



Safety Advice 10-2002 (NZ)

PHASE TO PHASE CONTACT INCIDENT

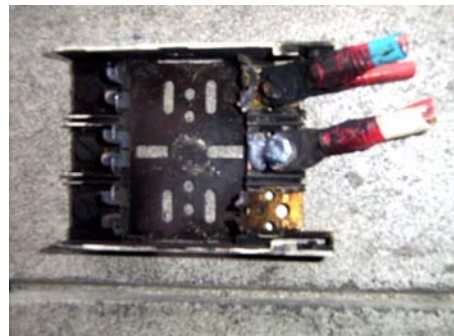
BACKGROUND

The job description was to terminate low voltage cables in a 3-phase service pillar, which involved securing cables to the Isolator ready for livening. An incident occurred involving two employees whilst replacing the original Isolator with a new one. During the operation, phase to phase contact occurred, injuring the faultman in charge to the degree that hospitalisation was required, and causing some eye aggravation to the assisting faultman.

INCIDENT DESCRIPTION

Lugs attached to the presumed red phase of the pillar installation moved across and connected with the presumed yellow phase causing a flashover and resultant energy release.

At the commencement of the job, the operator arrived on site and was expecting to meet the electrician as arranged. The electrician arrived shortly after and they discussed the installation of the new service cable. The operator realised that he required 2 x 35mm lugs and made a phone call to the depot for some lugs to be sent to site. Two lugs were delivered to the site and work commenced. Two of the three phases were connected to the de-energised side of the 160amp Isolator.

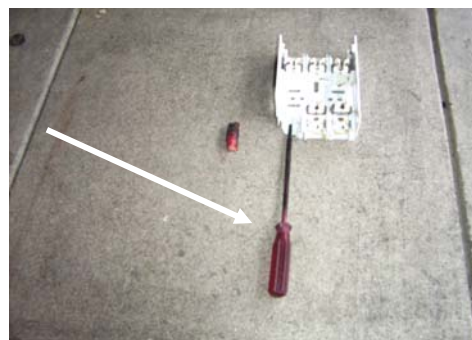


On connecting the third phase, over tightening occurred, causing the corner of the isolator to break off. A call was made to the depot for a replacement Isolator and one was dispatched to the site.

The broken isolator was removed and the phases separated. The replacement of the isolator then proceeded with the use of a socket set. A 13mm socket was used to re-connect the yellow and blue phases without incident to the isolator. All three phases had piggyback cables at the energised side connecting through to two sets of fuses.

Due to the limited space and obscured vision it was decided to use an **insulated screwdriver** to locate and mount the lugged cables onto the red phase at the isolator.

During this operation the bolt was difficult to locate and the lugs from the presumed red phase flicked across and made contact with the presumed yellow phase resulting in the phase to phase contact.





At this stage the operator was positioned in front of the pillar and his colleague standing to the side of the pillar.

Both workers were thrown clear of the pillar, with the operator sustaining superficial facial burns. His colleague sustained a slight burn to his right hand (due to an insulated glove partially melting to the skin) and a slight eye injury. Both required overnight hospitalisation. Safety eyewear was worn by both employees.

ANALYSIS

Direct Cause

Due to little room between the phases at the 160amp Isolator and no means of physical barrier protection between phases to prevent phase to phase contact, the opportunity was allowed for the lugs on the presumed red phase to make contact with the presumed yellow phase.

Contributing Factors

- Once the scope of the job changed from that of terminating the cables to the de-energised side of the Isolator, work should have ceased and a re-evaluation of the new hazards conducted. Upon Inspection of the Isolator, it would have been evident that a major possibility or probability of phase to phase contact existed. Once the hazard was recognised, a control measure such as LV matting would have prevented this occurrence.
- Due to the lack of room and the closeness of the phases within the isolator, the correct type of tools to be used and having them available at the time would have assisted. The use of a small-insulated screwdriver upon reflection was not the best option to secure the slotted hexagonal bolt at the isolator.
- Whilst the operator has many years of experience in the electrical industry, his and his assistant's ability to perform the work in question may not have been sufficient for a safe operation. An electrical jointer rather than a lineman/faultman may have been required.





RECOMMENDATIONS

1. A full face shield shall be worn when undertaking any work involving live LV pillars / pits.
2. Insulated tools shall be used when working on live LV pillars / pits.
3. Two operatives should perform all live work on pillars / pits.
4. LV rescue kit must be on site while live work is being performed.
5. Discussion with the manufacturer and distributor to explore the opportunity to redesign the 160amp Isolator to allow a physical separation between the phases.
6. All work on live equipment must be matted up as stated on the hazard I/D form NZ-HS-FORM-007.
7. In the event of the scope of work changing, all work must cease and a re-evaluation of the resultant risks undertaken and appropriate control measures put in place.
8. Work procedures revisited and any adjustments made to reflect best practice to be relayed back to the workforce concerned.