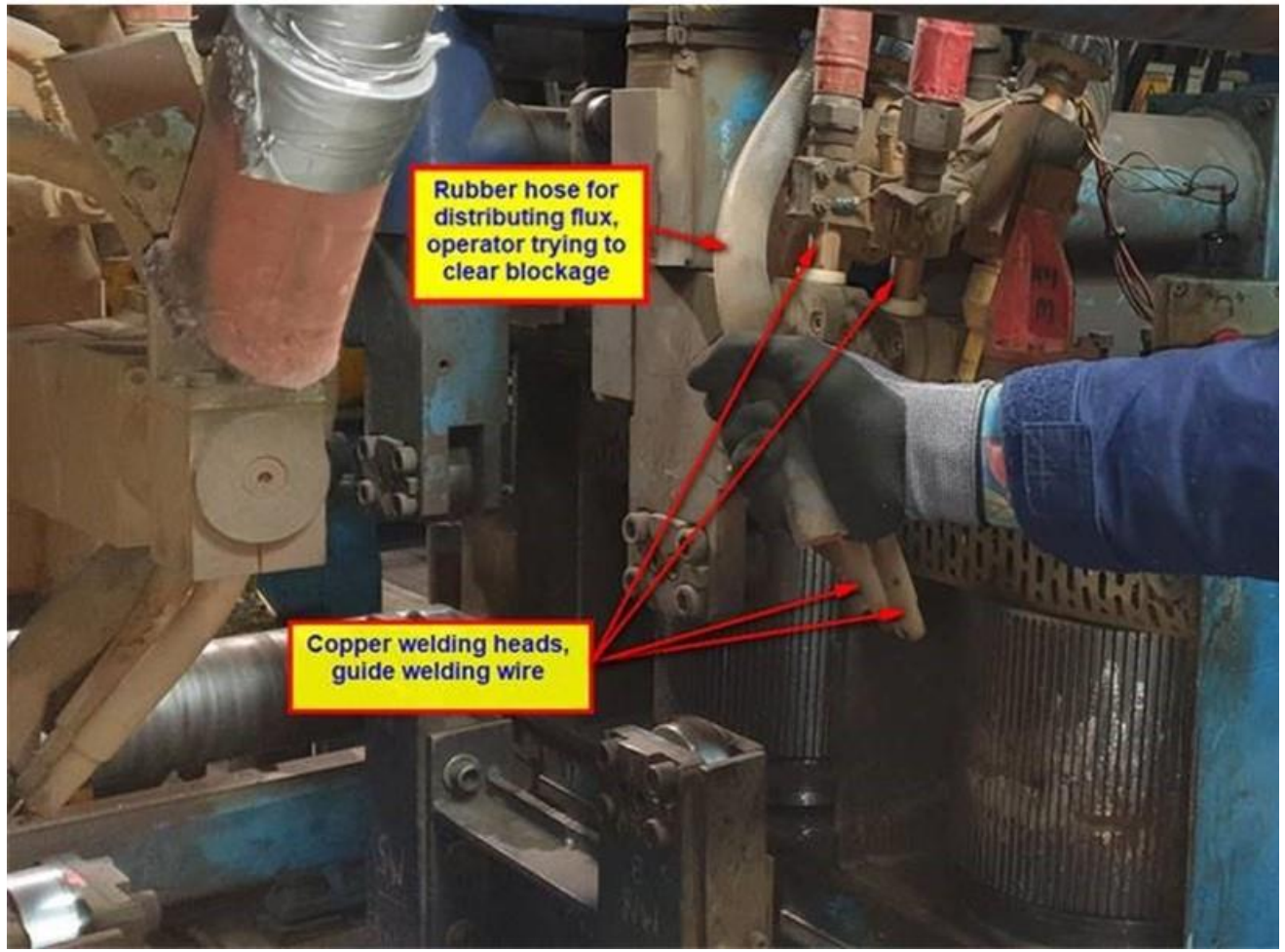
MONTHLY ELECTRICAL INCIDENTS

ASP Manufacturing

July 2020

An operator received an electric shock to the right hand while adjusting a blockage from the flux hopper on a beam welding machine. The machine has two wire feeders which place welding wire onto the beam adjacent to the flux hopper which allows flux to fall onto the section being welded. When setting up before commencing a weld the wire feeders can be inched down onto the beam, the wires energised with 25 Vac complete a circuit with the earthed beam and finally initiate the flux hopper solenoid to operate. With the blockage in the hopper the operator was holding the PVC/rubber flux hose below the hopper with the right hand and pressing the inch button with the left hand when the back of the right hand came in contact with the energised wire feeder head guides. At the time the operator was sweaty and wearing cut resistant gloves. A solenoid manual override release handle on the hopper was not used in this instance. Operating procedures and practices are being reviewed.

