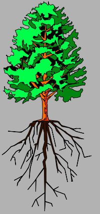

APR Business Unit

ENSCO 84

Incident Investigation Report

Synergi Case No. 2381

Hi-Potential - Near Miss – P4B - Level 2

Rotating Head Element Dropped to Platform narrowly missing Two Floormen

30 August 2007

ENSCO 84 Incident Investigation Report

Contents

- The Investigation team members
- Sequence of events
- ENSCO Incident model
- TapRooT SNAP Chart
- Root Cause Analysis
- Actions to prevent recurrence

ENSCO 84 Incident Investigation Report

Incident Investigation Team

Name	Position	Company
• Steve Cross	Operations Manager	ENSCO
• Stuart Johnstone	Rig Manager	ENSCO

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Description of Unplanned Event

- PJSM held with all crew about to commence shift
- POOH from 8134’ to 6620’ (casing shoe) acid stimulating @ 20 BPM – 850 psi
- Halliburton flush all lines with seawater. Monitor shut in casing pressure – 0psi
- 2 Floormen unlatch rotating head clamp
- Rotating head drive bushing pulled above rotary to monitor annulus
- Pumped 72bbls seawater – no returns
- Install FOSV in string below rotating head drive bushing – chain tong tight
- String lowered but unable to engage drive bushing into rotating head
- Decision made to continue & hang off string in lower pipe rams
- Floormen engage BOP ram locks & then climb back up to rotating head
- String backed out above FOSV
- Floormen still unable to engage drive bushing into rotating head
- 2 Floormen remain positioned on top of annular
- Toolpusher instructs Driller to raise drill string with drive bushing
- Drive bushing contacts underside of master bushings while being raised
- Drive bushing (293 lbs) starts to freefall down drill-pipe with sufficient momentum to slide over tool joint (total drop length that drive bushing falls on drill-pipe - 12ft)
- Drive bushing falls a further 6.4ft and impacts top of rotating head between the two Floormen before falling a further 20.1ft to the platform deck

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ENSCO Incident Model

Escalation (+) / Mitigation (-) Factors

(+) 2 Floormen on BOP
(+) No stopping job for re-assessment
(-) Platform area barriered off & informed of heavy lift operations over platform

Immediate Cause

Not identifying risk of drive bushing falling off end of drill-pipe

Hazardous Event

293 lbs drive bushing fell 18.4ft missing 2 Floormen

Consequence

Actual: Drive bushing narrowly missed 2 Floormen on BOP (Hi-Po - NM)
Potential: Fatality

Hazard

Potential Energy (Dropped Object)

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TapRooT SNAP Chart

29th Aug 2007 – 11.30hrs
PJSM with all crew about to commence shift

30th Aug 2007 – 00.00hrs – 02.00hrs
Con't POOH with 5" acid stimulation string from 8134' to 6620' (9-5/8" shoe) pumping @ 20 bpm

02.00hrs – 02.30hrs
Halliburton flush all lines with seawater

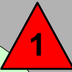
Cont 1

All crews informed about ongoing acid stimulation job

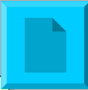
Drill crew informed about plan to N/D rotating head & N/U bell nipple

Rotating head in use to enable pipe to be pulled out of hole holding a back pressure as part of stimulation program

AD prepares JSA, PJSM. No Work Instruction available for Rotating Head

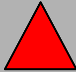


Asst Driller hand writes a WI, but has no job steps included



PJSM, review of JSA held on rig floor whilst Halliburton flushing lines

JSA identifies potential dropped objects. Mitigation measures identified (area to be barriered off / platform informed)



Causal Factor: any condition that, if corrected, could have prevented the incident from occurring or would have significantly mitigated its consequences.

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TapRooT SNAP Chart

Cont 1

02.30hrs – 02.45hrs
2 Floormen climb BOP, unscrew rotating head locking device & climb down clear

02.45 – 02.50
Rotating head drive bushing is pulled with 5" stimulation string to above rotary

02.50 – 03.00
Pumped 72bbls seawater to see if returns could be established

Cont 2

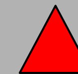
Floormen use scaffolding and "Dynalock" inertia reels for fall protection

1 Experienced Floorman has done the job 6 times, the other first time

This is to allow annulus to be monitored from rig floor while pumping

Returns not established

Continue plan and prepare to hang off drill string



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TapRooT SNAP Chart

Cont 2 → Acid stimulation string set in slips, string broken and FOSV installed below drive bushing → Acid stimulation string then lowered down for hanging off → Floormen attempt to line up drive bushing into rotating head → Cont 3

Drive bushing is not removed from drill pipe or this stand set-back (Causal Factor 2)

String made up chain tong tight in preparation for hanging off in bottom pipe rams

2 Floormen climb BOP & position ready to guide drive bushing into rotating head

Floormen attempt by hand to turn bushing but couldn't move it

TDS was not used so as not to torque up the joint & being unable to break out

Causal Factor: any condition that, if corrected, could have prevented the incident from occurring or would have significantly mitigated its consequences.

