Significant Incident Report No. 284

Subject: Service mechanic sustained serious hand injuries when struck by radiator fan blades on a generator.

Date: 22 February 2021

Summary of incident

Note: The Department of Mines, Industry Regulation and Safety's investigation is ongoing. Information contained in the significant incident report is based on findings at the time of writing.

On 29 October 2020, a contractor service mechanic serviced a generator that provided power to a mine village. The generator was on a hire agreement with a third party supply company, which is a common arrangement for mines in Western Australia.

The service mechanic completed a general service of the 300 kVA generator, de-isolated it and brought it back on-line. He then conducted post service inspections and clean-up, including wiping up oil and grease marks with a rag.

When the service mechanic leaned into the generator enclosure with a rag in his hand, it appears the rag and his hand were drawn into the rotating radiator fan blades causing serious injuries to his thumb, index and middle fingers.

Main photo and inset showing gap in the underside of the guarding as possible access point.

Direct causes

The service mechanic's hand contacted the rotating radiator fan blades while working near the underside of the fan guarding with the machine running.

Contributory causes

- The service mechanic was cleaning up inside the generator enclosure with the engine running.
- There was a gap in the underside of the guarding around the radiator fan.
- It is possible for a loose rag to be drawn into the fan blades thereby pulling a hand in through the gap in the guarding to contact the moving blades.
- Risk assessments conducted by duty holders had not identifed the risk of entanglement posed by the gap in the fan guarding.
- The work procedure for servicing and inspecting the generator was not clear in terms of job sequence and isolation requirements.
- Monitoring processes were not undertaken to confirm that standards/safe work procedures were followed (e.g. audit, task observations, site inspections).

Actions required

The following actions will assist in the safe operation of generators.

- Duty holders (i.e. designers, manufacturers, suppliers, employers, etc.) must undertake risk assessments on all generators used on mines to identify, assess and control all hazards to which workers are likely to be exposed.
- When choosing hazard controls, select the highest practicable control measures considering the heirarchy of controls and human and organisational factors (in particular, human error).
- Duty holders must ensure that guarding and other access controls prevent inadvertent contact to moving machine parts. Inadvertent contact can mean unintended contact in the course of performing work activities, and is not only due to a slip or trip event.
- Implement and enforce suitable isolation procedures for maintenance, servicing and cleaning of generators. The procedures must include de-energising plant and the lock, tag and try/test method.
- Develop safe work procedures for all tasks associated with operating and servicing generators in clear, unambiguous language.
- Confirm workers receive adequate supervision in the performance of their duties while operating and maintaining plant.
- Confirm that workers conducting cleaning, maintenance and repair work are adequately instructed, trained and assessed as competent.
- Establish robust contractor management processes to ensure adherence to required standards and safe systems of work.
- Implement regular and ongoing monitoring programs and processes to ensure adherence to safe work procedures.
- Ensure persons working around moving equipment with moving parts do not have loose items of clothing, unsecured hair or other items that could be caught by moving parts.

Further information

AS/NZS 4024.1601:2014: Safety of machinery – Design of controls, interlocks and guarding – Guards – General requirements for the design and construction of fixed and movable guards

Department of Mines, Industry Regulation and Safety

- Safeguarding of machinery and plant – Code of practice www.dmp.wa.gov.au/Documents/Safety/MSH_COP_SafeguardingOfMachineryAndPlant2009.p
- SIR No. 251 Worker seriously injured while operating a block-making machine - www.dmp.wa.gov.au/Documents/Safety/MSH_SIR_251.pdf -
- SIR No. 248 Worker seriously injured when caught in moving conveyor - www.dmp.wa.gov.au/Documents/Safety/MSH_SIR_248.pdf -
- SIR No. 225 Worker seriously injured by moving parts in a modified stemming bucket www.dmp.wa.gov.au/Documents/Safety/MS_SIR_225_Worker_seriously_injured_by_moving_p
- SIR No. 205 Worker injured by moving parts on automatic rotary sample collector - www.dmp.wa.gov.au/Documents/Safety/MSH_SIR_205.pdf -
- Human and organisational factors - www.dmp.wa.gov.au/Safety/Human-and-organisational-21920.aspx -

This Significant Incident Report was approved for release by the State Mining Engineer on 22 February 2021