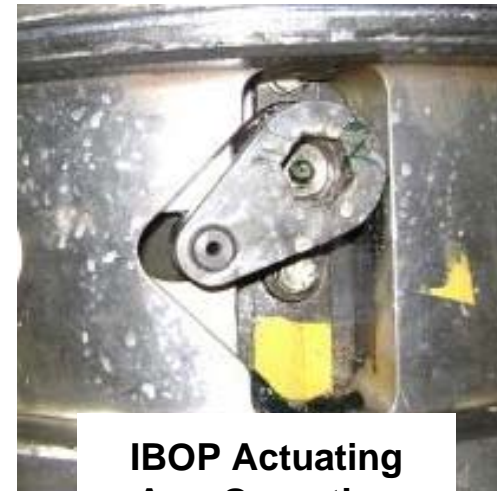
## **Thursday 16th 19.45pm**

- 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**



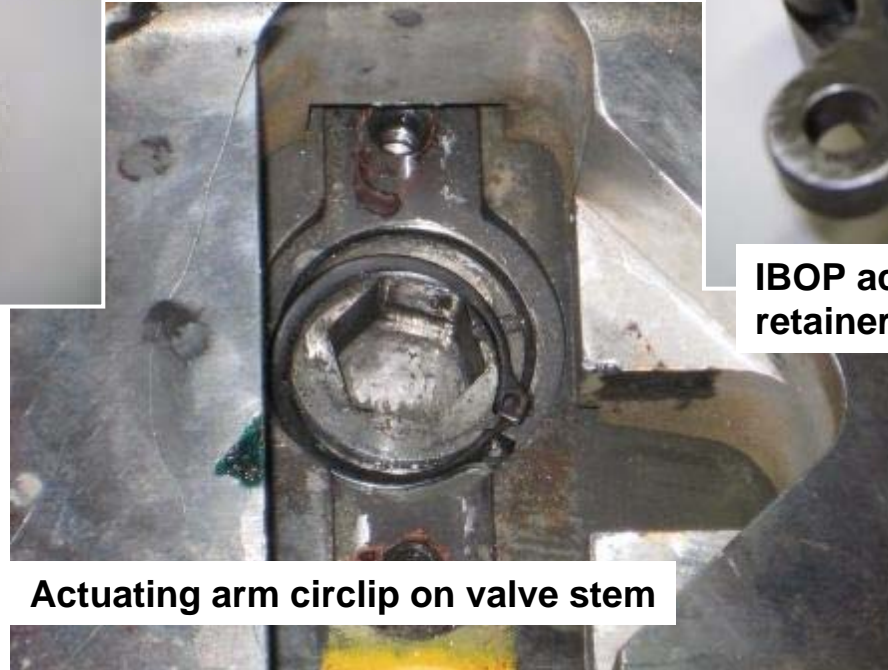
**IBOP Actuating Arm Operation**

# Dropped IBOP Actuator Arm

**IBOP Actuating arm (dropped object)**



**IBOP actuating arm with retainer**



**Actuating arm circlip on valve stem**

# 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.

---

Questions please?

