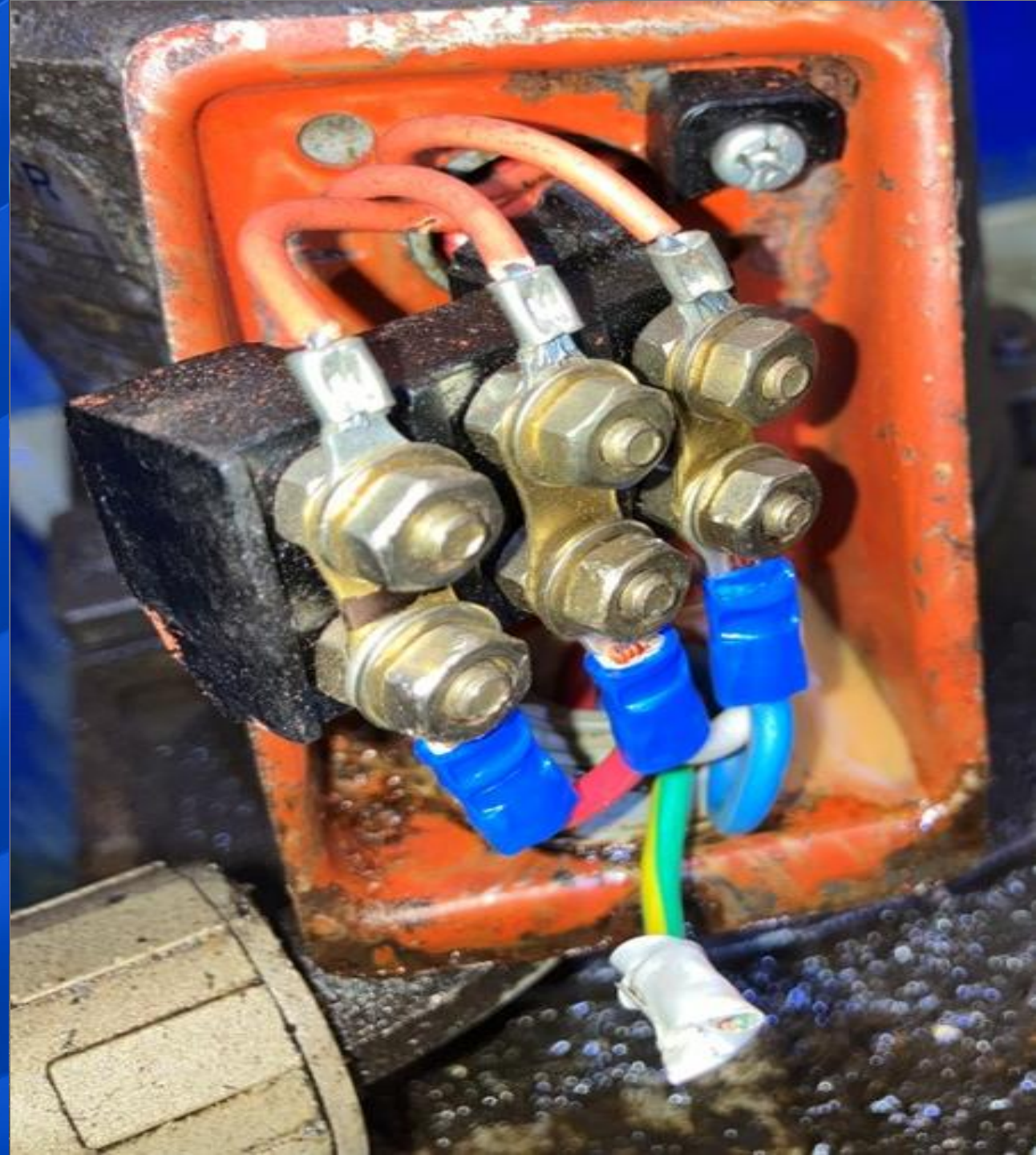


Electrical Incidents

Key Learnings

ASP Manufacturing

2024 / 2



Whilst operating a cold saw a worker noticed the steel strainer on the coolant tub below was sticking out. When they reached down to move it, the strainer contacted the frame of the electric coolant pump behind it and the worker felt an electric shock between their arms.

The coolant tub was a modification to the saw's original mechanical pump and faults were found with the electric pump motor –

- It was not sealed effectively to stop coolant entering.
- The termination block was broken, energised terminals could move and contact the motor frame.
- The motor frame was not earthed. The supply cable was earthed at the supply end but found disconnected and taped up at the motor.

