



Mines Safety Bulletin No. 93

Date: 19 November 2010

Subject: Lowering and raising of bottom guards on dozers — fatal accidents

Summary of hazard

This bulletin was prompted by concern relating to serious and fatal accidents involving the lowering and raising of bottom guards (“belly plates”) on heavy earth-moving equipment during inspections, maintenance and repairs. There have been three fatalities recently around the world during attempts to remove dozer bottom guards, including a fatal accident at a Western Australian mine in 2009.

Bottom guards are heavy. They also accumulate debris during dozer operations, which significantly increases their weight and obscures the critical components that secure them in position. Uncontrolled movement can occur when nuts or bolts securing the guard are loosened if the guard is not be appropriately restrained or supported. This may result in serious or fatal crush injuries.

Contributory factors

The preliminary investigation into the incidents confirmed that many employers, supervisors, operators and contractors were not sufficiently aware of the hazards associated with this task. In some cases, a job safety analysis (JSA) or job hazard analysis (JHA) was not performed, and safe work procedures were found to be inadequate or not followed.

The common contributory factors identified include:

- failure to establish appropriate systems of work that took into account different work environments;
- failure to plan and supervise the work and ensure available employees had the necessary knowledge, skills and equipment;
- failure to identify the hazards and put controls in place before work commenced;
- employee-training processes that did not effectively evaluate the trainee’s understanding of the bottom guard lowering and raising process, and lack of periodic re-assessment;
- lifting and lowering aids such as come-a-longs and lifting or component handling equipment were not used;
- employees positioned themselves directly under the bottom guards while attempting to remove mounting nuts and bolts;
- failure of the securing devices during the task and absence of back-up protection such as blocks;
- missing mounting nuts and bolts; and
- inadequate lighting.

Action required

Clearly, bottom guard lowering and raising on earth-moving equipment must be regarded as a safety critical task, and needs to be performed by competent persons in accordance with documented systems of work addressing all risks involved.

This bulletin serves as a reminder to responsible persons at mines to review current work practices and ensure their adequacy. It is appropriate to consider the following actions.

- The establishment and adherence to comprehensive bottom guard lowering and raising procedures as per the original equipment manufacturer's (OEM's) recommendations.
- Information on bottom guard lowering and raising provided and updated by the OEM should be readily available for review by employees.
- Bottom guard lowering and raising work should be undertaken in a workshop environment with the aid of fit-for-purpose lifting and lowering equipment to control the movement of the guard (see example in Figure 1).
- Where bottom guard lowering and raising tasks are required to be performed in the field, a comprehensive JHA must be performed and measures implement to control all hazards with appropriate management input, approval and supervision.
- Employees carrying out bottom guard lowering and raising tasks must be appropriately trained and assessed as competent before undertaking the work.
- Mounting nuts and bolts on bottom guards should be regularly inspected and tested by a competent person in a safe environment. Equipment component change-outs, repairs, testing and inspection must be recorded.
- During lowering and raising of a bottom guard, employees must not position themselves directly beneath the equipment, in the "line of fire".
- If adverse environmental conditions (e.g. inclement weather, poor lighting or visibility) are present then appropriate controls need to be put in place to manage the additional hazard.
- Regular monitoring and supervision of the workplace must be undertaken, including task observation and peer review.



Figure 1 Example of a fit-for-purpose component handler positioned to support the bottom guard (photo courtesy of Direct Mining & Industrial International Pty Ltd)

A handwritten signature in black ink, appearing to read 'Simon Ridge'.

Simon Ridge

STATE MINING ENGINEER