Significant Incident Report No. 247

Subject: Drill fitter crushed between drill head and rod centraliser arm - fatal accident - update

Date: 12 September 2016

Summary of incident

Note: Information contained in Significant Incident Report 243, issued on 14 July 2016, provided an initial assessment of this fatal accident based on materials received, knowledge and understanding at the time of writing. This update reflects new evidence gathered during the Department of Mines and Petroleum's ongoing investigation.

On the evening of 19 June 2016, two fitters were working on the deck of a blast-hole drill rig to replace a head slide that had fallen out of its bracket earlier in the shift. The rig had not been powered down, nor was it isolated.

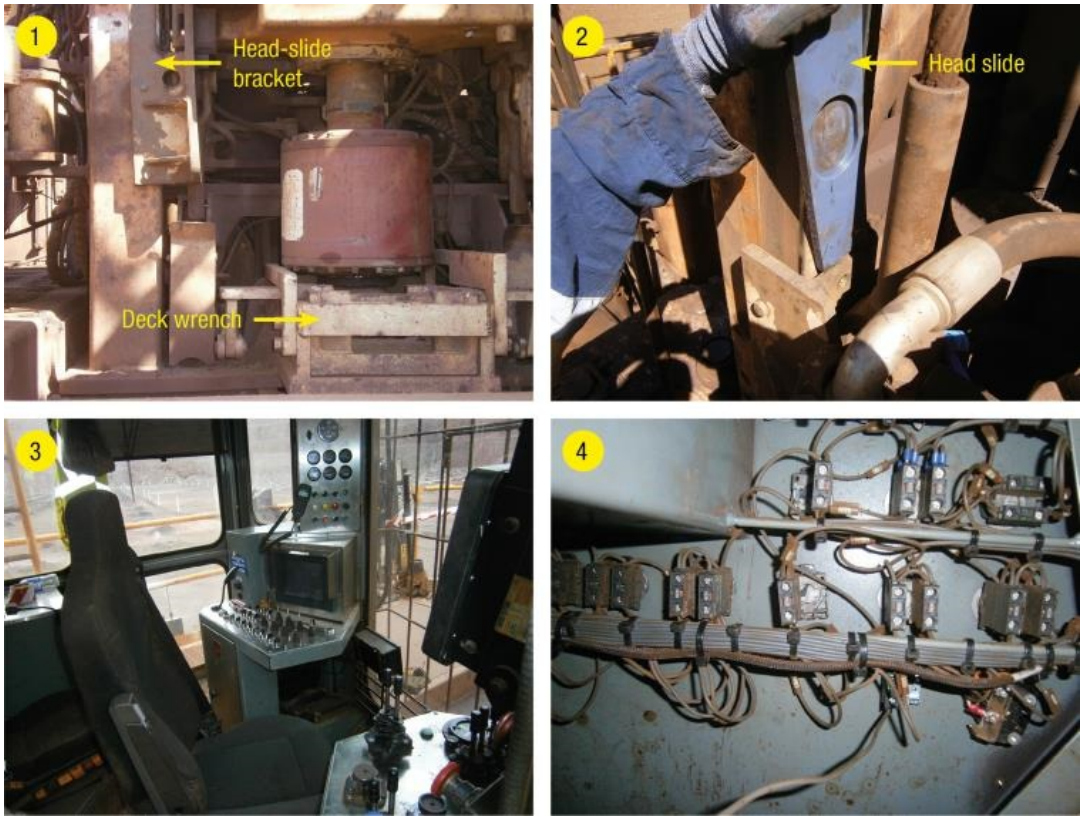
When the initial attempt to fit the head slide failed, the drill head was raised about a metre by the driller, who was sitting at the control panel in the rig's cabin. This was done so the drill pipe could be unthreaded using the deck wrench to take weight off the drill head, as well as providing a means of aligning the head-slide bolt holes with the head bracket.

As the drill fitter stood on the hydraulic break-out tool (HOBO) to check the alignment of the head slide and bracket, the centraliser arm closed unexpectedly. On seeing the movement, his colleague standing near the cabin, activated the emergency stop but it was too late. The fitter had been crushed between the centraliser arm and the drill head and his injuries were fatal.

The subsequent investigation found that the head slide could not be fitted from the rig's deck due to a damaged bracket in the rotary head arrangement. When working from the deck, workers are not in the centraliser arm's 'line-of-fire', which is around two metres above deck level.

Static and dynamic testing was also conducted as part of the investigation. The static testing did not identify logic defects in the hydraulic or programmable logic controller (PLC) circuits. Dynamic testing identified that it was possible for the driller's leg to contact exposed wiring and switches under the control panel, and cause an unplanned inward movement of the centraliser arm.

Note: The drill rig had been out of service for about two years and was recommissioned following refurbishment only weeks before the incident.



1. Bent head-slide bracket shown with drill head above the deck wrench 2. New head slide did not fit between head bracket and mast 3. Driller's cabin showing seat position and control panel 4. Exposed wires and switches on the underside of the control panel.

Direct causes

- The drill rod centraliser arm moved unexpectedly.
- The maintainer was standing on the HOBO in a potential crush zone.

Contributory causes

- Isolation had not been carried out prior to conducting maintenance.
- The uncontrolled movement of the rod centraliser arm had been identified on pre-start forms the previous week, but had not been entered in the maintenance system.
- Damage to the head-slide bracket prevented the head slide being fitted from the deck.
- The drill head was raised to unthread the drill pipe, making it impractical to fit the head slide from the deck.
- As designed, the underside of the control panel was not covered. This would have prevented inadvertent contact.
- The damaged head-slide bracket was not identified during the recommissioning process.
- A written safe work procedure (SWP) had not been developed for replacing a head slide.

Note: The unwritten work practice relied on head slides being fitted from the deck. To achieve this, the blast hole was drilled to its full extent (i.e. depth is defined by drill rig configuration).

- No task-based risk assessment (e.g. job hazard analysis or JHA) was conducted for the modified task of replacing the head slide.

Actions required

The following actions are recommended to reduce the potential for injury while repairing, maintaining, commissioning or recommissioning plant.

- Implement and enforce suitable isolation procedures.
- Confirm that workers conducting maintenance and repair work are adequately instructed, trained, assessed and supervised.
- Consider developing SWPs for repetitive tasks that have the potential to expose workers to hazards.
- Complete suitable task-based risk assessments where SWPs are not provided, and when the conditions or the scope of work changes, and assess and authorise prior to conducting work.
- Rectify defects or faults identified during equipment pre-start inspections within an appropriate timeframe.
- Conduct a thorough inspection and assessment process when recommissioning plant to identify any machine and component defects to be included in a scope of works for refurbishment.
- Check for exposed wiring and potential switch contacts that could initiate unexpected machine movements.

Further information

- Department of Mines and Petroleum, Guidelines, www.dmp.wa.gov.au/Safety/Guidelines-16146.aspx

  Isolation of hazardous energies associated with plant in Western Australian mining operations – guideline

- Department of Mines and Petroleum, Guidance about the isolation of hazardous energies

  www.dmp.wa.gov.au/Safety/Guidance-about-the-isolation-of-6652.aspx

This Significant Incident Report was approved for release by the State Mining Engineer on 12 September 2016