Modifications to appliances and other equipment must comply with current standards.

Equipment and protection must be suitable for the environment it is installed and the intended use.

Equipment must be adequately maintained to ensure live parts remain insulated and protect people from inadvertent contact. Periodic inspection procedures must ensure the integrity and safety of the whole electrical installation, with protective earthing confirmed on all accessible conductive parts.

Refer to AS 3019 Electrical installations - Periodic assessment, AS/NZ 3760 - In-service safety inspection and testing of electrical equipment and RCDs.

QUESTIONS –

- What is the maintenance plan for your work site appliances?
- Would the above faults and unterminated earth have been found?



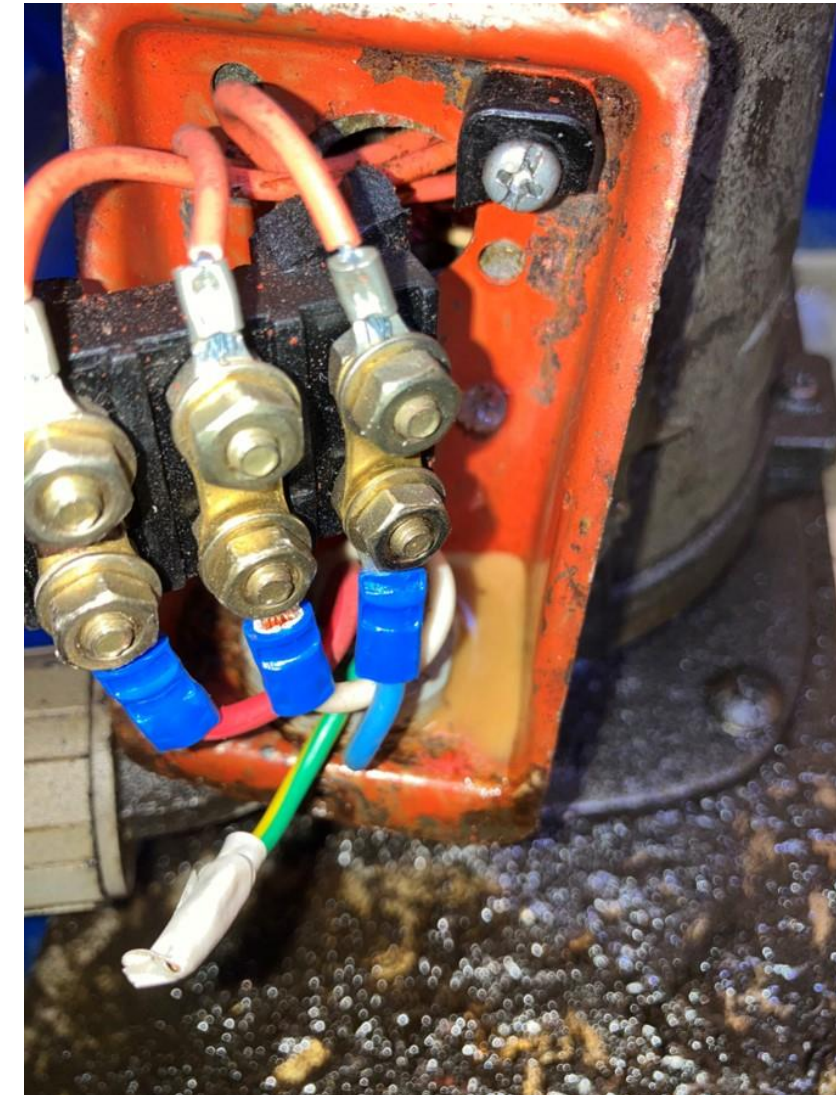
Cold Saw (coolant tub below is forward of normal position)



Modifications - coolant tub, 415-volt pump, bracket & tray



Motor terminal box IP rating insufficient for wet environment and cover not adequately secured



Motor terminal block base broken and loose.
(Motor frame not earthed)

Reference: Multiple incidents (9) – Switch Room Doors left unlocked or open

More than 10% of electrical incidents reported this month involved switchroom doors being left unlocked or held open by various means. These incidents mainly occurred during major shutdowns, resulting in more people than usual potentially being exposed to electrical hazards.

The normal restrictions that limit access to switch rooms failed or were intentionally bypassed.

Switchrooms or Electrical Stations must remain secured to restrict access to authorised persons due to the potential hazards present. Refer to DIV-ENG-ET-003 - Access To Electrical Stations. Electrical Station owners need to ensure all access control systems are working effectively and always maintained in good working order.