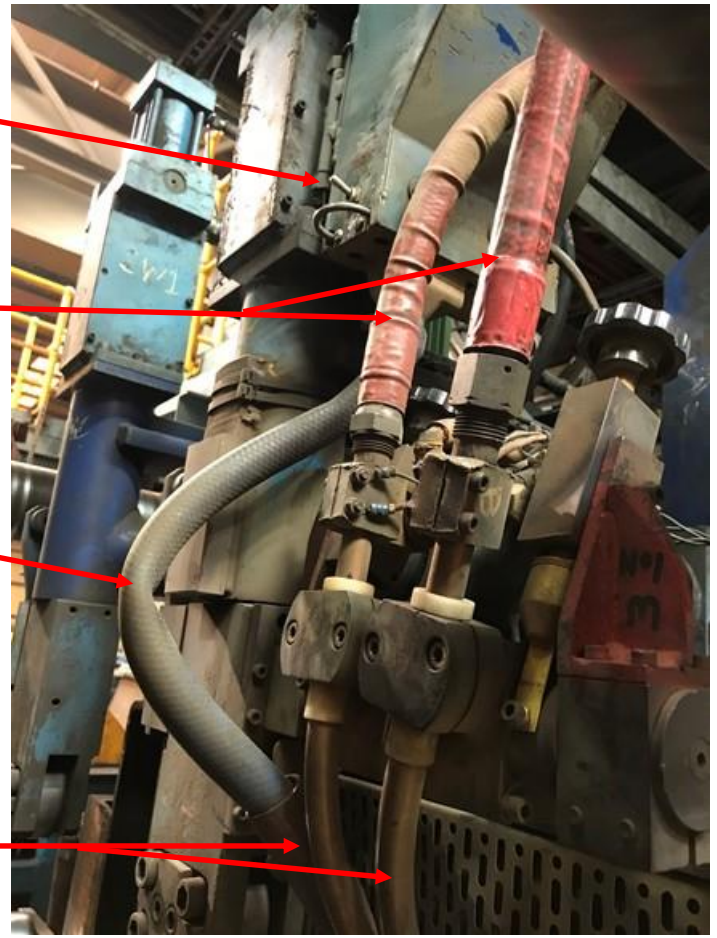


The flux hopper, with the manual override switch and handle

The two insulated wire feeder tubes

The PVC/rubber hose for the flux distribution which was being held by the operator

The two energised copper welding head guides which were contacted by the operator.



No.3 screen chute vibro failed to stop when the screen was shutdown by automation control. An operator responded to vibro alarms and attempted to stop the unit using a local stop push button, this also failed to stop the vibro. A shift electrician was unable to attend, so the shift controller assessed the risk in conjunction with the electrician and instructed the operator to shut the vibro off using the local off-load isolator after reducing the vibro to idle speed. The local isolator is not intended for interrupting a machine under load.

As per Electrical Safety Manual section 1.4.3.7 ‘performing operating work in close proximity to live equipment may result in arc blast and flash burn injuries’. To manage this risk never compromise safety for operational pressures, identify all the hazards, use appropriate PPE and do not operate switches under load unless designed for that purpose.

The off load isolator switch mounted next to the vibro drive.

