



MONTHLY ELECTRICAL INCIDENTS

ASP Manufacturing

July 2021



An electrician noticed a distribution board escutcheon plate was missing pole fillers where circuit breakers had not been installed, potentially allowing access to exposed energised parts of the busbar. Unable to obtain propriety style pole fillers, the electrician manufactured a metal plate to cover the hole and secured it with metal pop rivets. An Arc Flash occurred as the escutcheon was returned into position over the circuit breakers while the board remained energise, the incoming 160 A circuit breaker operated to clear the fault. Burn marks were evident on the rear of the escutcheon where the rivets had exceeded the required clearance.

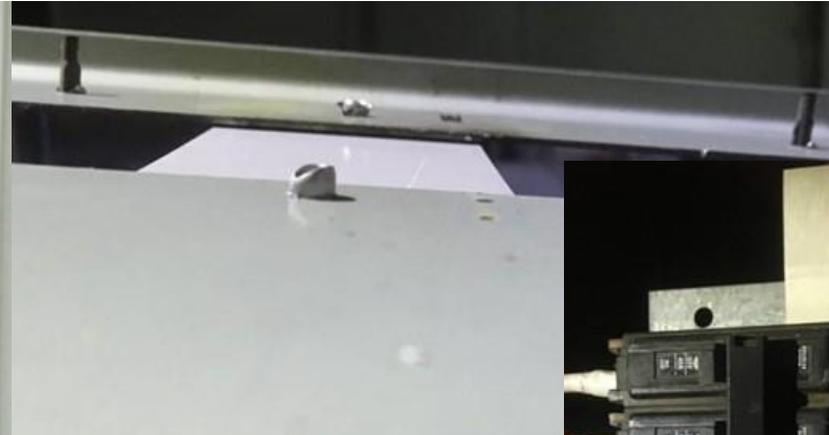
BSL policy is we do not work on or near exposed energised conductors or live conductive parts as per Electrical Safety Manual 1.4.3.6



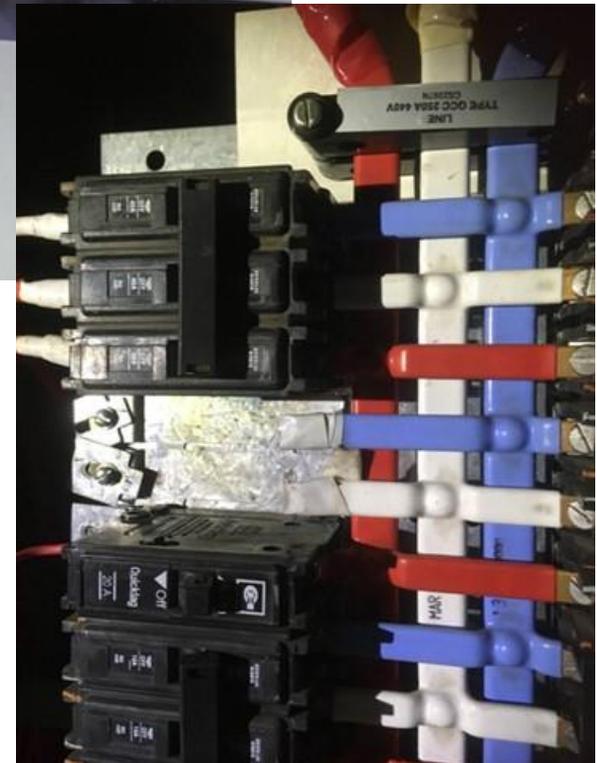
The reverse of the escutcheon showing the arc burn marks



