



Safety Advice 07-2002 (NZ)

LINE MAINTENANCE ON 110kV CIRCUIT

Introduction

This is advice of an electrical accident that may have relevance to other business units in the generation, transmission, distribution or other industries. The accident involved the opening of a ground mounted earth switch within a substation on a 110kV circuit being returned to service. The circuit was parallel to an in-service 110kV circuit.

Initial Accident Description

Line maintenance work was being carried out on one of the Masterton-Upper Hutt 110kV circuits. There are two parallel circuits running on the same towers. The Access Permit had been returned by the Line Maintenance Contractor to the Station Maintenance Contractor. The line work had been carried out by opening disconnectors at Masterton, Greytown and Upper Hutt, the line earth switch was closed at Masterton and work party earths applied.

The Station Maintenance Contractor employee was to then open the line earth at Masterton as part of restoring the circuit to service.

The employee had difficulty in opening the ground-mounted switch handle, which pulls downwards. In order to free the switch, the employee climbed to shoulder height on the structure supporting the switch handle in order to budge the switch. He appears to have been holding the operating rod with his left hand above the switch handle at the time he was pushing down on the switch operating handle with his foot.

When the switch opened he received an electric shock and was thrown several meters away from the switch, suffering physical injuries in addition to electrical burns.

The earth switch handle is bonded via a copper earth strap to a dedicated earth mat. This copper earth strap is also bonded to the lattice tower. The bottom of the operating rod is also bonded to the lattice tower, which is in turn bonded to the station earth mat.

Initial Loss Description

The employee suffered a broken pelvis, broken nose, lacerations to his face and lip, broken ankle, flash burns to his left ring finger, front thighs on each leg just below his crutch and to the outside of his right arm between his wrist and elbow. He is expected to be off work for 6 weeks.

Possible Causes

The precise causes are unknown at this stage and are being investigated. The electric shock may have occurred at the point when the earth switch just opened and he had placed himself outside the earth protection area provided for operating the earth switch.



Recommendations

Manual operation of earth switches or disconnectors within substations should only be carried out from the ground, standing on the appropriate pad provided. If a switch jams, then appropriate reports must be made and precautions taken before attempting other means to operate such switches.