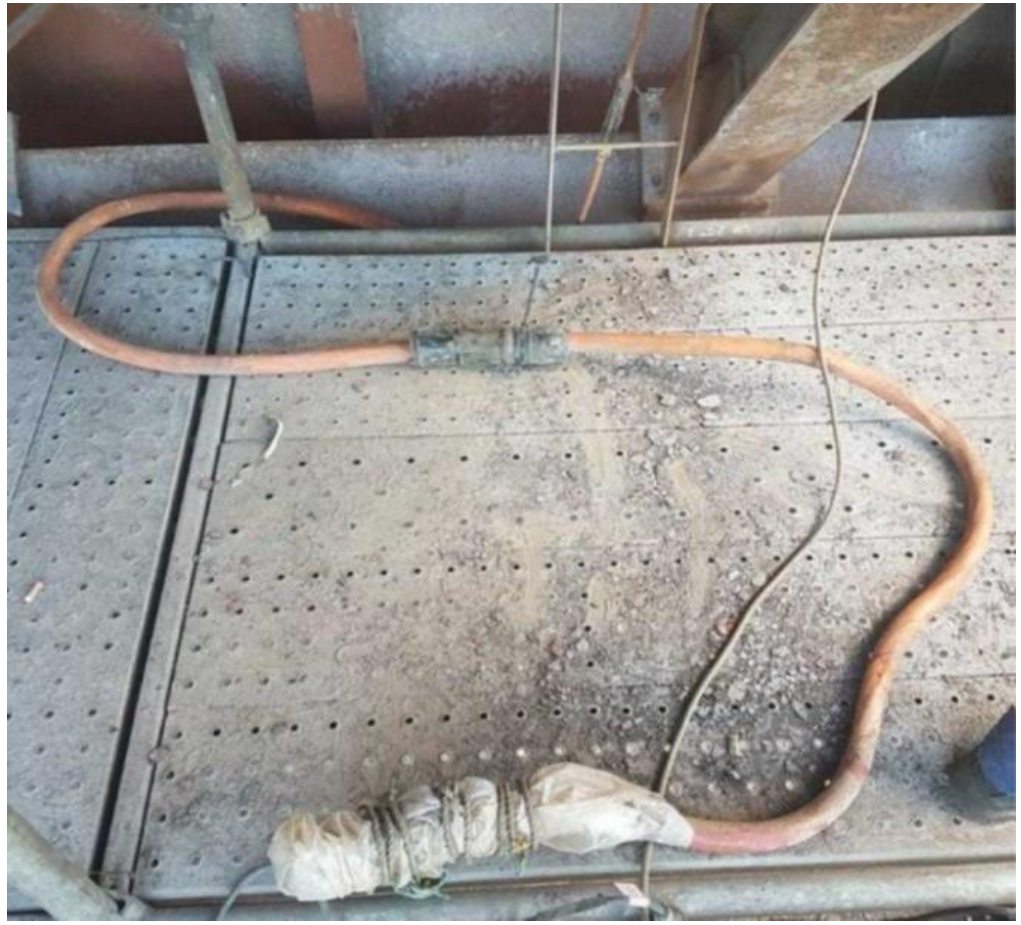
Electricians have found a hot joint in a fuseboard after reports of the power and lighting intermittently working in the site sheds it supplied. The red phase of the three phase feed to the site shed was found to have a burnt conductor at the bottom of the fuseholder. A closer inspection revealed the bottom of the fuse holder has been destroyed by the hot joint, the spring-loaded section of the fuse base came away with the fuse carrier when it was removed.
Fuseboards require periodic inspection and maintenance. Checking the tension of screws securing conductors and fuse holder spring tension should be part of maintenance procedures to prevent this type of incident from occurring.

The Fuseboard with the fuse indicated .

The fuse carrier removed with the spring-loaded section of the base still attached.