The front of the escutcheon with the metal plate pop rivetted in place



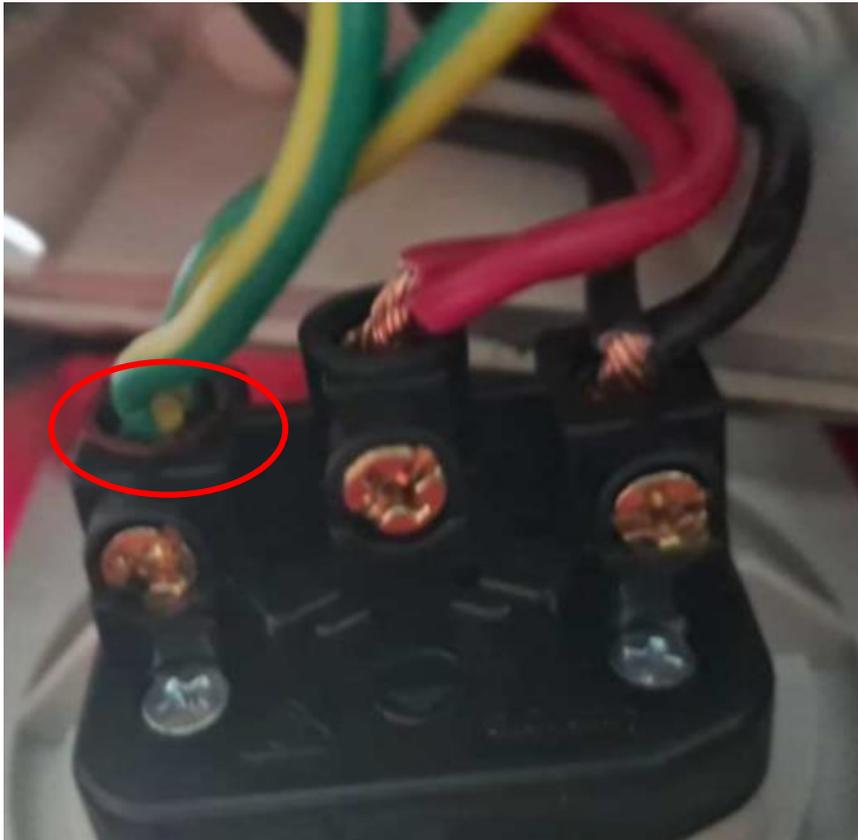
The reverse of the metal plate with the pop rivets protruding through



The board internal busbar comb and missing circuit breaker

Electricians installing a plug-in LED floodlight into an unused lighting outlet found it caused all the lights in the area to go out. After unplugging the light fitting it was found the outlet earth and active conductors had been transposed. Fortunately the fitting was mounted on an earthed frame at the time it was energised and no one was touching the fitting. The outlet was installed prior to 2000 without RCD protection in an area of plant which had been shutdown for a number of years and clearly had remained unused since original installation.

Mandatory inspections and tests are required to ensure electrical installations are verified safe and comply with requirement of AS3000 before allowing energisation. Installations found to be unsafe must be removed from service until rectified and verified safe. Refer AS3000 section 8 Verification for the minimum inspection and testing requirements.



The transposed wiring on the back of the outlet. The earth wires are clearly in the termination point which is indicated RED.



The outlet



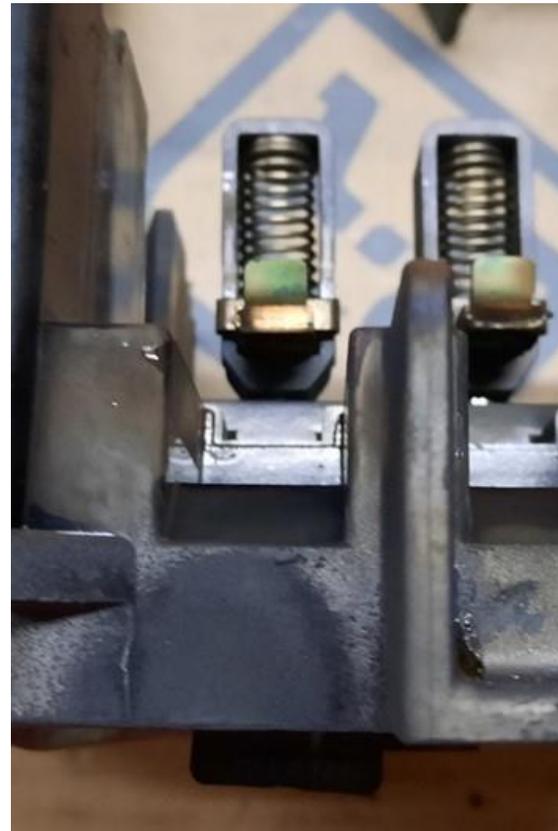
The light fitting mounted on an earthed frame

