



Learning Event



WORKING WITH ELECTRICAL EQUIPMENT

HAZARD
Electrical
(low voltage)

**Contact
With Live
Electricity**

CONSEQUENCES
Actual: No harm to persons
Potential: This could have
caused a fatality

WHAT ARE YOU DOING TO PREVENT CONTACT WITH LIVE ELECTRICITY WHEN WORKING ON LOW VOLTAGE ELECTRICAL EQUIPMENT?

What Happened?

An arc flash occurred during de-isolation switching in a 690V switchboard for a hydraulic starter module. The arc flash was inside the lower area of the tier displacing the vent panel. The initial pre-trip current was approx. 500 amps and increased to approx. 17,000 amps during flash across the supply side of the fused isolator. The nearest person was in immediate proximity to the module. The arc did not make contact with any personnel.



Observed tin whisker growth from bus bar

Why did it Happen?

A phenomenon known as 'Tin Whiskers' contributed to the arc flash. Thin strands or whiskers grow from bus bars over time, effectively reducing the air gap between bus bars, providing an arc pathway.

Tin whiskers are electrically conductive, crystalline structures of tin that sometimes grow from surfaces where tin (especially electroplated tin) is used as a final finish. Tin whiskers have been observed to grow to lengths of several millimetres (mm) and in rare instances to lengths in excess of 10 mm. However, tin whiskers are generally reported to be less than 50 µm long.

Module bus bar clearances were found to meet the minimum standard (>8mm). However, the standard does not account for the possibility of 'Tin Whiskers'.



For more images see toolbox package

What did they Learn?

- Prior to de-isolation:
 - conduct 1000vDC Meggar testing for insulation resistance
 - clean bus bars to remove any 'Tin Whisker' growth
- Change-out high-risk modules with fully insulated bus bars.
- Update design specification to increase minimum air gap to account for 'Tin Whisker' risk.

IOGP Life-Saving Rules

- ✓ Identify all energy sources
- ✓ Confirm that the hazardous energy sources have been isolated, locked and tagged
- ✓ Check there is zero energy and test for residual or stored energy



Ask yourself or your Crew:

- What checks do you conduct during de-isolation of LV electrical equipment? Have you identified and reported any 'Tin Whisker' growth? Do you clean isolated bus bars to remove any 'Tin Whisker' growth?
- Does the design of your LV electrical equipment adequately account for 'Tin Whisker' risk?

Further information:

Safe Work
Australia –
Electrical Safety
Overview



CLICK ME

Click here to send us your feedback

or scan the code

