

# ACCIDENT ALERT

## Electrocution — Welding in Wet Conditions

### The Situation

A welder was welding wear plates on the inside of a feeder chute. The weather was wet and humid and a tarpaulin cover had been used to keep the rain off. A helper passed the welder an electrode. Immediately afterwards the welder yelled for the welder lead to be pulled out. The helper had difficulty pulling the lead out and hauled the welder and lead out together from the chute. Despite efforts to save him, the unconscious welder died.

### Machinery

The welding machine was a MATCH model C. It was tested and found to be in good working order. It was properly earthed through its power lead and the work lead was properly isolated from the machine earth. The open circuit voltage of the welder was found to measure 78.8 volts. The welding leads were in good condition and the work leads were connected to the work in an appropriate location.

The welder was not wearing gloves. He was wearing rubber-soled boots but they offered little protection as his body was in contact with the chute.

### Cause of Fatality

It would appear the man was electrocuted when he went to change an electrode. Possible contributing factors to the severity of the shock are:

1. His body was in contact with the chute so his rubber-soled shoes did not protect him.
2. His clothes were wet and he was probably sweating.
3. He was not wearing welding gloves.

### The Hazard

An electric shock can be received when a person's body is in contact with any exposed part of the electrode holder circuit, including the electrode, and any metal connected to the work terminal.

The likelihood and severity of an electric shock are much greater when working in wet conditions.

Wet conditions in a confined area have the additional risk that other parts of the body other than the feet are more likely to be in touch with metal connected to the work terminal.

(Note: In this situation earth leakage protection does not help.)

### Precautions to Take

1. Whenever possible, avoid welding in wet conditions.  
  
Read the instruction manual supplied with the welder.  
  
Wear the right gear:
  - Safety footwear with insulating soles.
  - Make sure your clothes are dry — too many clothes can make you sweat which also increases the risk.
  - Outer clothing should be non-flammable. Wear dry leather welding gloves.
  - Whenever possible, stand on a dry surface. If necessary, use wooden duckboards or something similar.
  - Check equipment, particularly leads, regularly, to ensure insulation is not damaged.

2. When welding in wet conditions is unavoidable (also when welding in confined spaces):

- a) A helper, who is trained in resuscitation techniques, should keep the welder under constant observation.
- b) The helper should have a switch, adjacent to the work, so that he can cut off the current supply.
- c) An all-insulated electrode holder should be used.
- d) The output circuit should be de-energized:
  - i) Until the welder and helper are in position and the welder ready to weld.

- ii) While electrodes are being changed.

More complete information is available, from the following standards and publications:

- New Zealand Standard NZS 4781:1973  
This is an old standard and, in terms of electrical safety, will soon be joined by a New Zealand version of the Australian standard listed below.
- Australian Standard AS 1674.2 - 1990 *Safety in welding and allied processes - Part 2: Electrical*. A New Zealand issue of this standard will be issued soon.
- New Zealand Department of Labour Booklet — *Welding Safety*.