A 30kW drive tripped blowing all three main fuses. When electricians meggered the motor, cabling and MCC starter all was ok. A visual inspection was carried out, no obvious signs of faults were found except for some cabling showing signs of heat and age. The complete starter unit was replaced and the drive started successfully. The original starter was bench tested for circuit continuity and meggered at 500V, no faults were found. It was then dismantled to reveal tracking and burn marks on the steel base below the blue phase connections to the main contactor. The original fault is believed to have been the result of dust or dirt build up resulting in tracking at the base of the contactor.

This is high fault level equipment, the incident serves as a reminder of the importance of ensuring cells and covers are secured before performing switching operations or motor starting. It is essential MCCs and switchboards have an effective management system, including inspection and testing, to prevent similar faults.



How the contactor base was found. It is believed the cable damage was a result of the arc incident and was not the root cause.



Arc tracking marks below the blue phase connector



Arc mark below blue phase connector

Arc mark on steel base plate

A boilermaker doing structural repair work on the stairs of the excess gas bleeder cut through a cable with an angle grinder. The cable was a 24v dc signal cable going to an instrument. Other cables identified on another level of the bleeder were included in the JSEA. The JSEA was not updated, nor was the area inspected prior to cutting at this location.

It is imperative installations are checked for services and made safe before similar cutting, removal or welding work is performed. Electrical personnel should be consulted as part of the clearance checks.



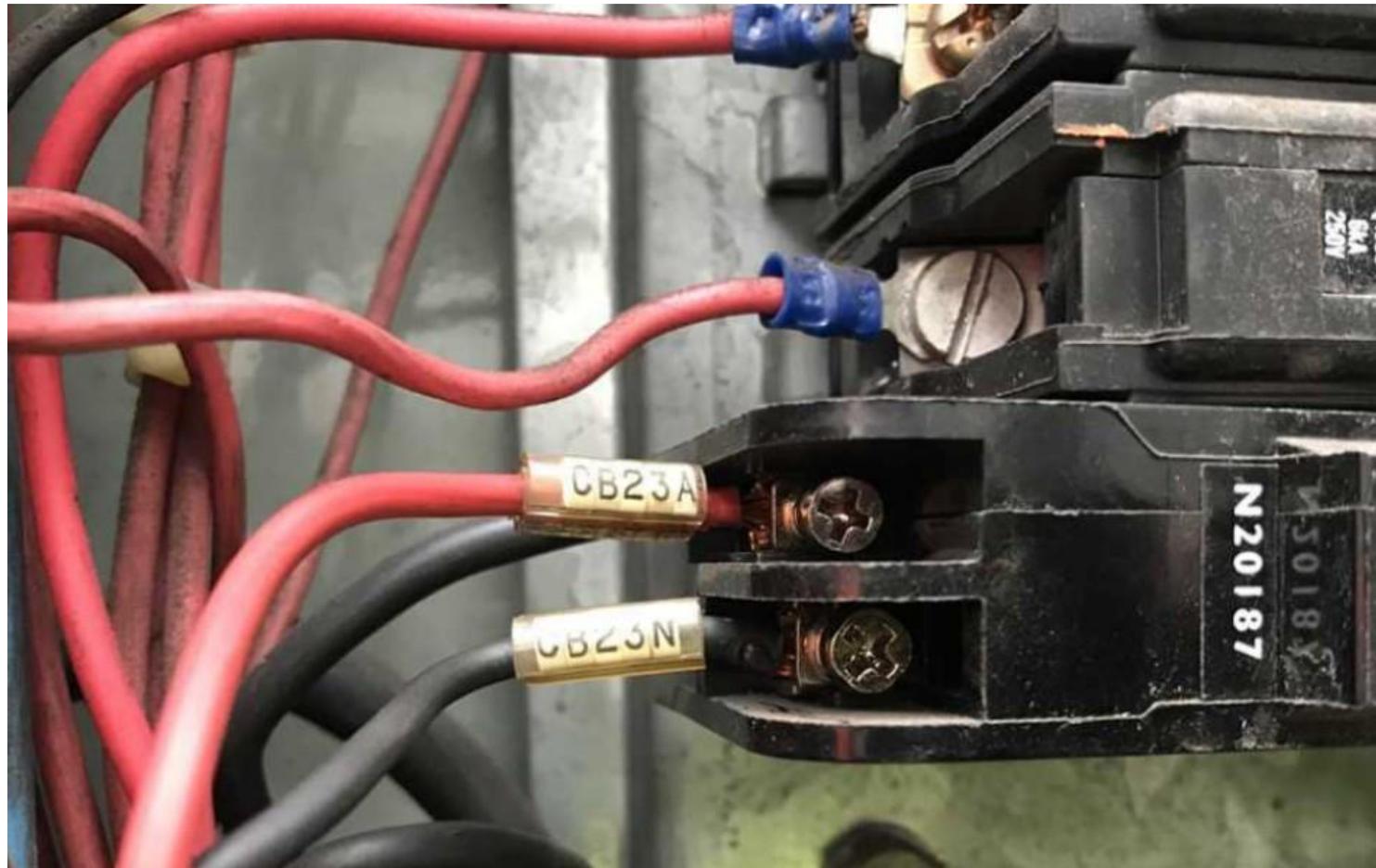
The work area involved with the steel plate step being replaced. The old step was cut from above, with the unseen cable below now visible.



