



Mines Safety Bulletin No. 104

Subject: Use of personal protective equipment for high voltage (HV) switching

Date: 12 April 2013

Note: HV switching for energised overhead electrical equipment should only be carried out when the switching cannot be done de-energised and a risk assessment has been undertaken and appropriate control measures are in place. Appropriately rated and tested personal protective equipment such as HV insulating gloves, work sticks and insulating platform are required for switching of energised overhead electrical equipment.

Summary of hazard

Inadvertent contact with live electrical equipment indirectly through work sticks can be lethal.

If the condition and test date of personal protective equipment (PPE) such as insulating gloves and work sticks are not verified before they are used for HV switching operations, there is the potential for critical control measures to fail. Five prohibition notices have been issued recently relating to the use of insulating gloves that displayed expired test dates, leading to uncertainty about their effectiveness during HV switching operations.



Insulating glove with “next test due” date stamp that was out-of-date as at 15 December 2012

Contributory factors

- Lack of or inadequate safe system of work for HV switching.
- Failure to inspect and check the testing records of personal protective equipment before HV switching operations.
- An inventory management system that does not flag when equipment testing is due.

Recommendations

Regulation 5.27 of the Mines Safety and Inspection Regulations 1995 mandates the periodic examination and testing of all electrical equipment (including PPE). In this regard, the appropriate Australian Standard is AS 5804:2010 *High-voltage live working*, which details the following test intervals:

- HV gloves every 6 months
- HV work sticks and insulating platforms (dry test) every 12 months.

Other recommendations for safe work practices are listed below.

- Treat all electrical equipment and conductors as energised, until proven to be de-energised.
- Undertake a formal risk assessment for HV switching operations to identify and consider all potential hazards, the risks associated with those hazards, including consequences, and the control measures that can be applied. The risk management process should eliminate, or reduce as far as reasonably practicable, risks associated with HV switching.
- Require a permit for HV switching, and cancel the permit upon completion.
- Before carrying out HV switching for energised overhead electrical equipment, identify the specific hazards associated with each job, considering risk factors such as:
 - the minimum approach distance from any exposed energised electrical equipment
 - the position of exposed energised conductors and live conductive parts
 - the access to insulating platforms
 - environmental conditions (e.g. hot, wet, humid)
 - fault levels (and their possible reduction)
 - the design of switches for operating under load
 - the capacity of personal protective equipment to withstand the fault current
 - automatic reclosing functions (e.g. disable to avoid reclosing after fault has occurred).
 If necessary, modify the risk control measures before starting the job.
- Where identified as a critical control measure by the risk assessment, provide a competent safety observer while performing HV switching.
- Include the inspection and checking of testing records of personal protective equipment in the HV switching procedure and work permit system. Before use:
 - air-test and visually inspect the entire surface of HV insulating gloves
 - thoroughly inspect HV work sticks for damage and deformity, and wipe them clean
 - ensure personal protective equipment is clean and completely free of moisture.
- Establish an inventory management system that prompts action when testing is due.
- Ensure the voltage rating of personal protective equipment is appropriate to insulate the HV operator from the energised part where the switching is performed.
- Implement an out-of-service tagging procedure for damaged personal protective equipment.
- Transport and store all HV personal protective equipment in suitable storage containers. Consult the original equipment manufacturer (OEM) for advice.



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