



# Safety Alert

From the International Association of Drilling Contractors

ALERT 07 – 34

## COUPLING FAILURE BETWEEN DRAWWORKS DRIVE SHAFT AND ELECTRIC AUXILIARY BRAKE....ALLOWS BLOCKS TO FALL

### WHAT HAPPENED:

While washing down the 7" liner assembly on 5 ½" DP which weighed 364,000 pounds (total 165 metric T) in open hole the Driller heard a loud bang. This was immediately followed by loss of the electric auxiliary brake's control over the assembly's descent. The Driller vigorously applied the manual brake to slow the descent and called for the slips. The string descended approximately 52 ft (16 m) before a Floorman managed to set the slips. The blocks came to rest about 28 ft (4.6 m) above rotary table.

### WHAT CAUSED IT:

Investigation revealed that the coupling sleeve that mates the electric brake shaft to the drawworks drum shaft had disengaged allowing the string to fall. This occurred because the coupling sleeve's female spline had not fully engaged and was only partially covering the drawworks drum shaft male splines. An inspection showed signs of excessive wear at the shaft end. This partial engagement was due to the rotating sleeve gradually backing off the drawworks drum shaft thereby allowing it to contact and wear down the coupling's cast iron shifter ring (which had 80% wear) which engages the sleeve with the drum shaft. This occurred because the shifter ring's control lever was not fully elevated although it was locked secure.



The picture at left shows the worn shifter ring as a result of the allowable movement of the sleeve due to the 2cm play in the lever locking assembly. This picture clearly demonstrates the quantity of wear on the shifter ring. Approximately 80 % of the ring had been worn down in about 5 months. The last ring was changed out after 5 years in service. A 2 cm space existed between the lever and its seating position allowing play in the shifter lock assembly. This space allowed the coupling sleeve to slowly back off the drum shaft until it finally disengaged allowing the blocks to fall. See Fig. 2 below.

### CORRECTIVE ACTIONS: To address this incident, this company did the following:

- Ensure the entire linkage system between the electric auxiliary brake and the drawworks drum shaft (including shifter ring, control lever, coupling sleeve, etc.) has safety critical status on the Preventive Maintenance System.
- Manufacturer was contacted for more detailed information on the installation of coupling (sleeve, control ring, lever, etc) and alignment of shafts. In addition maintenance information was obtained on the frequency and details of visual checks for correct engagement of the coupling sleeve, acceptable level of wear on the ring assembly, and measurement specifications on the shaft splines.
- Maintenance supervisors are to update PMS for the electric auxiliary brake/drawworks linkage system with additional information obtained from the Manufacturer.
- Ensure that adequate maintenance history of electric auxiliary brake/drawworks linkage system is detailed and updated in PMS.
- Ensure that sleeve and shift ring assembly follows a strict, structured greasing program to minimize wear on ring and splines.

Fig. 2. Showing linkage system between drum and electric brake shafts and how coupling sleeve backed off drum shaft and wearing away ring assembly.

**The Corrective Actions stated in this alert are one company's attempts to address the incident, and do not necessarily reflect the position of IADC or the IADC HSE Committee.**

This material is presented for information purposes only. Managers & Supervisors should evaluate this information to determine if it can be applied to their own situations and practices

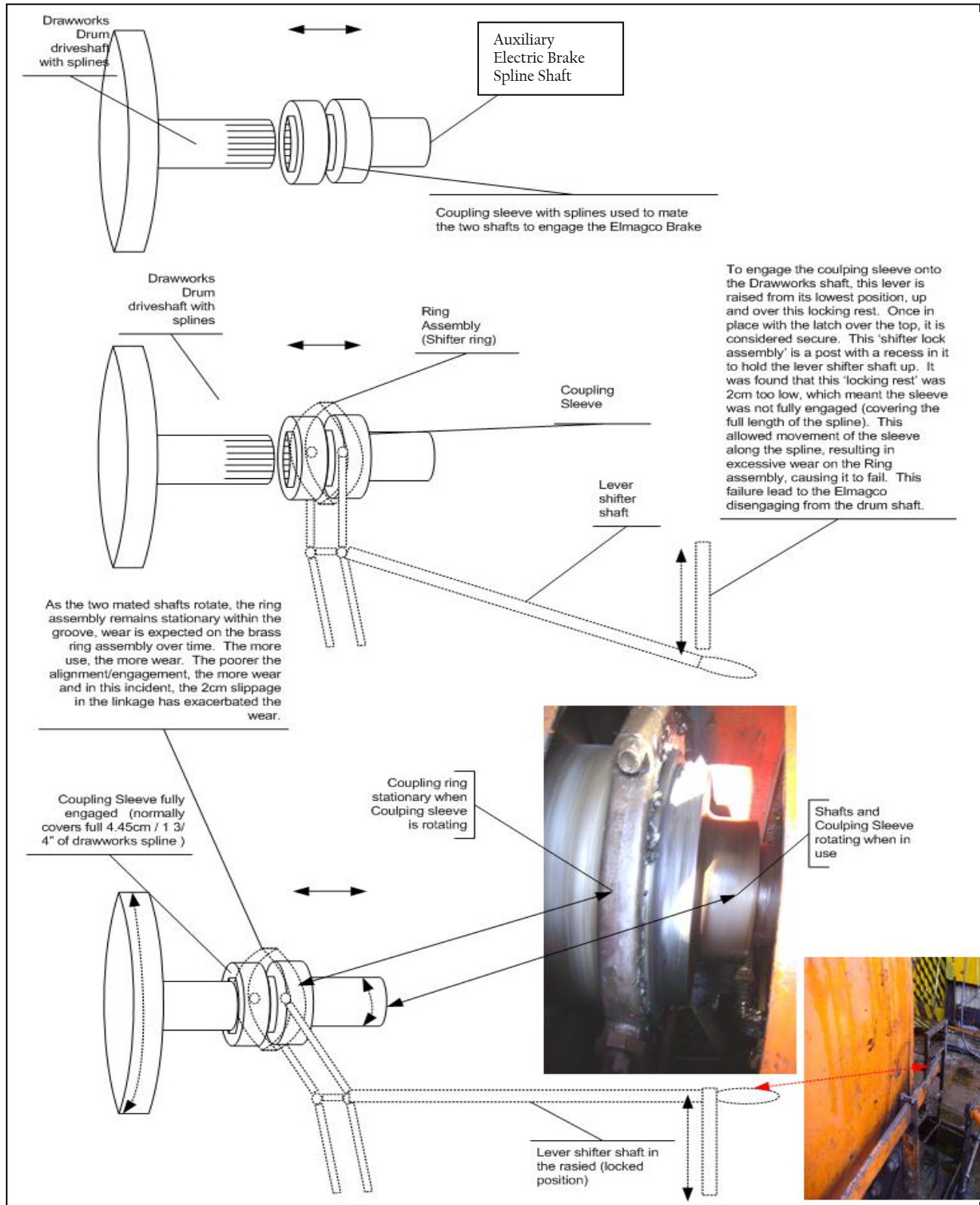
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