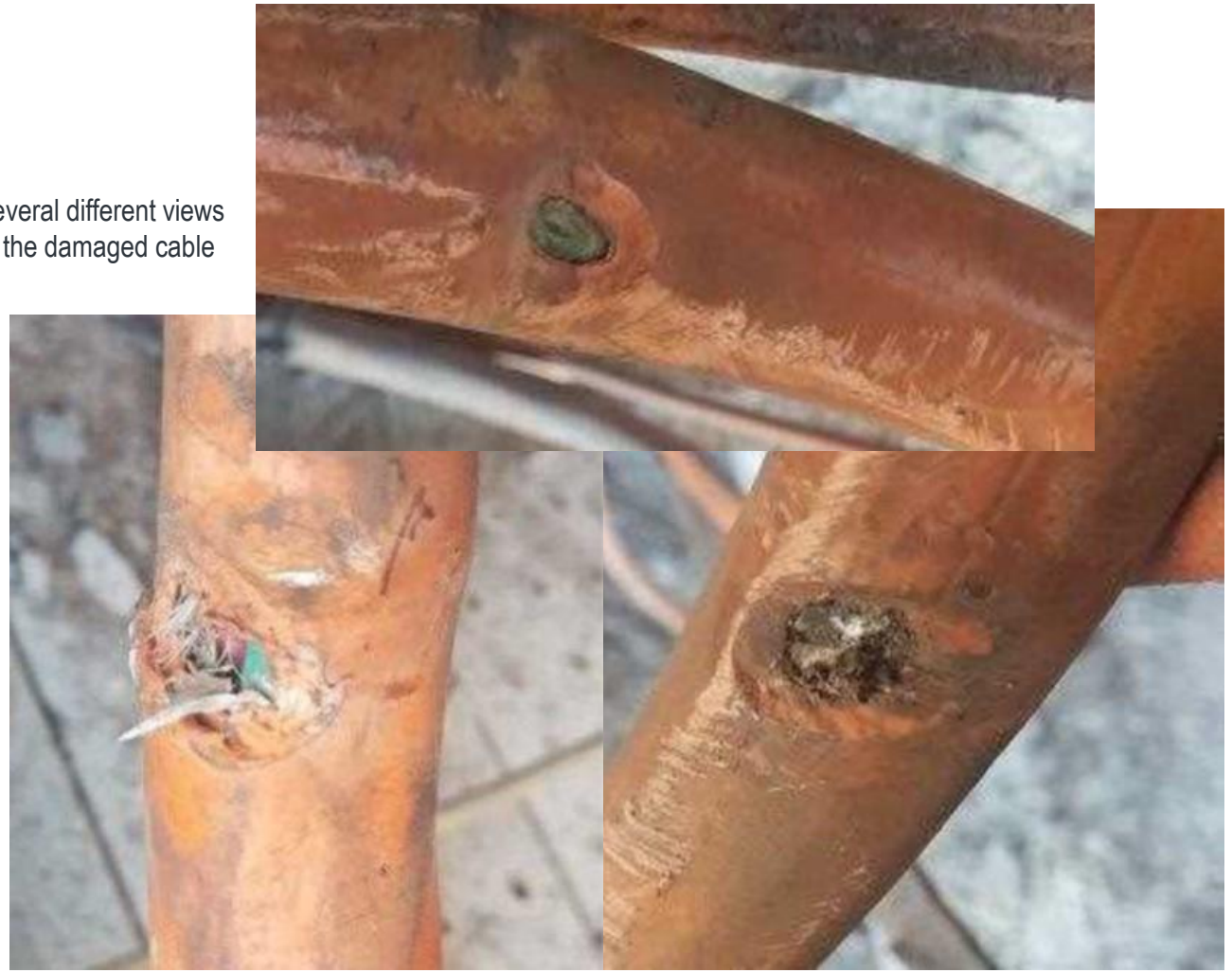
A close up of the burnt wire at the base of the fuse.

Significant damage was identified to insulation on a cable supplying a de-dusting fan motor when the motor and fan were removed for replacement. The cable sheath was worn through at points in contact with the cable rack exposing insulated cores, the earth core conductor was completely exposed. The cable rack was an old style construction featuring round bar support braces and the installation was subject to significant vibration from the fan and vibros operating below.
It's essential cables are installed with adequate support and protection for the operating environment. Cable racks and conductive parts supporting electrical equipment must be adequately earthed or equipotential bonded to restrict touch potential should insulation failure occur.



The disconnected motor cable with the round bar cable rack in the background which was used to support the cable

Several different views of the damaged cable



During isolation and Test Before You Touch verification of No.2 Grinder for a motor and drive upgrade an unpleasant discovery was found on the incoming power supply cables. An emancipated mouse was found across two of the phases which had been there quite a while.
Switchrooms and panel openings must be secured against vermin for reliable operation and to reduce fire risks.

A side view and top view of the main incomer terminations.

The Internals of the panel and cable terminations.