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Unplanned vehicle movement - Failure of Battery Isolator and Braking System

What happened?

A Komatsu 930E-2 rear dump truck ascending a ramp incurred a fault and lost all power and propulsion, coming to a complete standstill on the ramp. The operator exited the cabin and descended to ground level to reset a battery isolator. When the operator stepped off the access ladder the rear dump truck began to roll backwards. It gained speed, travelling an estimated distance of 200 metres down the ramp and came to rest on a bund. A grader and another rear dump truck had to take evasive action.

How did it happen?

There was an existing issue on the main battery power isolator where it was difficult to initiate it into the ON position due to the mechanism being tight to turn. When the battery isolator has been reset it has not been fully turned, locked, and engaged into the ON position, allowing the isolator to trip to the OFF position, likely from vibration during operation of the truck.

Before the incident, the Komatsu rear dump truck has incurred the same fault and lost all power and propulsion on flat ground. The operator exited the cabin and reset the battery isolator. An intrinsic condition exists with the vehicle's operational design, inhibiting the application of the park brake if the vehicle monitoring identifies movement above 0.5 mph (0.8 kph) to ensure the integrity of the park brake system is maintained as its reliability will be degraded if it is applied at speed.

When the vehicle lost all power, both electrical and mechanical, the park brake, being spring applied and oil release, has lost hydraulic pressure and would have tried to engage whilst the vehicle was still moving forward, degrading the effectiveness of the park brake system. Vehicle diagnostic, monitoring and protection systems would have been rendered ineffective due to the loss of the main electrical supply. The operator was not aware of the above condition when the rear

dump truck has returned to service. When the second loss of power event occurred on the ramp, the park brake integrity has failed resulting in the unplanned movement.

Key issues

- A known condition existed where the battery isolator was difficult to engage.
- Pre-start inspections had not identified the fault.
- Hazard identification did not identify the loss of vehicle diagnostic, monitoring and protection systems from loss of stable supply when the vehicle is in operation.
- The operator was not aware of park brake degradation from a speed event.
- Deviation from reporting and rectifying defects.
- Similar defects were found on the other Komatsu 930E-2 trucks in the fleet. However, the isolator defect appears to be restricted to the 930E-2 rear dump truck.
- The intrinsic condition potentially exists on rear dump trucks of other makes and models. This is the condition where the operational design inhibiting the application of the park brake if the vehicle monitoring identifies movement above a certain speed. This design is used to ensure the integrity of the park brake system is maintained and its reliability is not degraded if it is applied at speed.

Recommendations

- Mines should review their safety and health management system (SHMS) to ensure the continued effectiveness of braking systems on fixed and mobile plant used at the mine.
- Mines should review their SHMS to ensure training schemes for the operation of mobile plant communicate and control the hazard of park brake degradation to both assessors and operators if applicable.
- Mines should review their SHMS to ensure it provides for reporting all defects in the mine's plant, structures and procedures and the rectification of defects that create an unacceptable level of risk.
- Mines should review the battery power isolator operation on rear dump trucks and ensure that any similar defects are rectified.

Investigations are ongoing and further information may be published as it becomes available. The information in this publication is what is known at the time of writing.

We issue Safety Notices to draw attention to the occurrence of a serious incident, raise awareness of risks, and prompt assessment of your existing controls.

References and further information

- OEM Operational Guidelines and Technical Information
- Coal Mining Safety and Health Act 1999 - s39 Obligations
- Coal Mining Safety and Health Regulations 2017 - s66 Braking systems

- Coal Mining Safety and Health Regulations 2017 - s71 Safety checks by competent person
- Coal Mining Safety and Health Regulations 2017 - s98 Reporting and rectifying defects

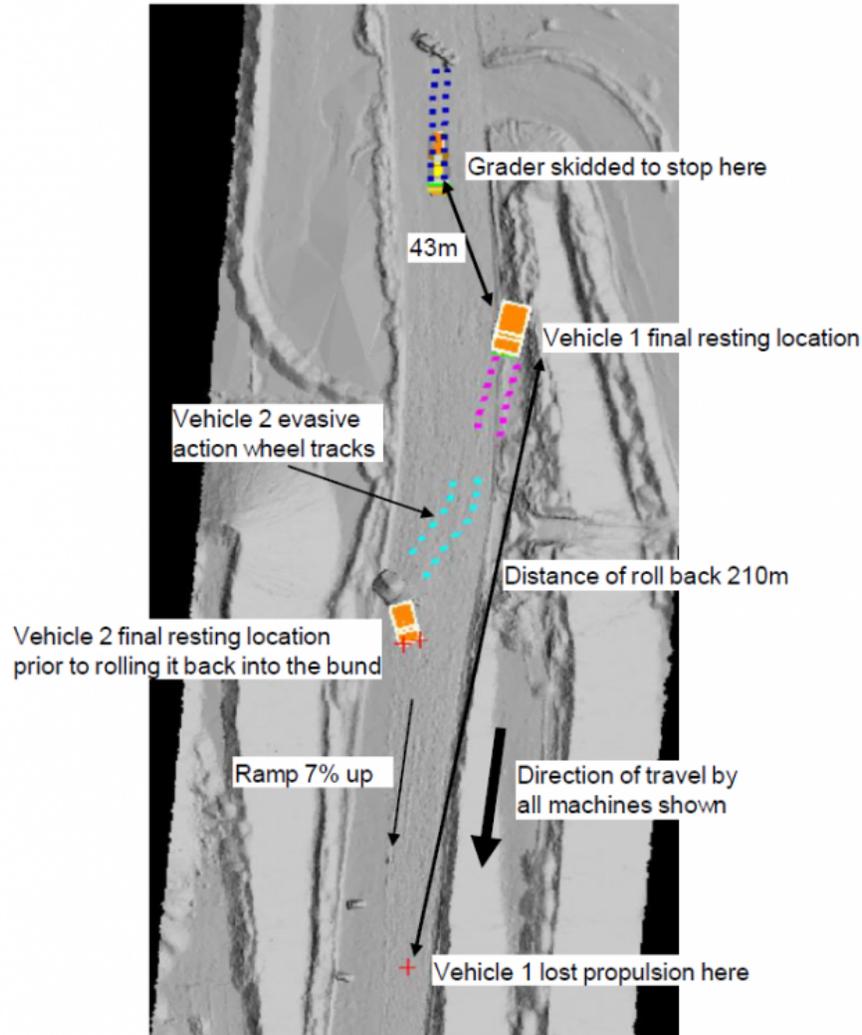
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Incident Measurements



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