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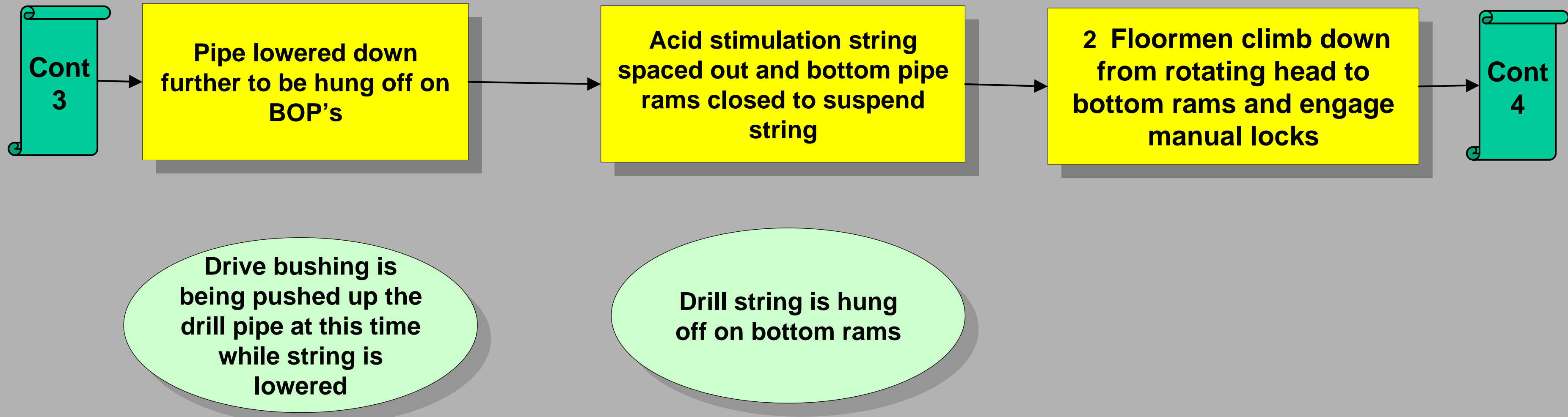
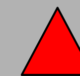
TapRooT SNAP Chart





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TapRooT SNAP Chart

Cont 4 → On rig floor the Floormen then back string out from top of safety valve → The 2 Floormen climb up the BOP to the rotating head to try and lock in the drive bushing → Toolpusher instructs Driller to pull string up with drive bushing on end of string → Cont 5

- Drive bushing now 6" too high to be set in rotating head and would not move downwards
- Assumed that due to worn inside rubber element the bushing is cocked and can't move down
- Nobody stops job to re-evaluate the hazards now that the job has changed (3)

- Driller is not informed that drive bushing is still on the drill pipe
- 2 off Floormen stay at rotating head

Causal Factor: any condition that, if corrected, could have prevented the incident from occurring or would have significantly mitigated its consequences.

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TapRooT SNAP Chart

Cont 5

Driller commences raising drill string with drive bushing contacting underside of master bushings

293 lbs drive bushing falls from drill pipe hitting top of Rotating Head before continuing to fall to deck

Operations suspended Toolpusher goes to check on men at BOP

Cont 6

Although identified in the JSA that the master bushings would be removed they are not

4

½" clearance between master bushing ID & drive bushing OD

Experienced Floorman reports that drill pipe was pulled up quickly

Drive bushing narrowly misses striking the Floormen on top of BOP

Individuals are shaken but un-injured.

No damage found to any of the equipment

Causal Factor: any condition that, if corrected, could have prevented the incident from occurring or would have significantly mitigated its consequences.