If planned work requires switch room doors to be left open (E.g., for ventilation, movement of equipment) then additional access controls need to be in place. A danger barricade in the immediate area or a designated safety watcher can help prevent unauthorized or accidental entry.



Door tied open with electrical cable



Door chocked open with timber



Door chocked with fire extinguisher

A steel cover for a cable trench was deformed and fell onto cables below after been driven over by a forklift.

The cable trenches were for old production lines in the area and had bracing underneath to prevent sideways movement but were not designed for the weight of a forklift. The production lines had been removed years ago, and the area repurposed as a warehouse, with the frequent use of forklifts to move heavy items around.

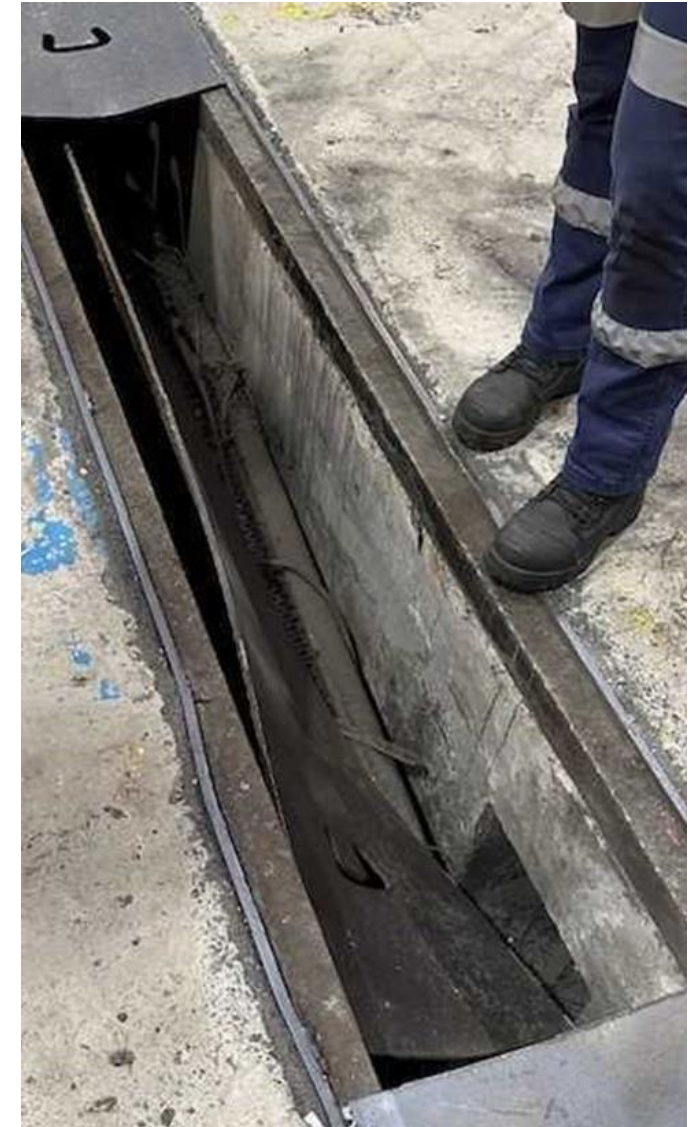
Modification control of the building usage failed to identify cable trench covers as being a potential hazard when driven over.

When areas of plant are repurposed, existing infrastructure and location of electrical services must be considered.

Cable trenches, racks, pipes and conduits may require additional mechanical protection.

Electrical distribution boards and panels may require bollards and barricades to protect from contact with moving machinery, and extra signage to be more visible to drivers.

An audit of repurposed areas like this can highlight these potential hazards.



Damaged floor plate on cables

Reference: i2439753 – Vacuum Cleaner power lead cut by fish scaler

During cleaning of a process area, the energised power lead of a vacuum cleaner was cut when someone stepped onto it. The lead was on the floor, laying on top of a fish scaling tool that is used as a scraping device. The tools teeth punctured and shorted the power lead conductors, causing the supply circuit breaker to trip.

Housekeeping and management of appliance lead controls had failed.

Storage of tools and equipment, and the location of leads needs to be considered when using powered appliances.

A designated storage location for the scaler and the use of insulated hooks to hang the lead safely above ground level would have prevented this.



Work Area



Vacuum Cleaner and Fish Scaling Tool



Damaged Vacuum Power Lead

Reference: i2441685 – Incorrect installation of outlets with metallic conduit

Metal conduit and reducers attached to PVC switch bases were found with no protective earth connection and the base mounting screws had no insulating plugs covering the screw heads. These were mounted on a steel backing plate.