The cut cable and flexible conduit underneath the step

An RCD power circuit was found to be wired incorrectly when disconnecting redundant circuits during an office renovation. The active and neutral conductors were found transposed at the RCD breaker terminals, resulting in the black core of the TPS cable becoming an active conductor and the red core the neutral conductor. The it would be switched at each of the outlets. This contravenes AS3000 Section 2.3.2.1.2.

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The wiring to the QuickLag RCD breaker, clearly showing the red wire in the terminal above the black neutral reference conductor for the breaker. Even the core numbers indicate it to be the active conductor

During renovations of an old office and kitchen a number of potentially serious scenarios were discovered:

- Exposed, unterminated conductors were found stuffed inside paper towel within floor mounted SKN ducting at an outlet mounting bracket. The conductors would have been energised before work commenced.
- Cables were found with damaged insulation in the corner section of wall ducting behind a plastic container lid jammed into position. Conductors were likely damaged by vermin.

In both cases a deliberate actions had been taken which put others at risk of electric shock. All incidents like these must be reported and the installation made safe.



The three exposed conductors and the paper wrapping which covered them, when they were energised



The temporary plastic container lid cover and the exposed conductors behind which were energised



Electricians investigating an issue in a mechanical crib room found two hardwired wall plates with the appliance cables cut off at the wall plate leaving exposed conductors. The outlets remained energised at 240V ac and were fed from non-RCD protected circuit breakers. There was no record of what the outlets supplied.



The two hardwired wall plates with the energised three core cables coming from them with exposed conductors



Electricians removing a four gang outlet have found the labelling to be incorrect. The cover plate label indicated the outlet to be fed from CB2 but when CB2 was isolated 240V ac was still on the outlet. A different source, CB1, was identified once the cover the plate was removed, this was isolated and verified to be the correct source using Test Before You Touch.

This incident highlights the importance of accurate labelling and the critical need to thoroughly Test Before You Touch.



The two conflicting labels on the outlet and outlet cover plate