ENSCO 84 Incident Investigation Report

TapRooT SNAP Chart

Cont 7 → Decision made to run back up drive bushing from stand in Derrick → Drive bushing successfully engaged in rotating head → 04:00 Hrs Toolpusher wakes OIM and informs him of the incident → Cont 8

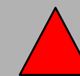
Lifting eyes are installed on spare drive bushing and air hoist used as back-up while stand lowered

Dropped drive bushing recovered using lifting eyes and air hoist

Operation of rigging down the rotating head continues successfully

OIM and Toolpusher discuss the details of the incident. OIM is informed of men on BOP

OIM instructs TP to call town and report incident to management while he goes to rig floor



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ENSCO 84 Incident Investigation Report

TapRooT SNAP Chart

Cont 8 → At 07:34 Hrs Rig Manager receives call from Toolpusher → OIM completes Synergi report case # 2381 → 08:30 Hrs 31st August Rig Manager informs OIM that TapRooT will be required → Cont 9

Statement from Rig Manager attached. TP states that no one was in the area

Operations Manager calls Rig Manager and is informed of incident and that nobody was in the area

Maersk Drilling Supt is offshore and attends daily planning meeting with OIM, Co Rep, TP & BE

Report does not state that men were positioned on top of BOP

Initial Synergi report submitted as a level 1 incident

Incident is discussed during this meeting but the fact that men were on top of BOP never mentioned

OIM instructed to gather investigation information

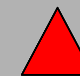
Causal Factor: any condition that, if corrected, could have prevented the incident from occurring or would have significantly mitigated its consequences.

ENSCO 84 Incident Investigation Report

TapRooT SNAP Chart

Cont 9 → 12:30 Hrs Maersk Co Rep commences offshore investigation → At 16:00 Hrs OIM calls Rig Manager → 01 Sept OIM, TP and Driller crew change and report to shore base office → END

- During interviews he discovers two men were positioned on top of BOP
- OIM states having reviewed the Synergi report again he notes that this does not reflect that 2 men were on the BOP
- Rig Manager calls Operations Manager and informs him of the change of report
- Rig Manager on Conference call with Ops Manager in Dubai conducts interviews
- Outstanding statements are taken from OIM and Driller



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ENSCO 84 Incident Investigation Report

Root Cause Analysis

Causal Factor	Unsafe Act / condition	Root Causes
1 – AD prepares JSA, PJSM. No Work Instruction available for Rotating Head	There was no formal WI prepared for this job although it had been done before. The WI that was prepared did not outline the job steps.	**Management System** SPAC Not Used Enforcement NI
2 – Drive bushing is not removed from drill pipe or this stand set-back	Opportunity to remove the drive bushing while it is on the rig floor. The housing could have been recovered later with an air hoist. No WI in place meant there was no plan for the job steps to be carried out.	**Management System** SPAC Not Used Enforcement NI
3 – Nobody stops job to re-evaluate the hazards now that the job has changed	Toolpusher & Assistant Driller looking down through rotary table do not take time to re-evaluate job after the job had changed with drive bushing being unable to lock into rotating head and fail to identify risk of two Floormen on BOP stack.	**Work Direction** Supervision During Work Crew Teamwork NI

ENSCO 84 Incident Investigation Report

Root Cause Analysis

Causal Factor	Unsafe Act / condition	Root Causes
Although identified in the JSA that the master bushings would be removed they are not	JSA had identified the potential hazard of the drive bushing contacting the master bushings but was not followed through when doing the job.	**Procedures** Followed Incorrectly No Check off

ENSCO 84 Incident Investigation Report

Actions to prevent recurrence

Root Cause	Corrective Action	Due Date	Responsibility
Management System SPAC Not Used Enforcement NI	Develop new WI for this task with details on secondary fall protection and ensure all are aware of this new instruction.	**20 Sept 07**	**OIM**
Work Direction Supervision During Work Crew Teamwork NI	1. JSA training to be implemented using new procedure. 2. All Supervisors to be formally reminded (documented) that their duty is to Supervise the task. 3. Discuss incident with all crews to highlight the requirement to STOP the job and re-evaluate tasks if they change from original plan.	**1. 30 Oct 07** **2. 30 Oct 07** **3. 30 Oct 07**	**1. SHE&Q Adviser** **2. Rig Manager** **3. OIM**
Procedures Followed Incorrectly No check-off	All crews to be reminded that when using the JSA and highlighting steps to be followed then a quick check off when going through the job can help in carrying out the job safely and provide a timely reminder that you are following the original plan correctly.	**30 Oct 07**	**OIM**