This arrangement has the potential for metallic parts to become energised under fault conditions.

Earthing arrangements shall be selected and installed to enable automatic disconnection of the supply in the event of a short circuit to earth fault in the protected part of the installation (AS/NZS 3000:2018, Section 5). Reference to basic protection requirements such as insulation/barriers can be found in Section 1.5.4.

Refer to BSL Electrical Installation Manual MA-ENG-INS-001, Rev3, Figure 4-39 for an example of a conduit earthing ring installation.



A Switchroom fire alarm was activated by smoke generated from a wiring fault in a convertor panel.

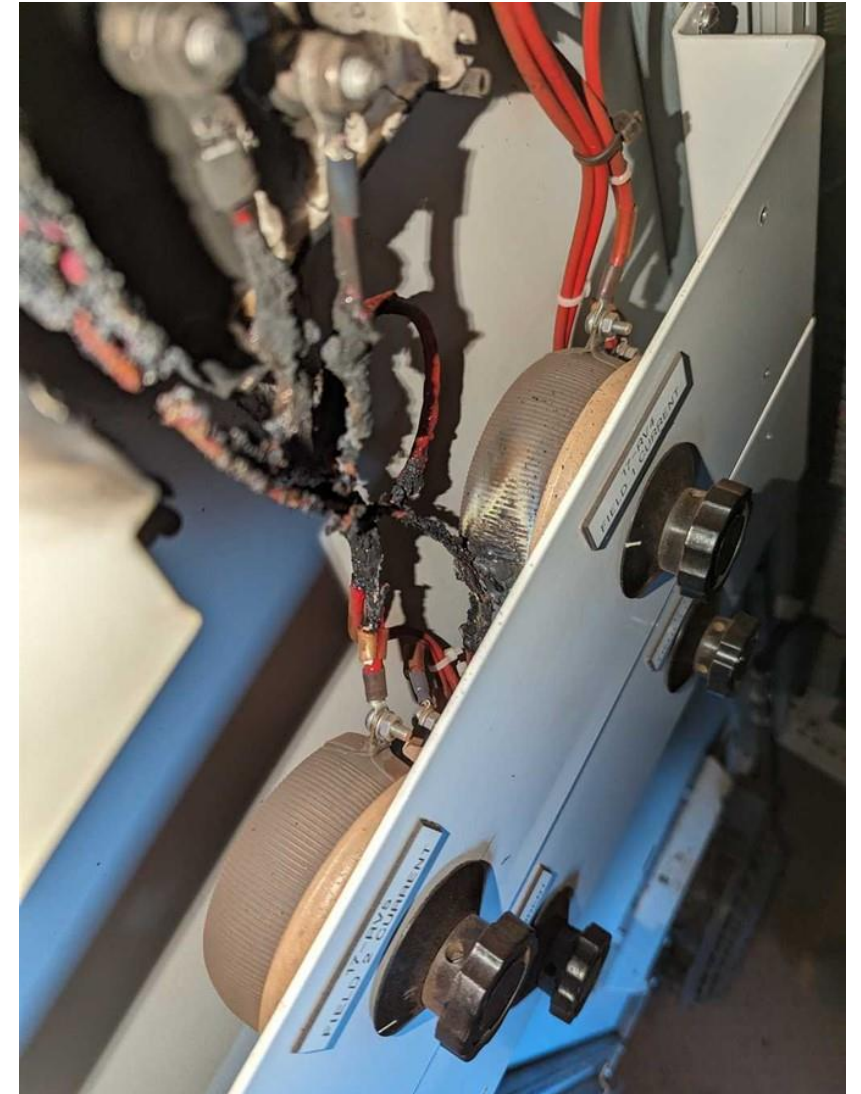
Over time, the insulation of the convertor wiring had broken down due to their proximity to rheostats which are warm during normal operations. The integrity of the wiring insulation failed, causing exposed copper to contact one of the windings of the rheostat, creating an arc fault that spread through adjacent wiring.

The installation did not allow for protection against the heat generated from the rheostats.

Extra precautions are required to prevent damage to adjacent wiring or equipment from the heat produced by some electrical equipment. Devices like high wattage rheostats, resistors, heatsinks etc. should be spaced to allow for adequate heat dissipation and cooling fans installed where required.

Wiring adjacent to these devices should also be adequately spaced, protected by heat shielding or be rated for the temperatures present.

An audit of similar installations will help identify heat affected wiring before it becomes a fire hazard.



Rheostat Wiring